

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) U OF WI
 SNF ID #: 1035
 Fuel Units & Descr: 9 - ELEMENT
 Heavy Metal Mass: BOL=1.573kg EOL=1.573kg
 ROD Storage Site: INEEL

Fuel decay start date: 2035
 Estimates as of: 2010
 Template: TRIGA-FLIP (LW/U-Zr, SST, 60 to 100%, U)
 Template Burnup(MWd): 66.52
 Template BOL Heavy Metal Mass (MT): 0.000196
 Template Decay Time: 5 years

Estimated
 Canister usage
 18"x10"
 0.08

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8488E-10	59.32	118.64	0.00E+00	1.69E-08	3.38E-08	Avg MeV	
Am-241	7.5767E-03	59.32	118.64	0.00E+00	4.49E-01	8.99E-01	0.0150	1.914E+13
Am-242m	2.4459E-05	59.32	118.64	0.00E+00	1.45E-03	2.90E-03	0.0250	4.201E+12
Am-243	3.0983E-05	59.32	118.64	0.00E+00	1.84E-03	3.68E-03	0.0375	3.716E+12
C-14	1.2590E-04	59.32	118.64	0.00E+00	7.47E-03	1.49E-02	0.0575	3.709E+12
Cl-36	2.6624E-06	59.32	118.64	0.00E+00	1.58E-04	3.16E-04	0.0850	2.308E+12
Cm-243	3.8244E-05	59.32	118.64	0.00E+00	2.27E-03	4.54E-03	0.1250	1.853E+12
Cm-244	4.1010E-03	59.32	118.64	0.00E+00	2.43E-01	4.87E-01	0.2250	1.961E+12
Co-60	1.2410E+00	59.32	118.64	0.00E+00	7.36E+01	1.47E+02	0.3750	9.786E+11
Cs-134	6.5454E-01	59.32	118.64	0.00E+00	3.88E+01	7.77E+01	0.5750	1.620E+13
Cs-135	1.9753E-05	59.32	118.64	0.00E+00	1.17E-03	2.34E-03	0.8500	2.971E+12
Cs-137	2.7375E+00	59.32	118.64	0.00E+00	1.62E+02	3.25E+02	1.2500	1.141E+13
Eu-154	1.2324E-01	59.32	118.64	0.00E+00	7.31E+00	1.46E+01	1.7500	1.526E+10
Eu-155	5.3037E-02	59.32	118.64	0.00E+00	3.15E+00	6.29E+00	2.2500	1.196E+10
Fe-55	7.9555E-01	59.32	118.64	0.00E+00	4.72E+01	9.44E+01	2.7500	1.085E+08
H-3	1.0531E-02	59.32	118.64	0.00E+00	6.25E-01	1.25E+00	3.5000	1.277E+07
I-129	7.1287E-07	59.32	118.64	0.00E+00	4.23E-05	8.46E-05	5.0000	3.059E+03
Kr-85	2.4955E-01	59.32	118.64	0.00E+00	1.48E+01	2.96E+01	7.0000	3.520E+02
Np-237	1.2121E-05	59.32	118.64	0.00E+00	7.19E-04	1.44E-03	11.0000	4.039E+01
Pa-231	1.1230E-09	59.32	118.64	0.00E+00	6.66E-08	1.33E-07		
Pb-210	6.1636E-14	59.32	118.64	0.00E+00	3.66E-12	7.31E-12		
Pm-147	1.1302E+00	59.32	118.64	0.00E+00	6.70E+01	1.34E+02		
Pu-238	5.4826E-02	59.32	118.64	0.00E+00	3.25E+00	6.50E+00		
Pu-239	1.4056E-03	59.32	118.64	0.00E+00	8.34E-02	1.67E-01		
Pu-240	1.1536E-03	59.32	118.64	0.00E+00	6.84E-02	1.37E-01		
Pu-241	4.2995E-01	59.32	118.64	0.00E+00	2.55E+01	5.10E+01		
Pu-242	4.9910E-06	59.32	118.64	0.00E+00	2.96E-04	5.92E-04		
Ra-226	2.4008E-13	59.32	118.64	0.00E+00	1.42E-11	2.85E-11		
Ra-228	1.8220E-11	59.32	118.64	0.00E+00	1.08E-09	2.16E-09		
Ru-106	1.0343E-01	59.32	118.64	0.00E+00	6.14E+00	1.23E+01		
Se-79	1.2832E-05	59.32	118.64	0.00E+00	7.61E-04	1.52E-03		
Sn-126	1.2090E-05	59.32	118.64	0.00E+00	7.17E-04	1.43E-03		
Sr-90	2.5646E+00	59.32	118.64	0.00E+00	1.52E+02	3.04E+02		
Tc-99	4.0319E-04	59.32	118.64	0.00E+00	2.39E-02	4.78E-02		
Th-229	7.7375E-11	59.32	118.64	0.00E+00	4.59E-09	9.18E-09		
Th-230	1.2211E-10	59.32	118.64	0.00E+00	7.24E-09	1.45E-08		
Th-232	2.3842E-11	59.32	118.64	0.00E+00	1.41E-09	2.83E-09		
Th-208	1.4313E-07	59.32	118.64	0.00E+00	8.49E-06	1.70E-05		
U-232	4.1927E-07	59.32	118.64	0.00E+00	2.49E-05	4.97E-05		
U-233	6.8491E-08	59.32	118.64	0.00E+00	4.06E-06	8.13E-06		
U-234	2.0189E-06	59.32	118.64	0.00E+00	1.20E-04	2.40E-04		
U-235	-2.6572E-06	59.32	0.00	2.38E-03	2.22E-03	2.38E-03		
U-236	1.3575E-05	59.32	118.64	0.00E+00	8.05E-04	1.61E-03		
U-238	-2.2698E-08	59.32	0.00	1.59E-04	1.58E-04	1.59E-04		
Y-90	2.5646E+00	59.32	118.64	0.00E+00	1.52E+02	3.04E+02		
Other Radionuclides					2.11E+02	4.23E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	69.93004832	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	59.32		
Bounding		118.64	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.11	0.00	
Bounding	0.22		0.96

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) UNIV OF WISCONSIN
 SNF ID #: 242
 Fuel Units & Descr: 92 - ELEMENT
 Heavy Metal Mass: BOL=18 032kg; EOL=15.53kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 Estimates as of: 2010
 Template: TRIGA-FLIP (LW/U-Zr, SST, 60 to 100%, U)
²Template Burnup(MWd): 66 52
 Template BOL Heavy Metal Mass (MT) 0 000196
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0 83

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CvMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2 8488E-10	2,378 33	4,756 66	0 00E+00	6 78E-07	1 36E-06	Avg MeV	
Am-241	7 5767E-03	2,378 33	4,756 66	0 00E+00	1 80E+01	3 60E+01	0 0150	7 675E+14
Am-242m	2 4459E-05	2,378 33	4,756 66	0 00E+00	5 82E-02	1 16E-01	0 0250	1 684E+14
Am-243	3 0983E-05	2,378 33	4,756 66	0 00E+00	7 37E-02	1 47E-01	0 0375	1 490E+14
C-14	1 2590E-04	2,378 33	4,756 66	0 00E+00	2 99E-01	5 99E-01	0 0575	1 487E+14
Cl-36	2 6624E-06	2,378 33	4,756 66	0 00E+00	6 33E-03	1 27E-02	0 0850	9 252E+13
Cm-243	3 8244E-05	2,378 33	4,756 66	0 00E+00	9 10E-02	1 82E-01	0 1250	7 429E+13
Cm-244	4 1010E-03	2,378 33	4,756 66	0 00E+00	9 75E+00	1 95E+01	0 2250	7 863E+13
Co-60	1 2410E+00	2,378 33	4,756 66	0 00E+00	2 95E+03	5 90E+03	0 3750	3 923E+13
Cs-134	6 5454E-01	2,378 33	4,756 66	0 00E+00	1 56E+03	3 11E+03	0 5750	6 493E+14
Cs-135	1 9753E-05	2,378 33	4,756 66	0 00E+00	4 70E-02	9 40E-02	0 8500	1 191E+14
Cs-137	2 7375E+00	2,378 33	4,756 66	0 00E+00	6 51E+03	1 30E+04	1 2500	4 575E+14
Eu-154	1 2324E-01	2,378 33	4,756 66	0 00E+00	2 93E+02	5 86E+02	1 7500	6 120E+11
Eu-155	5 3037E-02	2,378 33	4,756 66	0 00E+00	1 26E+02	2 52E+02	2 2500	4 797E+11
Fe-55	7 9555E-01	2,378 33	4,756 66	0 00E+00	1 89E+03	3 78E+03	2 7500	4 349E+09
H-3	1 0531E-02	2,378 33	4,756 66	0 00E+00	2 50E+01	5 01E+01	3 5000	5 118E+08
I-129	7 1287E-07	2,378 33	4,756 66	0 00E+00	1 70E-03	3 39E-03	5 0000	1 226E+05
Kr-85	2 4955E-01	2,378 33	4,756 66	0 00E+00	5 94E+02	1 19E+03	7 0000	1 411E+04
Np-237	1 2121E-05	2,378 33	4,756 66	0 00E+00	2 88E-02	5 77E-02	11 0000	1 619E+03
Pa-231	1 1230E-09	2,378 33	4,756 66	0 00E+00	2 67E-06	5 34E-06		
Pb-210	6 1636E-14	2,378 33	4,756 66	0 00E+00	1 47E-10	2 93E-10		
Pm-147	1 1302E+00	2,378 33	4,756 66	0 00E+00	2 69E+03	5 38E+03		
Pu-238	5 4826E-02	2,378 33	4,756 66	0 00E+00	1 30E+02	2 61E+02		
Pu-239	1 4056E-03	2,378 33	4,756 66	0 00E+00	3 34E+00	6 69E+00		
Pu-240	1 1536E-03	2,378 33	4,756 66	0 00E+00	2 74E+00	5 49E+00		
Pu-241	4 2995E-01	2,378 33	4,756 66	0 00E+00	1 02E+03	2 05E+03		
Pu-242	4 9910E-06	2,378 33	4,756 66	0 00E+00	1 19E-02	2 37E-02		
Ra-226	2 4008E-13	2,378 33	4,756 66	0 00E+00	5 71E-10	1 14E-09		
Ra-228	1 8220E-11	2,378 33	4,756 66	0 00E+00	4 33E-08	8 67E-08		
Ru-106	1 0343E-01	2,378 33	4,756 66	0 00E+00	2 46E+02	4 92E+02		
Se-79	1 2832E-05	2,378 33	4,756 66	0 00E+00	3 05E-02	6 10E-02		
Sn-126	1 2090E-05	2,378 33	4,756 66	0 00E+00	2 88E-02	5 75E-02		
Sr-90	2 5646E+00	2,378 33	4,756 66	0 00E+00	6 10E+03	1 22E+04		
Tc-99	4 0319E-04	2,378 33	4,756 66	0 00E+00	9 59E-01	1 92E+00		
Th-229	7 7375E-11	2,378 33	4,756 66	0 00E+00	1 84E-07	3 68E-07		
Th-230	1 2211E-10	2,378 33	4,756 66	0 00E+00	2 90E-07	5 81E-07		
Th-232	2 3842E-11	2,378 33	4,756 66	0 00E+00	5 67E-08	1 13E-07		
Ti-208	1 4313E-07	2,378 33	4,756 66	0 00E+00	3 40E-04	6 81E-04		
U-232	4 1927E-07	2,378 33	4,756 66	0 00E+00	9 97E-04	1 99E-03		
U-233	6 8491E-08	2,378 33	4,756 66	0 00E+00	1 63E-04	3 26E-04		
U-234	2 0189E-06	2,378 33	4,756 66	0 00E+00	4 80E-03	9 60E-03		
U-235	-2 6572E-06	2,378 33	0 00	2 72E-02	2 09E-02	2 72E-02		
U-238	1 3575E-05	2,378 33	4,756 66	0 00E+00	3 23E-02	6 46E-02		
U-238	-2 2698E-08	2,378 33	0 00	1 82E-03	1 77E-03	1 82E-03		
Y-90	2 5646E+00	2,378 33	4,756 66	0 00E+00	6 10E+03	1 22E+04		
Other Radionuclides					8 47E+03	1 69E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1 56E+02	3 12E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	69 89795918	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	509 96	2 378 33	
Bounding:		4 756 66	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 39	4 66	
Bounding	0 78		1 00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA (FLIP) WSU
SNF ID # 243
Fuel Units & Descr 78 - ELEMENT
Heavy Metal Mass BOL=15.288kg EOL=13.291kg
ROD Storage Site INEEL

¹Fuel decay start date 2035
Estimates as of 2010
Template TRIGA FLIP (LW/U-Zr SST, 60 to 100%, U)
²Template Burnup(MWd) 66.52
Template BOL Heavy Metal Mass (MT): 0.000196
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.70

II. Estimates							Gamma Sources	
	m	x _n	x _b	b	y _n	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	2.8488E-10	1,897.80	3,795.60	0.00E+00	5.41E-07	1.08E-06	0.0150	6.124E+14
Am-241	7.5767E-03	1,897.80	3,795.60	0.00E+00	1.44E+01	2.88E+01	0.0250	1.344E+14
Am-242m	2.4459E-05	1,897.80	3,795.60	0.00E+00	4.64E-02	9.28E-02	0.0375	1.189E+14
Am-243	3.0983E-05	1,897.80	3,795.60	0.00E+00	5.88E-02	1.18E-01	0.0575	1.186E+14
C-14	1.2590E-04	1,897.80	3,795.60	0.00E+00	2.39E-01	4.78E-01	0.0850	7.383E+13
Cf-252	2.6624E-06	1,897.80	3,795.60	0.00E+00	5.05E-03	1.01E-02	0.1250	5.928E+13
Cm-243	3.8244E-05	1,897.80	3,795.60	0.00E+00	7.26E-02	1.45E-01	0.2250	6.274E+13
Cm-244	4.1010E-03	1,897.80	3,795.60	0.00E+00	7.78E+00	1.56E+01	0.3750	3.131E+13
Co-60	1.2410E+00	1,897.80	3,795.60	0.00E+00	2.36E+03	4.71E+03	0.5750	5.181E+14
Cs-134	6.5454E-01	1,897.80	3,795.60	0.00E+00	1.24E+03	2.48E+03	0.8500	9.505E+13
Cs-135	1.9753E-05	1,897.80	3,795.60	0.00E+00	3.75E-02	7.50E-02	1.2500	3.651E+14
Cs-137	2.7375E+00	1,897.80	3,795.60	0.00E+00	5.20E+03	1.04E+04	1.7500	4.883E+11
Eu-154	1.2324E-01	1,897.80	3,795.60	0.00E+00	2.34E+02	4.68E+02	2.2500	3.828E+13
Eu-155	5.3037E-02	1,897.80	3,795.60	0.00E+00	1.01E+02	2.01E+02	2.7500	3.470E+09
Fe-55	7.9555E-01	1,897.80	3,795.60	0.00E+00	1.51E+03	3.02E+03	3.5000	4.084E+08
H-3	1.0531E-02	1,897.80	3,795.60	0.00E+00	2.00E+01	4.00E+01	5.0000	9.784E+04
I-129	7.1287E-07	1,897.80	3,795.60	0.00E+00	1.35E-03	2.71E-03	7.0000	1.126E+04
Kr-85	2.4955E-01	1,897.80	3,795.60	0.00E+00	4.74E+02	9.47E+02	11.0000	1.292E+03
Np-237	1.2121E-05	1,897.80	3,795.60	0.00E+00	2.30E-02	4.60E-02		
Pa-231	1.1230E-09	1,897.80	3,795.60	0.00E+00	2.13E-06	4.26E-06		
Pb-210	6.1636E-14	1,897.80	3,795.60	0.00E+00	1.17E-10	2.34E-10		
Pm-147	1.1302E+00	1,897.80	3,795.60	0.00E+00	2.14E+03	4.29E+03		
Pu-238	5.4826E-02	1,897.80	3,795.60	0.00E+00	1.04E+02	2.08E+02		
Pu-239	1.4056E-03	1,897.80	3,795.60	0.00E+00	2.67E+00	5.34E+00		
Pu-240	1.1536E-03	1,897.80	3,795.60	0.00E+00	2.19E+00	4.38E+00		
Pu-241	4.2995E-01	1,897.80	3,795.60	0.00E+00	8.16E+02	1.63E+03		
Pu-242	4.9910E-06	1,897.80	3,795.60	0.00E+00	9.47E-03	1.89E-02		
Ra-226	2.4008E-13	1,897.80	3,795.60	0.00E+00	4.56E-10	9.11E-10		
Ra-228	1.8220E-11	1,897.80	3,795.60	0.00E+00	3.46E-08	6.92E-08		
Ru-106	1.0343E-01	1,897.80	3,795.60	0.00E+00	1.96E+02	3.93E+02		
Se-79	1.2832E-05	1,897.80	3,795.60	0.00E+00	2.44E-02	4.87E-02		
Sn-126	1.2090E-05	1,897.80	3,795.60	0.00E+00	2.29E-02	4.59E-02		
Sr-90	2.5646E+00	1,897.80	3,795.60	0.00E+00	4.87E+03	9.73E+03		
Tc-99	4.0319E-04	1,897.80	3,795.60	0.00E+00	7.65E-01	1.53E+00		
Th-229	7.7375E-11	1,897.80	3,795.60	0.00E+00	1.47E-07	2.94E-07		
Th-230	1.2211E-10	1,897.80	3,795.60	0.00E+00	2.32E-07	4.63E-07		
Th-232	2.3842E-11	1,897.80	3,795.60	0.00E+00	4.52E-08	9.05E-08		
Ti-208	1.4313E-07	1,897.80	3,795.60	0.00E+00	2.72E-04	5.43E-04		
U-232	4.1927E-07	1,897.80	3,795.60	0.00E+00	7.96E-04	1.59E-03		
U-233	6.8491E-08	1,897.80	3,795.60	0.00E+00	1.30E-04	2.60E-04		
U-234	2.0189E-06	1,897.80	3,795.60	0.00E+00	3.83E-03	7.66E-03		
U-235	2.6572E-06	1,897.80	0.00	2.31E-02	1.81E-02	2.31E-02		
U-236	1.3575E-05	1,897.80	3,795.60	0.00E+00	2.58E-02	5.15E-02		
U-238	2.2698E-08	1,897.80	0.00	1.54E-03	1.50E-03	1.54E-03		
Y-90	2.5646E+00	1,897.80	3,795.60	0.00E+00	4.87E+03	9.73E+03		
Other Radionuclides					6.76E+03	1.35E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	70	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal	432.36	1,897.80	
Bounding		3,795.60	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.37	4.39	
Bounding	0.73		1.00

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (HIGH POWER) (HEU)
 SNF ID #: 998
 Fuel Units & Descr: 4 - ELEMENT
 Heavy Metal Mass: BOL=0 117kg; EOL=0 117kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1970
 Estimates as of: 2010
 Template: TRIGA-FLIP (LW/U-Zr, SST, 60 to 100%, U)
²Template Burnup(MWd): 66 52
 Template BOL Heavy Metal Mass (MT): 0 000196
 Template Decay Time: 35 years

Estimated
 Canister usage
 18"x10"
 0 05

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 5469E-09	2 22	4 44	0 00E+00	3 43E-09	6 87E-09	Avg. MeV	
Am-241	1 6326E-02	2 22	4 44	0 00E+00	3 62E-02	7 25E-02	0 0150	3 071E+11
Am-242m	2 1332E-05	2 22	4 44	0 00E+00	4 74E-05	9 47E-05	0 0250	6 351E+10
Am-243	3 0893E-05	2 22	4 44	0 00E+00	6 86E-05	1 37E-04	0 0375	5 580E+10
C-14	1 2544E-04	2 22	4 44	0 00E+00	2 78E-04	5 57E-04	0 0575	6 022E+10
Cl-36	2 6624E-06	2 22	4 44	0 00E+00	5 91E-06	1 18E-05	0 0850	3 576E+10
Cm-243	1 8446E-05	2 22	4 44	0 00E+00	4 10E-05	8 19E-05	0 1250	2 389E+10
Cm-244	1 3020E-03	2 22	4 44	0 00E+00	2 89E-03	5 78E-03	0 2250	3 089E+10
Co-60	2 4053E-02	2 22	4 44	0 00E+00	5 34E-02	1 07E-01	0 3750	1 342E+10
Cs-134	2 7480E-05	2 22	4 44	0 00E+00	6 10E-05	1 22E-04	0 5750	2 264E+11
Cs-135	1 9738E-05	2 22	4 44	0 00E+00	4 38E-05	8 76E-05	0 8500	3 039E+09
Cs-137	1 3692E+00	2 22	4 44	0 00E+00	3 04E+00	6 08E+00	1 2500	9 577E+09
Eu-154	1 1001E-02	2 22	4 44	0 00E+00	2 44E-02	4 88E-02	1 7500	8 452E+07
Eu-155	8 0292E-04	2 22	4 44	0 00E+00	1 78E-03	3 57E-03	2 2500	4 822E+04
Fe-55	2 6894E-04	2 22	4 44	0 00E+00	5 97E-04	1 19E-03	2 7500	2 009E+04
H-3	1 9573E-03	2 22	4 44	0 00E+00	4 35E-03	8 69E-03	3 5000	9 161E+01
I-129	7 1287E-07	2 22	4 44	0 00E+00	1 58E-06	3 17E-06	5 0000	3 897E+01
Kr-85	3 5914E-02	2 22	4 44	0 00E+00	7 97E-02	1 59E-01	7 0000	4 467E+00
Np-237	1 2294E-05	2 22	4 44	0 00E+00	2 73E-05	5 46E-05	11 0000	5 115E-01
Pa-231	2 6383E-09	2 22	4 44	0 00E+00	5 86E-09	1 17E-08		
Pb-210	4 4648E-12	2 22	4 44	0 00E+00	9 91E-12	1 98E-11		
Pm-147	4 1025E-04	2 22	4 44	0 00E+00	9 11E-04	1 82E-03		
Pu-238	4 3265E-02	2 22	4 44	0 00E+00	9 61E-02	1 92E-01		
Pu-239	1 4044E-03	2 22	4 44	0 00E+00	3 12E-03	6 24E-03		
Pu-240	1 1563E-03	2 22	4 44	0 00E+00	2 57E-03	5 13E-03		
Pu-241	1 0156E-01	2 22	4 44	0 00E+00	2 25E-01	4 51E-01		
Pu-242	4 9910E-06	2 22	4 44	0 00E+00	1 11E-05	2 22E-05		
Ra-226	1 4301E-11	2 22	4 44	0 00E+00	3 18E-11	6 35E-11		
Ra-228	2 3767E-11	2 22	4 44	0 00E+00	5 28E-11	1 06E-10		
Ru-106	1 1521E-10	2 22	4 44	0 00E+00	2 56E-10	5 12E-10		
Se-79	1 2828E-05	2 22	4 44	0 00E+00	2 85E-05	5 70E-05		
Sn-126	1 2088E-05	2 22	4 44	0 00E+00	2 68E-05	5 37E-05		
Sr-90	1 2560E+00	2 22	4 44	0 00E+00	2 79E+00	5 58E+00		
Tc-99	4 0319E-04	2 22	4 44	0 00E+00	8 95E-04	1 79E-03		
Th-229	3 3915E-10	2 22	4 44	0 00E+00	7 53E-10	1 51E-09		
Th-230	1 8175E-09	2 22	4 44	0 00E+00	4 04E-09	8 07E-09		
Th-232	2 3873E-11	2 22	4 44	0 00E+00	5 30E-11	1 06E-10		
Th-208	1 2736E-07	2 22	4 44	0 00E+00	2 83E-07	5 66E-07		
U-232	3 4501E-07	2 22	4 44	0 00E+00	7 66E-07	1 53E-06		
U-233	7 0610E-08	2 22	4 44	0 00E+00	1 57E-07	3 14E-07		
U-234	7 1407E-06	2 22	4 44	0 00E+00	1 59E-05	3 17E-05		
U-235	-2 6572E-06	2 22	0 00	2 35E-04	2 29E-04	2 35E-04		
U-236	1 3576E-05	2 22	4 44	0 00E+00	3 01E-05	6 03E-05		
U-238	-2 2698E-08	2 22	0 00	2 69E-06	2 64E-06	2 69E-06		
Y-90	1 2563E+00	2 22	4 44	0 00E+00	2 79E+00	5 58E+00		
Other Radionuclides					3 00E+00	6 01E+00		

Thermal Power
 Nominal Heat Output (Watts)
 Bounding Heat Output (Watts)
 3 93E-02 7 85E-02
 Total Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	This Template was used for the following reasons.
Fuel Cladding	INCOLOY	SST	This fuel matches on all parameters except cladding (SST is conservative)
BOL HM Constituents	U	U	
BOL Enrichment %	93 152	60 to 100	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		2 22	Nominal burnup assumed to be 2% of BOL heavy metal mass
Bounding		4 44	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0 06		0 98
Bounding	0 11		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (HIGH POWER) ROMANIA
SNF ID #: 302
Fuel Units & Descr: 611 - ELEMENT
Heavy Metal Mass: BOL=27.067kg EOL=13 992kg
ROD Storage Site: INEEL

Fuel decay start date: 1978
Estimates as of: 2010
Template: TRIGA-FLIP (LW/U-Zr, SST, 60 to 100% U)
Template Burnup (MWd): 66.52
Template BOL Heavy Metal Mass (MT): 0.000196
Template Decay Time: 25 years

Estimated
Canister usage
18"x10"
5.50

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0386E-09	12,427.12	24,854.25	0.00E+00	1.29E-05	2.58E-05	Avg MeV	
Am-241	1.4973E-02	12,427.12	24,854.25	0.00E+00	1.86E+02	3.72E+02	0.0150	2.185E+15
Am-242m	2.2324E-05	12,427.12	24,854.25	0.00E+00	2.77E-01	5.55E-01	0.0250	4.523E+14
Am-243	3.0923E-05	12,427.12	24,854.25	0.00E+00	3.84E-01	7.69E-01	0.0375	3.975E+14
C-14	1.2559E-04	12,427.12	24,854.25	0.00E+00	1.56E+00	3.12E+00	0.0575	4.271E+14
Cl-36	2.6624E-06	12,427.12	24,854.25	0.00E+00	3.31E-02	6.62E-02	0.0850	2.550E+14
Cm-243	2.3527E-05	12,427.12	24,854.25	0.00E+00	2.92E-01	5.85E-01	0.1250	1.741E+14
Cm-244	1.9092E-03	12,427.12	24,854.25	0.00E+00	2.37E+01	4.75E+01	0.2250	2.203E+14
Co-60	8.9552E-02	12,427.12	24,854.25	0.00E+00	1.11E+03	2.23E+03	0.3750	9.561E+13
Cs-134	7.9074E-04	12,427.12	24,854.25	0.00E+00	9.83E+00	1.97E+01	0.5750	1.598E+15
Cs-135	1.9753E-05	12,427.12	24,854.25	0.00E+00	2.45E-01	4.91E-01	0.8500	2.686E+13
Cs-137	1.7243E+00	12,427.12	24,854.25	0.00E+00	2.14E+04	4.29E+04	1.2500	1.818E+14
Eu-154	2.4609E-02	12,427.12	24,854.25	0.00E+00	3.06E+02	6.12E+02	1.7500	7.549E+11
Eu-155	3.2456E-03	12,427.12	24,854.25	0.00E+00	4.03E+01	8.07E+01	2.2500	9.182E+08
Fe-55	3.8605E-03	12,427.12	24,854.25	0.00E+00	4.80E+01	9.59E+01	2.7500	1.256E+08
H-3	3.4305E-03	12,427.12	24,854.25	0.00E+00	4.26E+01	8.53E+01	3.5000	7.303E+05
I-129	7.1287E-07	12,427.12	24,854.25	0.00E+00	8.86E-03	1.77E-02	5.0000	3.100E+05
Kr-85	6.8536E-02	12,427.12	24,854.25	0.00E+00	8.52E+02	1.70E+03	7.0000	3.559E+04
Np-237	1.2219E-06	12,427.12	24,854.25	0.00E+00	1.52E-01	3.04E-01	11.0000	4.079E+03
Pa-231	2.0701E-09	12,427.12	24,854.25	0.00E+00	2.57E-05	5.14E-05		
Pb-210	1.3279E-12	12,427.12	24,854.25	0.00E+00	1.65E-08	3.30E-08		
Pm-147	5.7517E-03	12,427.12	24,854.25	0.00E+00	7.15E+01	1.43E+02		
Pu-238	4.6828E-02	12,427.12	24,854.25	0.00E+00	5.82E+02	1.16E+03		
Pu-239	1.4048E-03	12,427.12	24,854.25	0.00E+00	1.75E+01	3.49E+01		
Pu-240	1.1563E-03	12,427.12	24,854.25	0.00E+00	1.44E+01	2.87E+01		
Pu-241	1.6431E-01	12,427.12	24,854.25	0.00E+00	2.04E+03	4.08E+03		
Pu-242	4.9910E-06	12,427.12	24,854.25	0.00E+00	6.20E-02	1.24E-01		
Ra-226	5.4390E-12	12,427.12	24,854.25	0.00E+00	6.76E-08	1.35E-07		
Ra-228	2.3437E-11	12,427.12	24,854.25	0.00E+00	2.91E-07	5.82E-07		
Ru-106	1.1115E-07	12,427.12	24,854.25	0.00E+00	1.38E-03	2.76E-03		
Se-79	1.2829E-05	12,427.12	24,854.25	0.00E+00	1.59E-01	3.19E-01		
Sn-126	1.2088E-05	12,427.12	24,854.25	0.00E+00	1.50E-01	3.00E-01		
Sr-90	1.5935E+00	12,427.12	24,854.25	0.00E+00	1.98E+04	3.96E+04		
Tc-99	4.0319E-04	12,427.12	24,854.25	0.00E+00	5.01E+00	1.00E+01		
Th-229	2.4023E-10	12,427.12	24,854.25	0.00E+00	2.99E-06	5.97E-06		
Th-230	9.6948E-10	12,427.12	24,854.25	0.00E+00	1.20E-05	2.41E-05		
Th-232	2.3857E-11	12,427.12	24,854.25	0.00E+00	2.96E-07	5.93E-07		
Ti-208	1.3982E-07	12,427.12	24,854.25	0.00E+00	1.74E-03	3.48E-03		
U-232	3.7943E-07	12,427.12	24,854.25	0.00E+00	4.72E-03	9.43E-03		
U-233	6.9814E-08	12,427.12	24,854.25	0.00E+00	8.68E-04	1.74E-03		
U-234	5.4059E-06	12,427.12	24,854.25	0.00E+00	6.72E-02	1.34E-01		
U-235	-2.6572E-06	12,427.12	0.00	5.45E-02	2.15E-02	5.45E-02		
U-236	1.3576E-05	12,427.12	24,854.25	0.00E+00	1.69E-01	3.37E-01		
U-238	-2.2698E-08	12,427.12	0.00	6.24E-04	3.42E-04	6.24E-04		
Y-90	1.5935E+00	12,427.12	24,854.25	0.00E+00	1.98E+04	3.96E+04		
Other Radionuclides					2.11E+04	4.21E+04		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
Reactor Moderator	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding	INCOLOY	SST	This Template was used for the following reasons: This fuel matches on all parameters except cladding (SST is conservative)
BOL HM Constituents	U	U	
BOL Enrichment %	93.14	60 to 100	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated 12,427.12	
Bounding		24,854.25	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier 1.35	Estimated Burnup/ Given Burnup	
Bounding	2.71		1.00

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (HIGH POWER) ROMANIA
SNF ID #: 930
Fuel Units & Descr: 267 - ELEMENT
Heavy Metal Mass: BOL=11 828kg; EOL=5 58kg
ROD Storage Site: INEEL

Fuel decay start date: 1999
Estimates as of: 2010
Template: TRIGA-FLIP (LW/U-Zr, SST, 60 to 100%, U)
Template Burnup(MWd): 66 52
Template BOL Heavy Metal Mass (MT): 0.000196
Template Decay Time: 10 years

Estimated
Canister usage:
18"x10"
2 41

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.2243E-10	5,938 04	11,241 67	0 00E+00	2 51E-06	4.75E-06	Avg MeV	
Am-241	9 9143E-03	5,938 04	11,241 67	0 00E+00	5 89E+01	1 11E+02	0 0150	1 441E+15
Am-242m	2 3903E-05	5,938 04	11,241 67	0 00E+00	1 42E-01	2 69E-01	0 0250	3 043E+14
Am-243	3 0968E-05	5,938 04	11,241 67	0 00E+00	1 84E-01	3 48E-01	0 0375	2 682E+14
C-14	1 2581E-04	5,938 04	11,241 67	0 00E+00	7 47E-01	1 41E+00	0 0575	2 797E+14
Cl-36	2 6624E-06	5,938 04	11,241 67	0 00E+00	1 58E-02	2 99E-02	0 0850	1 696E+14
Cm-243	3 3870E-05	5,938 04	11,241 67	0 00E+00	2 01E-01	3 81E-01	0 1250	1 232E+14
Cm-244	3 3870E-03	5,938 04	11,241 67	0 00E+00	2 01E+01	3 81E+01	0 2250	1 454E+14
Co-60	6 4311E-01	5,938 04	11,241 67	0 00E+00	3 82E+03	7 23E+03	0 3750	6 592E+13
Cs-134	1 2201E-01	5,938 04	11,241 67	0 00E+00	7 24E+02	1 37E+03	0 5750	1 094E+15
Cs-135	1 9753E-05	5,938 04	11,241 67	0 00E+00	1 17E-01	2 22E-01	0 8500	7 118E+13
Cs-137	2 4384E+00	5,938 04	11,241 67	0 00E+00	1 45E+04	2 74E+04	1 2500	5 594E+14
Eu-154	8 2396E-02	5,938 04	11,241 67	0 00E+00	4 89E+02	9 26E+02	1 7500	8 067E+11
Eu-155	2 6383E-02	5,938 04	11,241 67	0 00E+00	1 57E+02	2 97E+02	2 2500	1 733E+10
Fe-55	2 1001E-01	5,938 04	11,241 67	0 00E+00	1 25E+03	2 36E+03	2 7500	3 770E+08
H-3	7 9555E-03	5,938 04	11,241 67	0 00E+00	4 72E+01	8 94E+01	3 5000	3 948E+07
I-129	7 1287E-07	5,938 04	11,241 67	0 00E+00	4 23E-03	8 01E-03	5 0000	2 409E+05
Kr-85	1 8070E-01	5,938 04	11,241 67	0 00E+00	1 07E+03	2 03E+03	7 0000	2 772E+04
Np-237	1 2135E-05	5,938 04	11,241 67	0 00E+00	7 21E-02	1 36E-01	11 0000	3 180E+03
Pa-231	1 3125E-09	5,938 04	11,241 67	0 00E+00	7 79E-06	1 48E-05		
Pb-210	1 1201E-13	5,938 04	11,241 67	0 00E+00	6 65E-10	1 26E-09		
Pm-147	3 0186E-01	5,938 04	11,241 67	0 00E+00	1 79E+03	3 39E+03		
Pu-238	5 2706E-02	5,938 04	11,241 67	0 00E+00	3 13E+02	5 93E+02		
Pu-239	1 4054E-03	5,938 04	11,241 67	0 00E+00	8 35E+00	1 58E+01		
Pu-240	1 1545E-03	5,938 04	11,241 67	0 00E+00	6 86E+00	1 30E+01		
Pu-241	3 3809E-01	5,938 04	11,241 67	0 00E+00	2 01E+03	3 80E+03		
Pu-242	4 9910E-06	5,938 04	11,241 67	0 00E+00	2 96E-02	5 61E-02		
Ra-226	6 1395E-13	5,938 04	11,241 67	0 00E+00	3 65E-09	6 90E-09		
Ra-228	2 0490E-11	5,938 04	11,241 67	0 00E+00	1 22E-07	2 30E-07		
Ru-106	3 3298E-03	5,938 04	11,241 67	0 00E+00	1 98E+01	3 74E+01		
Se-79	1 2831E-05	5,938 04	11,241 67	0 00E+00	7 62E-02	1 44E-01		
Sn-126	1 2090E-05	5,938 04	11,241 67	0 00E+00	7 18E-02	1 36E-01		
Sr-90	2 2760E+00	5,938 04	11,241 67	0 00E+00	1 35E+04	2 56E+04		
Tc-99	4 0319E-04	5,938 04	11,241 67	0 00E+00	2 39E+00	4 53E+00		
Th-229	1 0973E-10	5,938 04	11,241 67	0 00E+00	6 52E-07	1 23E-06		
Th-230	2 2940E-10	5,938 04	11,241 67	0 00E+00	1 36E-06	2 58E-06		
Th-232	2 3842E-11	5,938 04	11,241 67	0 00E+00	1 42E-07	2 68E-07		
Th-208	1 4857E-07	5,938 04	11,241 67	0 00E+00	8 82E-04	1 67E-03		
U-232	4 1927E-07	5,938 04	11,241 67	0 00E+00	2 49E-03	4 71E-03		
U-233	6 8746E-08	5,938 04	11,241 67	0 00E+00	4 08E-04	7 73E-04		
U-234	2 7511E-06	5,938 04	11,241 67	0 00E+00	1 63E-02	3 09E-02		
U-235	-2 6572E-06	5,938 04	0 00	2 38E-02	8 03E-03	2 38E-02		
U-236	1 3575E-05	5,938 04	11,241 67	0 00E+00	8 06E-02	1 53E-01		
U-238	-2 2698E-08	5,938 04	0 00	2 72E-04	1 38E-04	2 72E-04		
Y-90	2 2775E+00	5,938 04	11,241 67	0 00E+00	1 35E+04	2 56E+04		
Other Radionuclides					1 44E+04	2 72E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	This Template was used for the following reasons: This fuel matches on all parameters except cladding (SST is conservative).
Fuel Cladding	INCOLOY	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	93.14636964	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		5,938.04	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		11,241 67	Bounding burnup calculated assuming all BOL heavy metal burned

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	1 48		1 00
Bounding	2 80		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 20/20 FFCR MNRC

SNF ID #: 737

Fuel Units & Descr: 6 - ELEMENT

Heavy Metal Mass BOL=2 462kg; EOL=2 462kg

ROD Storage Site INEEL

¹Fuel decay start date 2035

Estimates as of 2010

Template TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)

²Template Burnup(MWd) 6 65

Template BOL Heavy Metal Mass (MT) 0 000195

Template Decay Time 5 years

Estimated

Canister usage:

18"x10"

0 08

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 5173E-10	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	Avg MeV	
Am-241	1 8331E-03	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 0150	2 607E+07
Am-242m	1 4129E-06	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 0250	0 000E+00
Am-243	1 4774E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 0375	3 553E+04
C-14	1 2871E-04	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 0575	2 174E+04
Cl-36	2 8120E-06	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 0850	3 036E+06
Cm-243	1 7940E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 1250	5 994E+06
Cm-244	1 6962E-06	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 2250	2 121E+07
Co-60	1 2839E+00	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 3750	5 293E+04
Cs-134	9 0541E-02	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 5750	2 604E+03
Cs-135	3 2195E-05	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 8500	4 065E+02
Cs-137	2 7564E+00	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	1 2500	2 427E+01
Eu-154	1 5368E-02	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	1 7500	1 188E+01
Eu-155	2 9293E-02	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	2 2500	6 879E+00
Fe-55	7 7158E-01	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	2 7500	3 997E+00
H-3	1 1111E-02	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	3 5000	3 573E+00
I-129	7 3684E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	5 0000	1 535E+00
Kr-85	2 5263E-01	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	7 0000	1 767E-01
Np-237	1 2427E-06	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	11 0000	2 032E-02
Pa-231	3 8511E-09	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pb-210	7 3880E-15	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pm-147	2 1023E+00	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pu-238	1 0383E-03	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pu-239	5 5293E-03	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pu-240	2 1278E-03	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pu-241	1 0195E-01	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pu-242	2 3128E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Ra-226	5 2782E-14	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Ra-228	1 9338E-10	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Ru-106	9 1684E-02	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Se-79	1 3018E-05	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Sn-126	1 2167E-05	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Sr-90	2 6045E+00	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Tc-99	4 4241E-04	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Th-229	1 3713E-10	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Th-230	1 8090E-11	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Th-232	2 5278E-10	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Ti-208	1 6947E-08	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
U-232	4 8737E-08	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
U-233	1 2203E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
U-234	1 5925E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
U-235	-2 6194E-06	0 00	0 00	1 05E-03	1 05E-03	1 05E-03		
U-236	1 2693E-05	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
U-238	-3 6331E-08	0 00	0 00	6 64E-04	6 64E-04	6 64E-04		
Y-90	2 6060E+00	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Other Radionuclides					0 00E+00	0 00E+00		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
BOL HM Constituents	SST	SST	
BOL Enrichment %	U	U	
	19 76779631	10 to 20 1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	0 00		
Bounding			
			Nominal burnup taken directly from SFD (converted to MWd)
			Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0 00		
Bounding	0 00		
			1 00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 30/20 FFCR MNRC
SNF ID #: 1055
Fuel Units & Descr: 1 - ELEMENT
Heavy Metal Mass: BOL=0.675kg; EOL=0.675kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.01

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	Avg MeV	
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0150	7.138E+06
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0250	0.000E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0375	9.726E+03
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0575	5.957E+03
Cf-252	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0850	8.309E+05
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.1250	1.641E+06
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.2250	5.806E+06
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.3750	1.449E+04
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.5750	7.127E+02
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.8500	1.113E+02
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.2500	6.652E+00
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.7500	3.255E+00
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.2500	1.885E+00
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.7500	1.095E+00
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	3.5000	9.793E-01
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	5.0000	4.207E-01
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	7.0000	4.843E-02
Np-237	1.2427E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	11.0000	5.568E-03
Pa-231	3.8511E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pb-210	7.3880E-15	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pm-147	2.1023E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-238	1.0383E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-239	5.5293E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-240	2.1278E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-241	1.0195E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-242	2.3128E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-226	5.2782E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-228	1.9338E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ru-106	9.1684E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Se-79	1.3018E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sn-126	1.2167E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sr-90	2.6045E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Tc-99	4.4241E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-229	1.3713E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-230	1.8090E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-232	2.5278E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ti-208	1.6947E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-232	4.8737E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-233	1.2203E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-234	1.5925E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-235	-2.6194E-06	0.00	0.00	2.88E-04	2.88E-04	2.88E-04		
U-236	1.2693E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-238	-3.6331E-08	0.00	0.00	1.82E-04	1.82E-04	1.82E-04		
Y-90	2.6060E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Other Radionuclides					0.00E+00	0.00E+00		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	19.74748006	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal	0.00		
Bounding			Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.00		
Bounding	0.00		1.00

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA 8 5/20 FFCR
SNF ID # 1003
Fuel Units & Descr 10 - ELEMENT
Heavy Metal Mass BOL=1.604kg EOL=1.541kg
ROD Storage Site INEEL

Fuel decay start date: 2035
Estimates as of 2010
Template TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
*Template Burnup(MWd) 6.65
Template BOL Heavy Metal Mass (MT) 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.14

II. Estimates		m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	60.14	120.28	0.00E+00	5.12E-08	1.02E-07		Avg MeV	
Am-241	1.8331E-03	60.14	120.28	0.00E+00	1.10E-01	2.20E-01		0.0150	1.944E+13
Am-242m	1.4129E-06	60.14	120.28	0.00E+00	8.50E-05	1.70E-04		0.0250	4.278E+12
Am-243	1.4774E-07	60.14	120.28	0.00E+00	8.89E-06	1.78E-05		0.0375	3.643E+12
C-14	1.2871E-04	60.14	120.28	0.00E+00	7.74E-03	1.55E-02		0.0575	3.739E+12
Cl-36	2.8120E-06	60.14	120.28	0.00E+00	1.69E-04	3.38E-04		0.0850	2.316E+12
Cm-243	1.7940E-07	60.14	120.28	0.00E+00	1.08E-05	2.16E-05		0.1250	1.682E+12
Cm-244	1.6962E-06	60.14	120.28	0.00E+00	1.02E-04	2.04E-04		0.2250	1.965E+12
Co-60	1.2839E+00	60.14	120.28	0.00E+00	7.72E+01	1.54E+02		0.3750	9.972E+11
Cs-134	9.0541E-02	60.14	120.28	0.00E+00	5.45E+00	1.09E+01		0.5750	1.326E+13
Cs-135	3.2195E-05	60.14	120.28	0.00E+00	1.94E-03	3.87E-03		0.8500	5.690E+11
Cs-137	2.7564E+00	60.14	120.28	0.00E+00	1.66E+02	3.32E+02		1.2500	1.155E+13
Eu-154	1.5368E-02	60.14	120.28	0.00E+00	9.24E-01	1.85E+00		1.7500	7.702E+09
Eu-155	2.9293E-02	60.14	120.28	0.00E+00	1.76E+00	3.52E+00		2.2500	1.241E+10
Fe-55	7.7158E-01	60.14	120.28	0.00E+00	4.64E+01	9.28E+01		2.7500	9.852E+07
H-3	1.1111E-02	60.14	120.28	0.00E+00	6.68E-01	1.34E+00		3.5000	1.147E+07
I-129	7.3684E-07	60.14	120.28	0.00E+00	4.43E-05	8.86E-05		5.0000	6.404E+01
Kr-85	2.5263E-01	60.14	120.28	0.00E+00	1.52E+01	3.04E+01		7.0000	7.250E+00
Np-237	1.2427E-06	60.14	120.28	0.00E+00	7.47E-05	1.49E-04		11.0000	8.259E-01
Pa-231	3.8511E-09	60.14	120.28	0.00E+00	2.32E-07	4.63E-07			
Pb-210	7.3880E-15	60.14	120.28	0.00E+00	4.44E-13	8.89E-13			
Pm-147	2.1023E+00	60.14	120.28	0.00E+00	1.26E+02	2.53E+02			
Pu-238	1.0383E-03	60.14	120.28	0.00E+00	6.24E-02	1.25E-01			
Pu-239	5.5293E-03	60.14	120.28	0.00E+00	3.33E-01	6.65E-01			
Pu-240	2.1278E-03	60.14	120.28	0.00E+00	1.28E-01	2.56E-01			
Pu-241	1.0195E-01	60.14	120.28	0.00E+00	6.13E+00	1.23E+01			
Pu-242	2.3128E-07	60.14	120.28	0.00E+00	1.39E-05	2.78E-05			
Ra-226	5.2782E-14	60.14	120.28	0.00E+00	3.17E-12	6.35E-12			
Ra-228	1.9338E-10	60.14	120.28	0.00E+00	1.16E-08	2.33E-08			
Ru-106	9.1684E-02	60.14	120.28	0.00E+00	5.51E+00	1.10E+01			
Se-79	1.3018E-05	60.14	120.28	0.00E+00	7.83E-04	1.57E-03			
Sn-126	1.2167E-05	60.14	120.28	0.00E+00	7.32E-04	1.46E-03			
Sr-90	2.6045E+00	60.14	120.28	0.00E+00	1.57E+02	3.13E+02			
Tc-99	4.4241E-04	60.14	120.28	0.00E+00	2.66E-02	5.32E-02			
Th-229	1.3713E-10	60.14	120.28	0.00E+00	8.25E-09	1.65E-08			
Th-230	1.8090E-11	60.14	120.28	0.00E+00	1.09E-09	2.18E-09			
Th-232	2.5278E-10	60.14	120.28	0.00E+00	1.52E-08	3.04E-08			
Ti-208	1.6947E-08	60.14	120.28	0.00E+00	1.02E-06	2.04E-06			
U-232	4.8737E-08	60.14	120.28	0.00E+00	2.93E-06	5.86E-06			
U-233	1.2203E-07	60.14	120.28	0.00E+00	7.34E-06	1.47E-05			
U-234	1.5925E-07	60.14	120.28	0.00E+00	9.58E-06	1.92E-05			
U-235	-2.6194E-06	60.14	0.00	6.68E-04	5.10E-04	6.68E-04			
U-236	1.2693E-05	60.14	120.28	0.00E+00	7.63E-04	1.53E-03			
U-238	-3.6331E-08	60.14	0.00	4.35E-04	4.33E-04	4.35E-04			
Y-90	2.6060E+00	60.14	120.28	0.00E+00	1.67E+02	3.13E+02			
Other Radionuclides					2.17E+02	4.34E+02			

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
Reactor Moderator	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %:			
19.26433915			10 to 20.1

Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal	54.71	60.14	
Bounding		120.28	
			Nominal burnup calculated from the heavy metal mass destroyed
			Bounding burnup assumed to be twice nominal burnup

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	1.10	1.10
Bounding	2.20	
Estimated EOL HM/Given EOL HM		
1.00		

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR AFRR1
SNF ID #: 969
Fuel Units & Descr: 3 - ELEMENT
Heavy Metal Mass: BOL= ; EOL=0.26kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2019
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.04

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	9.20	18.40	0.00E+00	7.84E-09	1.57E-08	Avg MeV	
Am-241	1.8331E-03	9.20	18.40	0.00E+00	1.69E-02	3.37E-02	0.0150	2.974E+12
Am-242m	1.4129E-06	9.20	18.40	0.00E+00	1.30E-05	2.60E-05	0.0250	6.544E+11
Am-243	1.4774E-07	9.20	18.40	0.00E+00	1.36E-06	2.72E-06	0.0375	5.573E+11
C-14	1.2871E-04	9.20	18.40	0.00E+00	1.18E-03	2.37E-03	0.0575	5.721E+11
Cl-36	2.8120E-06	9.20	18.40	0.00E+00	2.59E-05	5.17E-05	0.0850	3.544E+11
Cm-243	1.7940E-07	9.20	18.40	0.00E+00	1.65E-06	3.30E-06	0.1250	2.574E+11
Cm-244	1.6962E-06	9.20	18.40	0.00E+00	1.56E-05	3.12E-05	0.2250	3.006E+11
Co-60	1.2839E+00	9.20	18.40	0.00E+00	1.18E+01	2.36E+01	0.3750	1.526E+11
Cs-134	9.0541E-02	9.20	18.40	0.00E+00	8.33E-01	1.67E+00	0.5750	2.028E+12
Cs-135	3.2195E-05	9.20	18.40	0.00E+00	2.96E-04	5.92E-04	0.8500	8.705E+10
Cs-137	2.7564E+00	9.20	18.40	0.00E+00	2.54E+01	5.07E+01	1.2500	1.768E+12
Eu-154	1.5368E-02	9.20	18.40	0.00E+00	1.41E-01	2.83E-01	1.7500	1.178E+09
Eu-155	2.9235E-02	9.20	18.40	0.00E+00	2.70E-01	5.39E-01	2.2500	1.899E+09
Fe-55	7.7158E-01	9.20	18.40	0.00E+00	7.10E+00	1.42E+01	2.7500	1.507E+07
H-3	1.1111E-02	9.20	18.40	0.00E+00	1.02E-01	2.04E-01	3.5000	1.754E+06
I-129	7.3684E-07	9.20	18.40	0.00E+00	6.78E-06	1.36E-05	5.0000	9.812E+00
Kr-85	2.5263E-01	9.20	18.40	0.00E+00	2.32E+00	4.65E+00	7.0000	1.111E+00
Np-237	1.2427E-06	9.20	18.40	0.00E+00	1.14E-05	2.29E-05	11.0000	1.265E-01
Pa-231	3.8511E-09	9.20	18.40	0.00E+00	3.54E-08	7.09E-08		
Pb-210	7.3880E-15	9.20	18.40	0.00E+00	6.80E-14	1.36E-13		
Pm-147	2.1023E+00	9.20	18.40	0.00E+00	1.93E+01	3.87E+01		
Pu-238	1.0383E-03	9.20	18.40	0.00E+00	9.55E-03	1.91E-02		
Pu-239	5.5293E-03	9.20	18.40	0.00E+00	5.09E-02	1.02E-01		
Pu-240	2.1278E-03	9.20	18.40	0.00E+00	1.96E-02	3.92E-02		
Pu-241	1.0195E-01	9.20	18.40	0.00E+00	9.38E-01	1.88E+00		
Pu-242	2.3128E-07	9.20	18.40	0.00E+00	2.13E-06	4.26E-06		
Ra-226	5.2782E-14	9.20	18.40	0.00E+00	4.86E-13	9.71E-13		
Ra-228	1.9338E-10	9.20	18.40	0.00E+00	1.78E-09	3.56E-09		
Ru-106	9.1684E-02	9.20	18.40	0.00E+00	8.44E-01	1.69E+00		
Se-79	1.3018E-05	9.20	18.40	0.00E+00	1.20E-04	2.40E-04		
Sr-126	1.2167E-05	9.20	18.40	0.00E+00	1.12E-04	2.24E-04		
Sr-90	2.6045E+00	9.20	18.40	0.00E+00	2.40E+01	4.79E+01		
Tc-99	4.4241E-04	9.20	18.40	0.00E+00	4.07E-03	8.14E-03		
Th-229	1.3713E-10	9.20	18.40	0.00E+00	1.26E-09	2.52E-09		
Th-230	1.8090E-11	9.20	18.40	0.00E+00	1.66E-10	3.33E-10		
Th-232	2.5278E-10	9.20	18.40	0.00E+00	2.33E-09	4.65E-09		
Ti-208	1.6947E-08	9.20	18.40	0.00E+00	1.56E-07	3.12E-07		
U-232	4.8737E-08	9.20	18.40	0.00E+00	4.48E-07	8.97E-07		
U-233	1.2203E-07	9.20	18.40	0.00E+00	1.12E-06	2.25E-06		
U-234	1.5925E-07	9.20	18.40	0.00E+00	1.47E-06	2.93E-06		
U-235	-2.6194E-06	9.20	0.00	1.17E-04	9.25E-05	1.17E-04		
U-236	1.2693E-05	9.20	18.40	0.00E+00	1.17E-04	2.34E-04		
U-238	-3.6331E-08	9.20	0.00	7.25E-05	7.22E-05	7.25E-05		
Y-90	2.6060E+00	9.20	18.40	0.00E+00	2.40E+01	4.80E+01		
Other Radionuclides					3.32E+01	6.63E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituent	U	U	
BOL Enrichment %		10 to 20.1	

This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown)

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		9.20	
Bounding		18.40	Nominal burnup taken from SFD and converted to MWd using BOL=0.27kg Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	1.00		
Bounding	2.00		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR ENGLAND
 SNF ID #: 987
 Fuel Units & Descr: 4 - ELEMENT
 Heavy Metal Mass: BOL=0.641kg EOL=0.624kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2010
 Estimates as of: 2010
 Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
 Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.04

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	18.75	37.49	0.00E+00	1.60E-08	3.19E-08	Avg MeV	
Am-241	1.8331E-03	18.75	37.49	0.00E+00	3.44E-02	6.87E-02	0.0150	6.060E+12
Am-242m	1.4129E-06	18.75	37.49	0.00E+00	2.65E-05	5.30E-05	0.0250	1.333E+12
Am-243	1.4774E-07	18.75	37.49	0.00E+00	2.77E-06	5.54E-06	0.0375	1.136E+12
C-14	1.2871E-04	18.75	37.49	0.00E+00	2.41E-03	4.83E-03	0.0575	1.166E+12
Cl-36	2.8120E-06	18.75	37.49	0.00E+00	5.27E-05	1.05E-04	0.0850	7.221E+11
Cm-243	1.7940E-07	18.75	37.49	0.00E+00	3.36E-06	6.73E-06	0.1250	5.244E+11
Cm-244	1.6962E-06	18.75	37.49	0.00E+00	3.18E-05	6.36E-05	0.2250	6.126E+11
Co-60	1.2839E+00	18.75	37.49	0.00E+00	2.41E+01	4.81E+01	0.3750	3.109E+11
Cs-134	9.0541E-02	18.75	37.49	0.00E+00	1.70E+00	3.39E+00	0.5750	4.133E+12
Cs-135	3.2195E-05	18.75	37.49	0.00E+00	6.04E-04	1.21E-03	0.8500	1.774E+11
Cs-137	2.7564E+00	18.75	37.49	0.00E+00	5.17E+01	1.03E+02	1.2500	3.602E+12
Eu-154	1.5368E-02	18.75	37.49	0.00E+00	2.88E-01	5.76E-01	1.7500	2.401E+09
Eu-155	2.9293E-02	18.75	37.49	0.00E+00	5.49E-01	1.10E+00	2.2500	3.870E+09
Fe-55	7.7158E-01	18.75	37.49	0.00E+00	1.45E+01	2.89E+01	2.7500	3.071E+07
H-3	1.1111E-02	18.75	37.49	0.00E+00	2.08E-01	4.17E-01	3.5000	3.574E+06
I-129	7.3684E-07	18.75	37.49	0.00E+00	1.38E-05	2.76E-05	5.0000	2.005E+01
Kr-85	2.5263E-01	18.75	37.49	0.00E+00	4.74E+00	9.47E+00	7.0000	2.270E+00
Np-237	1.2427E-06	18.75	37.49	0.00E+00	2.33E-05	4.66E-05	11.0000	2.586E-01
Pa-231	3.8511E-09	18.75	37.49	0.00E+00	7.22E-08	1.44E-07		
Pb-210	7.3880E-15	18.75	37.49	0.00E+00	1.39E-13	2.77E-13		
Pm-147	2.1023E+00	18.75	37.49	0.00E+00	3.94E+01	7.88E+01		
Pu-238	1.0383E-03	18.75	37.49	0.00E+00	1.95E-02	3.89E-02		
Pu-239	5.5293E-03	18.75	37.49	0.00E+00	1.04E-01	2.07E-01		
Pu-240	2.1278E-03	18.75	37.49	0.00E+00	3.99E-02	7.98E-02		
Pu-241	1.0195E-01	18.75	37.49	0.00E+00	1.91E+00	3.82E+00		
Pu-242	2.3128E-07	18.75	37.49	0.00E+00	4.34E-06	8.67E-06		
Ra-226	5.2782E-14	18.75	37.49	0.00E+00	9.90E-13	1.98E-12		
Ra-228	1.9338E-10	18.75	37.49	0.00E+00	3.63E-09	7.25E-09		
Ru-106	9.1684E-02	18.75	37.49	0.00E+00	1.72E+00	3.44E+00		
Se-79	1.3018E-05	18.75	37.49	0.00E+00	2.44E-04	4.88E-04		
Sn-126	1.2167E-05	18.75	37.49	0.00E+00	2.28E-04	4.56E-04		
Sr-90	2.6045E+00	18.75	37.49	0.00E+00	4.88E+01	9.77E+01		
Tc-99	4.4241E-04	18.75	37.49	0.00E+00	8.29E-03	1.66E-02		
Th-229	1.3713E-10	18.75	37.49	0.00E+00	2.57E-09	5.14E-09		
Th-230	1.8090E-11	18.75	37.49	0.00E+00	3.39E-10	6.78E-10		
Th-232	2.5278E-10	18.75	37.49	0.00E+00	4.74E-09	9.48E-09		
Th-208	1.6947E-08	18.75	37.49	0.00E+00	3.18E-07	6.35E-07		
U-232	4.8737E-08	18.75	37.49	0.00E+00	9.14E-07	1.83E-06		
U-233	1.2203E-07	18.75	37.49	0.00E+00	2.29E-06	4.58E-06		
U-234	1.5925E-07	18.75	37.49	0.00E+00	2.99E-06	5.97E-06		
U-235	-2.6194E-06	18.75	0.00	2.77E-04	2.28E-04	2.77E-04		
U-236	1.2693E-05	18.75	37.49	0.00E+00	2.38E-04	4.76E-04		
U-238	-3.6331E-08	18.75	0.00	1.72E-04	1.72E-04	1.72E-04		
Y-90	2.6060E+00	18.75	37.49	0.00E+00	4.89E+01	9.77E+01		
Other Radionuclides					6.76E+01	1.35E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	19.96879875	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	18.75	16.80	
Bounding		37.49	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.86	0.90	
Bounding	1.71		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR HEIDELBERG
SNF ID #: 1045
Fuel Units & Descr. 5 - ELEMENT
Heavy Metal Mass: BOL=0.801kg; EOL=0.79kg
ROD Storage Site INEEL

Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.05

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	15.61	31.23	0.00E+00	1.33E-08	2.66E-08	Avg MeV	
Am-241	1.8331E-03	15.61	31.23	0.00E+00	2.86E-02	5.72E-02	0.0150	5.047E+12
Am-242m	1.4129E-06	15.61	31.23	0.00E+00	2.21E-05	4.41E-05	0.0250	1.111E+12
Am-243	1.4774E-07	15.61	31.23	0.00E+00	2.31E-06	4.61E-06	0.0375	9.457E+11
C-14	1.2871E-04	15.61	31.23	0.00E+00	2.01E-03	4.02E-03	0.0575	9.707E+11
Cl-36	2.8120E-06	15.61	31.23	0.00E+00	4.39E-05	8.78E-05	0.0850	6.014E+11
Cm-243	1.7940E-07	15.61	31.23	0.00E+00	2.80E-06	5.60E-06	0.1250	4.367E+11
Cm-244	1.6962E-06	15.61	31.23	0.00E+00	2.65E-05	5.30E-05	0.2250	5.101E+11
Co-60	1.2839E+00	15.61	31.23	0.00E+00	2.00E+01	4.01E+01	0.3750	2.589E+11
Cs-134	9.0541E-02	15.61	31.23	0.00E+00	1.41E+00	2.83E+00	0.5750	3.442E+12
Cs-135	3.2195E-05	15.61	31.23	0.00E+00	5.03E-04	1.01E-03	0.8500	1.477E+11
Cs-137	2.7564E+00	15.61	31.23	0.00E+00	4.30E+01	8.61E+01	1.2500	3.000E+12
Eu-154	1.5368E-02	15.61	31.23	0.00E+00	2.40E-01	4.80E-01	1.7500	2.000E+09
Eu-155	2.9293E-02	15.61	31.23	0.00E+00	4.57E-01	9.15E-01	2.2500	3.223E+09
Fe-55	7.7158E-01	15.61	31.23	0.00E+00	1.20E+01	2.41E+01	2.7500	2.558E+07
H-3	1.1111E-02	15.61	31.23	0.00E+00	1.73E-01	3.47E-01	3.5000	2.977E+06
I-129	7.3684E-07	15.61	31.23	0.00E+00	1.15E-05	2.30E-05	5.0000	1.686E+01
Kr-85	2.5263E-01	15.61	31.23	0.00E+00	3.94E+00	7.89E+00	7.0000	1.909E+00
Np-237	1.2427E-06	15.61	31.23	0.00E+00	1.94E-05	3.88E-05	11.0000	2.176E-01
Pa-231	3.8511E-09	15.61	31.23	0.00E+00	6.01E-08	1.20E-07		
Pb-210	7.3880E-15	15.61	31.23	0.00E+00	1.15E-13	2.31E-13		
Pm-147	2.1023E+00	15.61	31.23	0.00E+00	3.28E+01	6.56E+01		
Pu-238	1.0383E-03	15.61	31.23	0.00E+00	1.62E-02	3.24E-02		
Pu-239	5.5293E-03	15.61	31.23	0.00E+00	8.63E-02	1.73E-01		
Pu-240	2.1278E-03	15.61	31.23	0.00E+00	3.32E-02	6.64E-02		
Pu-241	1.0195E-01	15.61	31.23	0.00E+00	1.59E+00	3.18E+00		
Pu-242	2.3128E-07	15.61	31.23	0.00E+00	3.61E-06	7.22E-06		
Ra-226	5.2782E-14	15.61	31.23	0.00E+00	8.24E-13	1.65E-12		
Ra-228	1.9338E-10	15.61	31.23	0.00E+00	3.02E-09	6.04E-09		
Ru-106	9.1684E-02	15.61	31.23	0.00E+00	1.43E+00	2.86E+00		
Se-79	1.3018E-05	15.61	31.23	0.00E+00	2.03E-04	4.07E-04		
Sn-126	1.2167E-05	15.61	31.23	0.00E+00	1.90E-04	3.80E-04		
Sr-90	2.6045E+00	15.61	31.23	0.00E+00	4.07E+01	8.13E+01		
Tc-99	4.4241E-04	15.61	31.23	0.00E+00	6.91E-03	1.38E-02		
Th-229	1.3713E-10	15.61	31.23	0.00E+00	2.14E-09	4.28E-09		
Th-230	1.8090E-11	15.61	31.23	0.00E+00	2.82E-10	5.65E-10		
Th-232	2.5278E-10	15.61	31.23	0.00E+00	3.95E-09	7.89E-09		
Th-208	1.6947E-08	15.61	31.23	0.00E+00	2.65E-07	5.29E-07		
U-232	4.8737E-08	15.61	31.23	0.00E+00	7.61E-07	1.52E-06		
U-233	1.2203E-07	15.61	31.23	0.00E+00	1.91E-06	3.81E-06		
U-234	1.5925E-07	15.61	31.23	0.00E+00	2.49E-06	4.97E-06		
U-235	-2.6194E-06	15.61	0.00	3.44E-04	3.03E-04	3.44E-04		
U-236	1.2693E-05	15.61	31.23	0.00E+00	1.98E-04	3.96E-04		
U-238	-3.6331E-08	15.61	0.00	2.16E-04	2.15E-04	2.16E-04		
Y-90	2.6060E+00	15.61	31.23	0.00E+00	4.07E+01	8.14E+01		
Other Radionuclides					5.63E+01	1.13E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
Fuel Cladding	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
BOL HM Constituents	SST	SST	
BOL Enrichment %	19.85018727	10 to 20.1	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	15.61	10.02	
Bounding		31.23	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.57	0.64	
Bounding	1.14		0.99

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA 8.5/20 FFCR ITALY

SNF ID # 730

Fuel Units & Descr: 3 - ELEMENT

Heavy Metal Mass: BOL=0.484kg EOL=0.458kg

ROD Storage Site INEEL

¹Fuel decay start date 1959

Estimates as of 2010

Template TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)

²Template Burnup(MWd) 6.65

Template BOL Heavy Metal Mass (MT) 0.000195

Template Decay Time 50 years

Estimated

Canister usage

18"x10"

0.04

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	9.4992E-09	24.34	48.68	0.00E+00	2.31E-07	4.62E-07	0.0150	2.377E+12
Am-241	4.0120E-03	24.34	48.68	0.00E+00	9.77E-02	1.95E-01	0.0250	4.937E+11
Am-242m	1.1510E-06	24.34	48.68	0.00E+00	2.80E-05	5.60E-05	0.0375	4.297E+11
Am-243	1.4713E-07	24.34	48.68	0.00E+00	3.58E-06	7.16E-06	0.0575	4.629E+11
C-14	1.2800E-04	24.34	48.68	0.00E+00	3.12E-03	6.23E-03	0.0850	2.780E+11
Cl-36	2.8120E-06	24.34	48.68	0.00E+00	6.85E-05	1.37E-04	0.1250	1.805E+11
Cm-243	6.0120E-08	24.34	48.68	0.00E+00	1.46E-06	2.93E-06	0.2250	2.395E+11
Cm-244	3.0331E-07	24.34	48.68	0.00E+00	7.38E-06	1.48E-05	0.3750	1.045E+11
Co-60	3.4647E-03	24.34	48.68	0.00E+00	8.43E-02	1.69E-01	0.5750	1.766E+12
Cs-134	2.4632E-08	24.34	48.68	0.00E+00	6.00E-07	1.20E-06	0.8500	1.738E+10
Cs-135	3.2195E-05	24.34	48.68	0.00E+00	7.84E-04	1.57E-03	1.2500	1.859E+10
Cs-137	9.7519E-01	24.34	48.68	0.00E+00	2.37E+01	4.75E+01	1.7500	4.485E+08
Eu-154	4.0947E-04	24.34	48.68	0.00E+00	9.97E-03	1.99E-02	2.2500	1.142E+05
Eu-155	5.4586E-05	24.34	48.68	0.00E+00	1.33E-03	2.66E-03	2.7500	2.060E+04
Fe-55	4.7955E-06	24.34	48.68	0.00E+00	1.17E-04	2.33E-04	3.5000	6.010E+01
H-3	8.9038E-04	24.34	48.68	0.00E+00	2.17E-02	4.33E-02	5.0000	2.530E+01
I-129	7.3684E-07	24.34	48.68	0.00E+00	1.79E-05	3.59E-05	7.0000	2.854E+00
Kr-85	1.3791E-02	24.34	48.68	0.00E+00	3.36E-01	6.71E-01	11.0000	3.245E-01
Np-237	1.3038E-06	24.34	48.68	0.00E+00	3.17E-05	6.35E-05		
Pa-231	1.5534E-08	24.34	48.68	0.00E+00	3.78E-07	7.56E-07		
Pb-210	7.1759E-13	24.34	48.68	0.00E+00	1.75E-11	3.49E-11		
Pm-147	1.4547E-05	24.34	48.68	0.00E+00	3.54E-04	7.08E-04		
Pu-238	7.2827E-04	24.34	48.68	0.00E+00	1.77E-02	3.55E-02		
Pu-239	5.5218E-03	24.34	48.68	0.00E+00	1.34E-01	2.69E-01		
Pu-240	2.1173E-03	24.34	48.68	0.00E+00	5.15E-02	1.03E-01		
Pu-241	1.1702E-02	24.34	48.68	0.00E+00	2.85E-01	5.70E-01		
Pu-242	2.3128E-07	24.34	48.68	0.00E+00	5.63E-06	1.13E-05		
Ra-226	1.6827E-12	24.34	48.68	0.00E+00	4.10E-11	8.19E-11		
Ra-228	2.5263E-10	24.34	48.68	0.00E+00	6.15E-09	1.23E-08		
Ru-106	3.4090E-15	24.34	48.68	0.00E+00	8.30E-14	1.66E-13		
Se-79	1.3012E-05	24.34	48.68	0.00E+00	3.17E-04	6.33E-04		
Sn-126	1.2162E-05	24.34	48.68	0.00E+00	2.96E-04	5.92E-04		
Sr-90	8.9323E-01	24.34	48.68	0.00E+00	2.17E+01	4.35E+01		
Tc-99	4.4241E-04	24.34	48.68	0.00E+00	1.08E-02	2.15E-02		
Th-229	7.6902E-10	24.34	48.68	0.00E+00	1.87E-08	3.74E-08		
Th-230	1.3059E-10	24.34	48.68	0.00E+00	3.18E-09	6.36E-09		
Th-232	2.5278E-10	24.34	48.68	0.00E+00	6.15E-09	1.23E-08		
Ti-208	1.1892E-08	24.34	48.68	0.00E+00	2.89E-07	5.79E-07		
U-232	3.1970E-08	24.34	48.68	0.00E+00	7.78E-07	1.56E-06		
U-233	1.2232E-07	24.34	48.68	0.00E+00	2.98E-06	5.95E-06		
U-234	2.8662E-07	24.34	48.68	0.00E+00	6.98E-06	1.40E-05		
U-235	2.6194E-06	24.34	0.00	2.10E-04	1.46E-04	2.10E-04		
U-236	1.2696E-05	24.34	48.68	0.00E+00	3.09E-04	6.18E-04		
U-238	3.6331E-08	24.34	0.00	1.30E-04	1.29E-04	1.30E-04		
Y-90	8.9338E-01	24.34	48.68	0.00E+00	2.17E+01	4.35E+01		
Other Radionuclides					2.40E+01	4.80E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.72E-01	5.45E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20.04130579	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	16.51	24.34	
Bounding		48.68	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	1.48	1.47	
Bounding	2.95		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8 5/20 FFCR MNRC
SNF ID #: 703

Fuel Units & Descr: 5 - ELEMENT

Heavy Metal Mass: BOL=0.801kg EOL=0.761kg

ROD Storage Site: INEEL

¹Fuel decay start date: 2035
Estimates as of: 2010

Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)

²Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.000195

Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0.07

II. Estimates	m	X _A	X _B	b	Y _A	Y _B	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	39.14	78.28	0.00E+00	3.33E-08	6.67E-08	Avg MeV	
Am-241	1.8331E-03	39.14	78.28	0.00E+00	7.17E-02	1.43E-01	0.0150	1.265E+13
Am-242m	1.4129E-06	39.14	78.28	0.00E+00	5.53E-05	1.11E-04	0.0250	2.784E+12
Am-243	1.4774E-07	39.14	78.28	0.00E+00	5.78E-06	1.16E-05	0.0375	2.371E+12
C-14	1.2871E-04	39.14	78.28	0.00E+00	5.04E-03	1.01E-02	0.0575	2.433E+12
Cl-36	2.8120E-06	39.14	78.28	0.00E+00	1.10E-04	2.20E-04	0.0850	1.508E+12
Cm-243	1.7940E-07	39.14	78.28	0.00E+00	7.02E-06	1.40E-05	0.1250	1.095E+12
Cm-244	1.6962E-06	39.14	78.28	0.00E+00	6.64E-05	1.33E-04	0.2250	1.279E+12
Co-60	1.2839E+00	39.14	78.28	0.00E+00	5.03E+01	1.01E+02	0.3750	6.490E+11
Cs-134	9.0541E-02	39.14	78.28	0.00E+00	3.54E+00	7.09E+00	0.5750	8.628E+12
Cs-135	3.2195E-05	39.14	78.28	0.00E+00	1.26E-03	2.52E-03	0.8500	3.703E+11
Cs-137	2.7564E+00	39.14	78.28	0.00E+00	1.08E+02	2.16E+02	1.2500	7.520E+12
Eu-154	1.5368E-02	39.14	78.28	0.00E+00	6.02E-01	1.20E+00	1.7500	5.013E+09
Eu-155	2.9293E-02	39.14	78.28	0.00E+00	1.15E+00	2.29E+00	2.2500	8.080E+09
Fe-55	7.7158E-01	39.14	78.28	0.00E+00	3.02E+01	6.04E+01	2.7500	6.412E+07
H-3	1.1111E-02	39.14	78.28	0.00E+00	4.35E-01	8.70E-01	3.5000	7.462E+06
I-129	7.3684E-07	39.14	78.28	0.00E+00	2.88E-05	5.77E-05	5.0000	4.153E+01
Kr-85	2.5263E-01	39.14	78.28	0.00E+00	9.89E+00	1.98E+01	7.0000	4.701E+00
Np-237	1.2427E-06	39.14	78.28	0.00E+00	4.86E-05	9.73E-05	11.0000	5.355E-01
Pa-231	3.8511E-09	39.14	78.28	0.00E+00	1.51E-07	3.01E-07		
Pb-210	7.3680E-15	39.14	78.28	0.00E+00	2.89E-13	5.78E-13		
Pm-147	2.1023E+00	39.14	78.28	0.00E+00	8.23E+01	1.65E+02		
Pu-238	1.0383E-03	39.14	78.28	0.00E+00	4.06E-02	8.13E-02		
Pu-239	5.5293E-03	39.14	78.28	0.00E+00	2.16E-01	4.33E-01		
Pu-240	2.1278E-03	39.14	78.28	0.00E+00	8.33E-02	1.67E-01		
Pu-241	1.0195E-01	39.14	78.28	0.00E+00	3.99E+00	7.98E+00		
Pu-242	2.3128E-07	39.14	78.28	0.00E+00	9.05E-06	1.81E-05		
Ra-226	5.2782E-14	39.14	78.28	0.00E+00	2.07E-12	4.13E-12		
Ra-228	1.9338E-10	39.14	78.28	0.00E+00	7.57E-09	1.51E-08		
Ru-106	9.1684E-02	39.14	78.28	0.00E+00	3.59E+00	7.18E+00		
Se-79	1.3018E-05	39.14	78.28	0.00E+00	5.10E-04	1.02E-03		
Sn-126	1.2167E-05	39.14	78.28	0.00E+00	4.76E-04	9.52E-04		
Sr-90	2.6045E+00	39.14	78.28	0.00E+00	1.02E+02	2.04E+02		
Tc-99	4.4241E-04	39.14	78.28	0.00E+00	1.73E-02	3.46E-02		
Th-229	1.3713E-10	39.14	78.28	0.00E+00	5.37E-09	1.07E-08		
Th-230	1.8090E-11	39.14	78.28	0.00E+00	7.08E-10	1.42E-09		
Th-232	2.5278E-10	39.14	78.28	0.00E+00	9.89E-09	1.98E-08		
Ti-208	1.6947E-08	39.14	78.28	0.00E+00	6.63E-07	1.33E-06		
U-232	4.8737E-08	39.14	78.28	0.00E+00	1.91E-06	3.82E-06		
U-233	1.2203E-07	39.14	78.28	0.00E+00	4.78E-06	9.55E-06		
U-234	1.5925E-07	39.14	78.28	0.00E+00	6.23E-06	1.25E-05		
U-235	-2.6194E-06	39.14	0.00	3.35E-04	2.32E-04	3.35E-04		
U-236	1.2693E-05	39.14	78.28	0.00E+00	4.97E-04	9.94E-04		
U-238	-3.6331E-08	39.14	0.00	2.17E-04	2.16E-04	2.17E-04		
Y-90	2.6060E+00	39.14	78.28	0.00E+00	1.02E+02	2.04E+02		
Other Radionuclides					1.41E+02	2.82E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.34235977	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	27.34	39.14
Bounding		78.28

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	1.43	1.43
Bounding	2.86	

Estimated EOL HM/Given EOL HM

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA 8.5/20 FFCR OSU
SNF ID # 1041

Fuel Units & Descr: 2 - ELEMENT
Heavy Metal Mass BOL=0.392kg EOL=0.37kg
ROD Storage Site INEEL

Fuel decay start date 2025

Estimates as of 2010

Template TRIGA-FLIP (LW/U-Zr SST, 60 to 100%, U)

Template Burnup(MWd) 66.52

Template BOL Heavy Metal Mass (MT): 0.000196

Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0.02

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8488E-10	20.91	41.82	0.00E+00	5.96E-09	1.19E-08	Avg MeV	
Am-241	7.5767E-03	20.91	41.82	0.00E+00	1.58E-01	3.17E-01	0.0150	6.747E+12
Am-242m	2.4459E-05	20.91	41.82	0.00E+00	5.11E-04	1.02E-03	0.0250	1.481E+12
Am-243	3.0983E-05	20.91	41.82	0.00E+00	6.48E-04	1.30E-03	0.0375	1.310E+12
C-14	1.2590E-04	20.91	41.82	0.00E+00	2.63E-03	5.27E-03	0.0575	1.307E+12
Cl-36	2.6624E-06	20.91	41.82	0.00E+00	5.57E-05	1.11E-04	0.0850	8.134E+11
Cm-243	3.8244E-05	20.91	41.82	0.00E+00	8.00E-04	1.60E-03	0.1250	6.531E+11
Cm-244	4.1010E-03	20.91	41.82	0.00E+00	8.57E-02	1.71E-01	0.2250	6.913E+11
Co-60	1.2410E+00	20.91	41.82	0.00E+00	2.59E+01	5.19E+01	0.3750	3.449E+11
Cs-134	6.5454E-01	20.91	41.82	0.00E+00	1.37E+01	2.74E+01	0.5750	5.709E+12
Cs-135	1.9753E-05	20.91	41.82	0.00E+00	4.13E-04	8.26E-04	0.8500	1.047E+12
Cs-137	2.7375E+00	20.91	41.82	0.00E+00	5.72E+01	1.14E+02	1.2500	4.023E+12
Eu-154	1.2324E-01	20.91	41.82	0.00E+00	2.58E+00	5.15E+00	1.7500	5.380E+09
Eu-155	5.3037E-02	20.91	41.82	0.00E+00	1.11E+00	2.22E+00	2.2500	4.217E+09
Fe-55	7.9555E-01	20.91	41.82	0.00E+00	1.66E+01	3.33E+01	2.7500	3.823E+07
H-3	1.0531E-02	20.91	41.82	0.00E+00	2.20E-01	4.40E-01	3.5000	4.499E+06
I-129	7.1287E-07	20.91	41.82	0.00E+00	1.49E-05	2.98E-05	5.0000	1.078E+03
Kr-85	2.4955E-01	20.91	41.82	0.00E+00	5.22E+00	1.04E+01	7.0000	1.241E+02
Np-237	1.2121E-05	20.91	41.82	0.00E+00	2.53E-04	5.07E-04	11.0000	1.424E+01
Pa-231	1.1230E-09	20.91	41.82	0.00E+00	2.35E-08	4.70E-08		
Pb-210	6.1636E-14	20.91	41.82	0.00E+00	1.29E-12	2.58E-12		
Pm-147	1.1302E+00	20.91	41.82	0.00E+00	2.36E+01	4.73E+01		
Pu-238	5.4826E-02	20.91	41.82	0.00E+00	1.15E+00	2.29E+00		
Pu-239	1.4056E-03	20.91	41.82	0.00E+00	2.94E-02	5.88E-02		
Pu-240	1.1536E-03	20.91	41.82	0.00E+00	2.41E-02	4.82E-02		
Pu-241	4.2995E-01	20.91	41.82	0.00E+00	8.99E+00	1.80E+01		
Pu-242	4.9910E-06	20.91	41.82	0.00E+00	1.04E-04	2.09E-04		
Ra-226	2.4008E-13	20.91	41.82	0.00E+00	5.02E-12	1.00E-11		
Ra-228	1.8220E-11	20.91	41.82	0.00E+00	3.81E-10	7.62E-10		
Ru-106	1.0343E-01	20.91	41.82	0.00E+00	2.16E+00	4.33E+00		
Se-79	1.2832E-05	20.91	41.82	0.00E+00	2.68E-04	5.37E-04		
Sn-126	1.2090E-05	20.91	41.82	0.00E+00	2.53E-04	5.06E-04		
Sr-90	2.5646E+00	20.91	41.82	0.00E+00	5.36E+01	1.07E+02		
Tc-99	4.0319E-04	20.91	41.82	0.00E+00	8.43E-03	1.69E-02		
Th-229	7.7375E-11	20.91	41.82	0.00E+00	1.62E-09	3.24E-09		
Th-230	1.2211E-10	20.91	41.82	0.00E+00	2.55E-09	5.11E-09		
Th-232	2.3842E-11	20.91	41.82	0.00E+00	4.99E-10	9.97E-10		
Ti-208	1.4313E-07	20.91	41.82	0.00E+00	2.99E-06	5.99E-06		
U-232	4.1927E-07	20.91	41.82	0.00E+00	8.77E-06	1.75E-05	Thermal Power	
U-233	6.8491E-08	20.91	41.82	0.00E+00	1.43E-06	2.86E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	2.0189E-06	20.91	41.82	0.00E+00	4.22E-05	8.44E-05	1.37E+00	2.74E+00
U-235	2.6572E-06	20.91	0.00	5.92E-04	5.37E-04	5.92E-04	Total	Total
U-236	1.3575E-05	20.91	41.82	0.00E+00	2.84E-04	5.68E-04		
U-238	2.2698E-08	20.91	0.00	3.97E-05	3.92E-05	3.97E-05		
Y-90	2.5646E+00	20.91	41.82	0.00E+00	5.36E+01	1.07E+02		
Other Radionuclides					7.45E+01	1.49E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:	
Reactor Moderator	From SFD	Used		
Fuel Cladding	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE		
BOL HM Constituents	SST	SST		
BOL Enrichment %	U	U		
	69.89795918	60 to 100		
Burnup Summary (MWd) ²			Basis for burnup used in estimate:	
Nominal	From SFD	Estimated		
Bounding	5.73	20.91		
		41.82	Nominal burnup calculated from the heavy metal mass destroyed	
			Bounding burnup assumed to be twice nominal burnup	
Checks				
Nominal	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM	
Bounding	0.16	3.65		
	0.31		1.00	

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8 520 FFCR PENN STATE UNIV
SNF ID #: 815
Fuel Units & Descr: 7 - ELEMENT
Heavy Metal Mass: BOL=1.379kg; EOL=1.316kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd): 6 65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0 09

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	60 14	120 28	0.00E+00	5.12E-08	1.02E-07	Avg MeV	
Am-241	1.8331E-03	60 14	120 28	0.00E+00	1.10E-01	2.20E-01	0 0150	1.944E+13
Am-242m	1.4129E-06	60 14	120 28	0.00E+00	8.50E-05	1.70E-04	0 0250	4.278E+12
Am-243	1.4774E-07	60 14	120 28	0.00E+00	8.89E-06	1.78E-05	0 0375	3.643E+12
C-14	1.2871E-04	60 14	120 28	0.00E+00	7.74E-03	1.55E-02	0 0575	3.739E+12
Cl-36	2.810E-06	60 14	120 28	0.00E+00	1.69E-04	3.38E-04	0 0850	2.316E+12
Cm-243	1.7940E-07	60 14	120 28	0.00E+00	1.08E-05	2.16E-05	0 1250	1.682E+12
Cm-244	1.6962E-06	60 14	120 28	0.00E+00	1.02E-04	2.04E-04	0 2250	1.965E+12
Co-60	1.2839E+00	60 14	120 28	0.00E+00	7.72E+01	1.54E+02	0 3750	9.972E+11
Cs-134	9.0541E-02	60 14	120 28	0.00E+00	5.45E+00	1.09E+01	0 5750	1.326E+13
Cs-135	3.2195E-05	60 14	120 28	0.00E+00	1.94E-03	3.87E-03	0 8500	5.690E+11
Cs-137	2.7564E+00	60 14	120 28	0.00E+00	1.66E+02	3.32E+02	1.2500	1.155E+13
Eu-154	1.5368E-02	60 14	120 28	0.00E+00	9.24E-01	1.85E+00	1.7500	7.702E+09
Eu-155	2.9293E-02	60 14	120 28	0.00E+00	1.76E+00	3.52E+00	2.2500	1.241E+10
Fe-55	7.7158E-01	60 14	120 28	0.00E+00	4.64E+01	9.28E+01	2.7500	9.852E+07
H-3	1.1111E-02	60 14	120 28	0.00E+00	6.68E-01	1.34E+00	3.5000	1.147E+07
I-129	7.3684E-07	60 14	120 28	0.00E+00	4.43E-05	8.86E-05	5.0000	6.389E+01
Kr-85	2.5263E-01	60 14	120 28	0.00E+00	1.52E+01	3.04E+01	7.0000	7.233E+00
Np-237	1.2427E-06	60 14	120 28	0.00E+00	7.47E-05	1.49E-04	11.0000	8.239E-01
Pa-231	3.8511E-09	60 14	120 28	0.00E+00	2.32E-07	4.63E-07		
Pb-210	7.3880E-15	60 14	120 28	0.00E+00	4.44E-13	8.89E-13		
Pm-147	2.1023E+00	60 14	120 28	0.00E+00	1.26E+02	2.53E+02		
Pu-238	1.0383E-03	60 14	120 28	0.00E+00	6.24E-02	1.25E-01		
Pu-239	5.5293E-03	60 14	120 28	0.00E+00	3.33E-01	6.65E-01		
Pu-240	2.1278E-03	60 14	120 28	0.00E+00	1.28E-01	2.56E-01		
Pu-241	1.0195E-01	60 14	120 28	0.00E+00	6.13E+00	1.23E+01		
Pu-242	2.3128E-07	60 14	120 28	0.00E+00	1.39E-05	2.78E-05		
Ra-226	5.2782E-14	60 14	120 28	0.00E+00	3.17E-12	6.35E-12		
Ra-228	1.9338E-10	60 14	120 28	0.00E+00	1.16E-08	2.33E-08		
Ru-106	9.1684E-02	60 14	120 28	0.00E+00	5.51E+00	1.10E+01		
Se-79	1.3018E-05	60 14	120 28	0.00E+00	7.83E-04	1.57E-03		
Sn-126	1.2167E-05	60 14	120 28	0.00E+00	7.32E-04	1.46E-03		
Sr-90	2.6045E+00	60 14	120 28	0.00E+00	1.57E+02	3.13E+02		
Tc-99	4.4241E-04	60 14	120 28	0.00E+00	2.66E-02	5.32E-02		
Th-229	1.3713E-10	60 14	120 28	0.00E+00	8.25E-09	1.65E-08		
Th-230	1.8090E-11	60 14	120 28	0.00E+00	1.09E-09	2.18E-09		
Th-232	2.5278E-10	60 14	120 28	0.00E+00	1.52E-08	3.04E-08		
Ti-208	1.6947E-08	60 14	120 28	0.00E+00	1.02E-06	2.04E-06		
U-232	4.8737E-08	60 14	120 28	0.00E+00	2.93E-06	5.86E-06		
U-233	1.2203E-07	60 14	120 28	0.00E+00	7.34E-06	1.47E-05		
U-234	1.5925E-07	60 14	120 28	0.00E+00	9.58E-06	1.92E-05		
U-235	-2.6194E-06	60 14	0.00	5.90E-04	4.32E-04	5.90E-04		
U-236	1.2693E-05	60 14	120 28	0.00E+00	7.63E-04	1.53E-03		
U-238	-3.6331E-08	60 14	0.00	3.72E-04	3.70E-04	3.72E-04		
Y-90	2.6060E+00	60 14	120 28	0.00E+00	1.57E+02	3.13E+02		
Other Radionuclides					2.17E+02	4.34E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences ¹
Reactor Moderator	From SFD	Used	
Fuel Cladding	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
BOL HM Constituents	SST	SST	
BOL Enrichment %	U	U	
	19.79695431	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	40.32	60 14	
Bounding		120 28	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	1.28	1.49	
Bounding	2.56		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA 8 5/20 FFCR SLOVENIA
SNF ID # 941
Fuel Units & Descr: 3 - ELEMENT
Heavy Metal Mass BOL=0 473kg, EOL=0 457kg
ROD Storage Site: INEEL

*Fuel decay start date 1959
Estimates as of 2010
Template TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
*Template Burnup(MWd) 6 65
Template BOL Heavy Metal Mass (MT) 0.000195
Template Decay Time 50 years

Estimated
Canister usage
18"x10"
0 04

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9 4992E-09	16 14	32 28	0 00E+00	1 53E-07	3 07E-07	Avg MeV	
Am-241	4 0120E-03	16 14	32 28	0 00E+00	6 47E-02	1 29E-01	0 0150	1 576E+12
Am-242m	1 1510E-06	16 14	32 28	0 00E+00	1 86E-05	3 71E-05	0 0250	3 273E+11
Am-243	1 4713E-07	16 14	32 28	0 00E+00	2 37E-06	4 75E-06	0 0375	2 849E+11
C-14	1 2800E-04	16 14	32 28	0 00E+00	2 07E-03	4 13E-03	0 0575	3 069E+11
Cl-36	2 8120E-06	16 14	32 28	0 00E+00	4 54E-05	9 08E-05	0 0850	1 843E+11
Cm-243	6 0120E-08	16 14	32 28	0 00E+00	9 70E-07	1 94E-06	0 1250	1 197E+11
Cm-244	3 0331E-07	16 14	32 28	0 00E+00	4 89E-06	9 79E-06	0 2250	1 588E+11
Co-60	3 4647E-03	16 14	32 28	0 00E+00	5 59E-02	1 12E-01	0 3750	6 926E+10
Cs-134	2 4632E-08	16 14	32 28	0 00E+00	3 98E-07	7 95E-07	0 5750	1 171E+12
Cs-135	3 2195E-05	16 14	32 28	0 00E+00	5 20E-04	1 04E-03	0 8500	1 152E+10
Cs-137	9 7519E-01	16 14	32 28	0 00E+00	1 57E+01	3 15E+01	1 2500	1 232E+10
Eu-154	4 0947E-04	16 14	32 28	0 00E+00	6 61E-03	1 32E-02	1 7500	2 973E+08
Eu-155	5 4586E-05	16 14	32 28	0 00E+00	8 81E-04	1 76E-03	2 2500	7 573E+04
Fe-55	4 7955E-06	16 14	32 28	0 00E+00	7 74E-05	1 55E-04	2 7500	1 366E+04
H-3	8 9038E-04	16 14	32 28	0 00E+00	1 44E-02	2 87E-02	3 5000	4 007E+01
I-129	7 3684E-07	16 14	32 28	0 00E+00	1 19E-05	2 38E-05	5 0000	1 687E+01
Kr-85	1 3791E-02	16 14	32 28	0 00E+00	2 23E-01	4 45E-01	7 0000	1 903E+00
Np-237	1 3038E-06	16 14	32 28	0 00E+00	2 10E-05	4 21E-05	11 0000	2 164E-01
Pa-231	1 5534E-08	16 14	32 28	0 00E+00	2 51E-07	5 01E-07		
Pb-210	7 1759E-13	16 14	32 28	0 00E+00	1 16E-11	2 32E-11		
Pm-147	1 4547E-05	16 14	32 28	0 00E+00	2 35E-04	4 70E-04		
Pu-238	7 2827E-04	16 14	32 28	0 00E+00	1 18E-02	2 35E-02		
Pu-239	5 5218E-03	16 14	32 28	0 00E+00	8 91E-02	1 78E-01		
Pu-240	2 1173E-03	16 14	32 28	0 00E+00	3 42E-02	6 83E-02		
Pu-241	1 1702E-02	16 14	32 28	0 00E+00	1 89E-01	3 78E-01		
Pu-242	2 3128E-07	16 14	32 28	0 00E+00	3 73E-06	7 46E-06		
Ra-226	1 6827E-12	16 14	32 28	0 00E+00	2 72E-11	5 43E-11		
Ra-228	2 5263E-10	16 14	32 28	0 00E+00	4 08E-09	8 15E-09		
Ru-106	3 4090E-15	16 14	32 28	0 00E+00	5 50E-14	1 10E-13		
Se-79	1 3012E-05	16 14	32 28	0 00E+00	2 10E-04	4 20E-04		
Sn-126	1 2162E-05	16 14	32 28	0 00E+00	1 96E-04	3 93E-04		
Sr-90	8 9323E-01	16 14	32 28	0 00E+00	1 44E+01	2 88E+01		
Tc-99	4 4241E-04	16 14	32 28	0 00E+00	7 14E-03	1 43E-02		
Th-229	7 6902E-10	16 14	32 28	0 00E+00	1 24E-08	2 48E-08		
Th-230	1 3059E-10	16 14	32 28	0 00E+00	2 11E-09	4 21E-09		
Th-232	2 5278E-10	16 14	32 28	0 00E+00	4 08E-09	8 16E-09		
Ti-208	1 1892E-08	16 14	32 28	0 00E+00	1 92E-07	3 84E-07		
U-232	3 1970E-08	16 14	32 28	0 00E+00	5 16E-07	1 03E-06		
U-233	1 2232E-07	16 14	32 28	0 00E+00	1 97E-06	3 95E-06		
U-234	2 8662E-07	16 14	32 28	0 00E+00	4 63E-06	9 25E-06		
U-235	2 6194E-06	16 14	0 00	2 03E-04	1 61E-04	2 03E-04		
U-236	1 2696E-05	16 14	32 28	0 00E+00	2 05E-04	4 10E-04		
U-238	3 6331E-08	16 14	0 00	1 27E-04	1 27E-04	1 27E-04		
Y-90	8 9338E-01	16 14	32 28	0 00E+00	1 44E+01	2 88E+01		
Other Radionuclides					1 59E+01	3 18E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences*
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	19.87312476	10 to 20 1	

Burnup Summary (MWd)³

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	16 14	15 46	Nominal burnup taken directly from SFD (converted to MWd)
Bounding		32 28	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	1 00	0 96	1 00
Bounding	2 00		

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information:

Fuel Name: TRIGA 8 5/20 FFCR SO KOREA
SNF ID #: 734
Fuel Units & Descr: 3 - ELEMENT
Heavy Metal Mass: BOL=0.48kg, EOL=0.472kg
ROD Storage Site: INEEL

Fuel decay start date: 1996
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
*Template Burnup(MWd): 665
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 10 years

Estimated
Canister usage:
18"x10"
0.04

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3731E-09	11.70	23.39	0.00E+00	1.61E-08	3.21E-08	Avg MeV	
Am-241	2.3865E-03	11.70	23.39	0.00E+00	2.79E-02	5.58E-02	0.0150	3.022E+12
Am-242m	1.3812E-06	11.70	23.39	0.00E+00	1.62E-05	3.23E-05	0.0250	6.401E+11
Am-243	1.4767E-07	11.70	23.39	0.00E+00	1.73E-06	3.45E-06	0.0375	5.468E+11
C-14	1.2863E-04	11.70	23.39	0.00E+00	1.50E-03	3.01E-03	0.0575	5.828E+11
Cl-36	2.8120E-06	11.70	23.39	0.00E+00	3.29E-05	6.58E-05	0.0850	3.536E+11
Cm-243	1.5895E-07	11.70	23.39	0.00E+00	1.86E-06	3.72E-06	0.1250	2.324E+11
Cm-244	1.4008E-06	11.70	23.39	0.00E+00	1.64E-05	3.28E-05	0.2250	3.015E+11
Co-60	6.6541E-01	11.70	23.39	0.00E+00	7.78E+00	1.56E+01	0.3750	1.385E+11
Cs-134	1.6887E-02	11.70	23.39	0.00E+00	1.97E-01	3.95E-01	0.5750	2.170E+12
Cs-135	3.2195E-05	11.70	23.39	0.00E+00	3.77E-04	7.53E-04	0.8500	3.874E+10
Cs-137	2.4556E+00	11.70	23.39	0.00E+00	2.87E+01	5.74E+01	1.2500	1.165E+12
Eu-154	1.0268E-02	11.70	23.39	0.00E+00	1.20E-01	2.40E-01	1.7500	7.009E+08
Eu-155	1.4570E-02	11.70	23.39	0.00E+00	1.70E-01	3.41E-01	2.2500	3.661E+07
Fe-55	2.0361E-01	11.70	23.39	0.00E+00	2.38E+00	4.76E+00	2.7500	6.060E+05
H-3	8.3940E-03	11.70	23.39	0.00E+00	9.82E-02	1.96E-01	3.5000	7.182E+04
I-129	7.3684E-07	11.70	23.39	0.00E+00	8.62E-06	1.72E-05	5.0000	1.250E+01
Kr-85	1.8286E-01	11.70	23.39	0.00E+00	2.14E+00	4.28E+00	7.0000	1.414E+00
Np-237	1.2462E-06	11.70	23.39	0.00E+00	1.46E-05	2.91E-05	11.0000	1.611E-01
Pa-231	4.9143E-09	11.70	23.39	0.00E+00	5.75E-08	1.15E-07		
Pb-210	1.7173E-14	11.70	23.39	0.00E+00	2.01E-13	4.02E-13		
Pm-147	5.6165E-01	11.70	23.39	0.00E+00	6.57E+00	1.31E+01		
Pu-238	9.9820E-04	11.70	23.39	0.00E+00	1.17E-02	2.33E-02		
Pu-239	5.5293E-03	11.70	23.39	0.00E+00	6.47E-02	1.29E-01		
Pu-240	2.1263E-03	11.70	23.39	0.00E+00	2.49E-02	4.97E-02		
Pu-241	8.0165E-02	11.70	23.39	0.00E+00	9.38E-01	1.88E+00		
Pu-242	2.3128E-07	11.70	23.39	0.00E+00	2.70E-06	5.41E-06		
Ra-226	9.9774E-14	11.70	23.39	0.00E+00	1.17E-12	2.33E-12		
Ra-228	2.1729E-10	11.70	23.39	0.00E+00	2.54E-09	5.08E-09		
Ru-106	2.9519E-03	11.70	23.39	0.00E+00	3.45E-02	6.90E-02		
Se-79	1.3017E-05	11.70	23.39	0.00E+00	1.52E-04	3.04E-04		
Sn-126	1.2167E-05	11.70	23.39	0.00E+00	1.42E-04	2.85E-04		
Sr-90	2.3128E+00	11.70	23.39	0.00E+00	2.70E+01	5.41E+01		
Tc-99	4.4241E-04	11.70	23.39	0.00E+00	5.17E-03	1.03E-02		
Th-229	1.9459E-10	11.70	23.39	0.00E+00	2.28E-09	4.55E-09		
Th-230	2.5564E-11	11.70	23.39	0.00E+00	2.99E-10	5.98E-10		
Th-232	2.5278E-10	11.70	23.39	0.00E+00	2.96E-09	5.91E-09		
Ti-208	1.6947E-08	11.70	23.39	0.00E+00	1.98E-07	3.96E-07		
U-232	4.6812E-08	11.70	23.39	0.00E+00	5.47E-07	1.09E-06		
U-233	1.2206E-07	11.70	23.39	0.00E+00	1.43E-06	2.86E-06		
U-234	1.7323E-07	11.70	23.39	0.00E+00	2.03E-06	4.05E-06		
U-235	-2.6194E-06	11.70	0.00	2.07E-04	1.77E-04	2.07E-04		
U-236	1.2693E-05	11.70	23.39	0.00E+00	1.48E-04	2.97E-04		
U-238	-3.6331E-08	11.70	0.00	1.29E-04	1.29E-04	1.29E-04		
Y-90	2.3128E+00	11.70	23.39	0.00E+00	2.70E+01	5.41E+01		
Other Radionuclides					2.87E+01	5.73E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
Reactor Moderator	LW AND U ZIRC HYDRIDE	Used	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20	10 to 20.1	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	11.70	7.45	
Bounding		23.39	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.71	0.64	
Bounding	1.43		0.99

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

³Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8 5/20 FFCR U OF AZ
SNF ID #: 974
Fuel Units & Descr: 2 - ELEMENT
Heavy Metal Mass: BOL=0.32kg EOL=0.319kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0.03

II. Estimates	m	X _n	X _b	b	Y _n	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	0.95	1.91	0.00E+00	8.13E-10	1.63E-09	Avg MeV	
Am-241	1.8331E-03	0.95	1.91	0.00E+00	1.75E-03	3.50E-03	0.0150	3.086E+11
Am-242m	1.4129E-06	0.95	1.91	0.00E+00	1.35E-06	2.70E-06	0.0250	6.790E+10
Am-243	1.4774E-07	0.95	1.91	0.00E+00	1.41E-07	2.82E-07	0.0375	5.782E+10
C-14	1.2871E-04	0.95	1.91	0.00E+00	1.23E-04	2.46E-04	0.0575	5.935E+10
Cl-36	2.8120E-06	0.95	1.91	0.00E+00	2.68E-06	5.37E-06	0.0850	3.677E+10
Cm-243	1.7940E-07	0.95	1.91	0.00E+00	1.71E-07	3.43E-07	0.1250	2.670E+10
Cm-244	1.6962E-06	0.95	1.91	0.00E+00	1.62E-06	3.24E-06	0.2250	3.119E+10
Co-60	1.2839E+00	0.95	1.91	0.00E+00	1.23E+00	2.45E+00	0.3750	1.583E+10
Cs-134	9.0541E-02	0.95	1.91	0.00E+00	8.64E-02	1.73E-01	0.5750	2.104E+11
Cs-135	3.2195E-05	0.95	1.91	0.00E+00	3.07E-05	6.15E-05	0.8500	9.031E+09
Cs-137	2.7564E+00	0.95	1.91	0.00E+00	2.63E+00	5.26E+00	1.2500	1.834E+11
Eu-154	1.5368E-02	0.95	1.91	0.00E+00	1.47E-02	2.93E-02	1.7500	1.223E+08
Eu-155	2.9293E-02	0.95	1.91	0.00E+00	2.80E-02	5.59E-02	2.2500	1.971E+08
Fe-55	7.7158E-01	0.95	1.91	0.00E+00	7.37E-01	1.47E+00	2.7500	1.564E+06
H-3	1.1111E-02	0.95	1.91	0.00E+00	1.06E-02	2.12E-02	3.5000	1.820E+05
I-129	7.3684E-07	0.95	1.91	0.00E+00	7.03E-07	1.41E-06	5.0000	1.200E+00
Kr-85	2.5263E-01	0.95	1.91	0.00E+00	2.41E-01	4.82E-01	7.0000	1.362E-01
Np-237	1.2427E-06	0.95	1.91	0.00E+00	1.19E-06	2.37E-06	11.0000	1.553E-02
Pa-231	3.8511E-09	0.95	1.91	0.00E+00	3.68E-09	7.35E-09		
Pb-210	7.3880E-15	0.95	1.91	0.00E+00	7.05E-15	1.41E-14		
Pm-147	2.1023E+00	0.95	1.91	0.00E+00	2.01E+00	4.01E+00		
Pu-238	1.0383E-03	0.95	1.91	0.00E+00	9.91E-04	1.98E-03		
Pu-239	5.5293E-03	0.95	1.91	0.00E+00	5.28E-03	1.06E-02		
Pu-240	2.1278E-03	0.95	1.91	0.00E+00	2.03E-03	4.06E-03		
Pu-241	1.0195E-01	0.95	1.91	0.00E+00	9.73E-02	1.95E-01		
Pu-242	2.3128E-07	0.95	1.91	0.00E+00	2.21E-07	4.42E-07		
Ra-226	5.2782E-14	0.95	1.91	0.00E+00	5.04E-14	1.01E-13		
Ra-228	1.9338E-10	0.95	1.91	0.00E+00	1.85E-10	3.69E-10		
Ru-106	9.1684E-02	0.95	1.91	0.00E+00	8.75E-02	1.75E-01		
Se-79	1.3018E-05	0.95	1.91	0.00E+00	1.24E-05	2.49E-05		
Sn-126	1.2167E-05	0.95	1.91	0.00E+00	1.16E-05	2.32E-05		
Sr-90	2.6045E+00	0.95	1.91	0.00E+00	2.49E+00	4.97E+00		
Tc-99	4.4241E-04	0.95	1.91	0.00E+00	4.22E-04	8.45E-04		
Th-229	1.3713E-10	0.95	1.91	0.00E+00	1.31E-10	2.62E-10		
Th-230	1.8090E-11	0.95	1.91	0.00E+00	1.73E-11	3.45E-11		
Th-232	2.5278E-10	0.95	1.91	0.00E+00	2.41E-10	4.83E-10		
Ti-208	1.6947E-08	0.95	1.91	0.00E+00	1.62E-08	3.24E-08		
U-232	4.8737E-08	0.95	1.91	0.00E+00	4.65E-08	9.30E-08		
U-233	1.2203E-07	0.95	1.91	0.00E+00	1.16E-07	2.33E-07		
U-234	1.5925E-07	0.95	1.91	0.00E+00	1.52E-07	3.04E-07		
U-235	2.6194E-06	0.95	0.00	1.37E-04	1.35E-04	1.37E-04		
U-236	1.2693E-05	0.95	1.91	0.00E+00	1.21E-05	2.42E-05		
U-238	3.6331E-08	0.95	0.00	8.62E-05	8.61E-05	8.62E-05		
Y-90	2.6060E+00	0.95	1.91	0.00E+00	2.49E+00	4.98E+00		
Other Radionuclides					3.44E+00	6.88E+00		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	19.875	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	0.78	0.95
Bounding		1.91

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.09	1.22
Bounding	0.17	

Estimated EOL HM/Given EOL HM

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.520 FFCR U OF IL
SNF ID #: 448
Fuel Units & Descr: 4 - ELEMENT
Heavy Metal Mass: BOL=0.8kg; EOL=0.751kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0.05

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	46.58	93.17	0.00E+00	3.97E-08	7.94E-08	Avg MeV	
Am-241	1.8331E-03	46.58	93.17	0.00E+00	8.54E-02	1.71E-01	0.0150	1.506E+13
Am-242m	1.4129E-06	46.58	93.17	0.00E+00	6.58E-05	1.32E-04	0.0250	3.313E+12
Am-243	1.4774E-07	46.58	93.17	0.00E+00	6.88E-06	1.38E-05	0.0375	2.822E+12
C-14	1.2871E-04	46.58	93.17	0.00E+00	6.00E-03	1.20E-02	0.0575	2.896E+12
Cf-252	2.8120E-06	46.58	93.17	0.00E+00	1.31E-04	2.62E-04	0.0850	1.794E+12
Cm-243	1.7940E-07	46.58	93.17	0.00E+00	8.36E-06	1.67E-05	0.1250	1.303E+12
Cm-244	1.6962E-06	46.58	93.17	0.00E+00	7.90E-05	1.58E-04	0.2250	1.522E+12
Co-60	1.2839E+00	46.58	93.17	0.00E+00	5.98E+01	1.20E+02	0.3750	7.724E+11
Cs-134	9.0541E-02	46.58	93.17	0.00E+00	4.22E+00	8.44E+00	0.5750	1.027E+13
Cs-135	3.2195E-05	46.58	93.17	0.00E+00	1.50E-03	3.00E-03	0.8500	4.407E+11
Cs-137	2.7564E+00	46.58	93.17	0.00E+00	1.28E+02	2.57E+02	1.2500	8.950E+12
Eu-154	1.5368E-02	46.58	93.17	0.00E+00	7.16E-01	1.43E+00	1.7500	5.966E+09
Eu-155	2.9293E-02	46.58	93.17	0.00E+00	1.36E+00	2.73E+00	2.2500	9.617E+09
Fe-55	7.7158E-01	46.58	93.17	0.00E+00	3.59E+01	7.19E+01	2.7500	7.631E+07
H-3	1.1111E-02	46.58	93.17	0.00E+00	5.18E-01	1.04E+00	3.5000	8.881E+06
I-129	7.3684E-07	46.58	93.17	0.00E+00	3.43E-05	6.87E-05	5.0000	4.932E+01
Kr-85	2.5263E-01	46.58	93.17	0.00E+00	1.18E+01	2.35E+01	7.0000	5.583E+00
Np-237	1.2427E-06	46.58	93.17	0.00E+00	5.79E-05	1.16E-04	11.0000	6.360E-01
Pa-231	3.8511E-09	46.58	93.17	0.00E+00	1.79E-07	3.59E-07		
Pb-210	7.3880E-15	46.58	93.17	0.00E+00	3.44E-13	6.88E-13		
Pm-147	2.1023E+00	46.58	93.17	0.00E+00	9.79E+01	1.96E+02		
Pu-238	1.0383E-03	46.58	93.17	0.00E+00	4.84E-02	9.67E-02		
Pu-239	5.5293E-03	46.58	93.17	0.00E+00	2.58E-01	5.15E-01		
Pu-240	2.1278E-03	46.58	93.17	0.00E+00	9.91E-02	1.98E-01		
Pu-241	1.0195E-01	46.58	93.17	0.00E+00	4.75E+00	9.50E+00		
Pu-242	2.3128E-07	46.58	93.17	0.00E+00	1.08E-05	2.15E-05		
Ra-226	5.2782E-14	46.58	93.17	0.00E+00	2.46E-12	4.92E-12		
Ra-228	1.9338E-10	46.58	93.17	0.00E+00	9.01E-09	1.80E-08		
Ru-106	9.1684E-02	46.58	93.17	0.00E+00	4.27E+00	8.54E+00		
Se-79	1.3018E-05	46.58	93.17	0.00E+00	6.06E-04	1.21E-03		
Sn-126	1.2167E-05	46.58	93.17	0.00E+00	5.67E-04	1.13E-03		
Sr-90	2.6045E+00	46.58	93.17	0.00E+00	1.21E+02	2.43E+02		
Tc-99	4.4241E-04	46.58	93.17	0.00E+00	2.06E-02	4.12E-02		
Th-229	1.3713E-10	46.58	93.17	0.00E+00	6.39E-09	1.28E-08		
Th-230	1.8090E-11	46.58	93.17	0.00E+00	8.43E-10	1.69E-09		
Th-232	2.5278E-10	46.58	93.17	0.00E+00	1.18E-08	2.36E-08		
Ti-208	1.6947E-08	46.58	93.17	0.00E+00	7.89E-07	1.58E-06		
U-232	4.8737E-08	46.58	93.17	0.00E+00	2.27E-06	4.54E-06		
U-233	1.2203E-07	46.58	93.17	0.00E+00	5.68E-06	1.14E-05		
U-234	1.5925E-07	46.58	93.17	0.00E+00	7.42E-06	1.48E-05		
U-235	-2.6194E-06	46.58	0.00	3.46E-04	2.24E-04	3.46E-04		
U-236	1.2693E-05	46.58	93.17	0.00E+00	5.91E-04	1.18E-03		
U-238	-3.6331E-08	46.58	0.00	2.15E-04	2.13E-04	2.15E-04		
Y-90	2.6060E+00	46.58	93.17	0.00E+00	1.21E+02	2.43E+02		
Other Radionuclides					1.68E+02	3.36E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20.00000115	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	19.49	46.58	
Bounding		93.17	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	1.71	2.39	
Bounding	3.42		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA 8 5/20 FFCR U OF TX AUSTIN

SNF ID # 825

Fuel Units & Descr 3 - ELEMENT

Heavy Metal Mass BOL=0.48kg EOL=0.48kg

ROD Storage Site: INEEL

Fuel decay start date 2035

Estimates as of 2010

Template TRIGA-SS (LW/U-Zr, SST, 10 to 20% U)

Template Burnup(MWd) 6.65

Template BOL Heavy Metal Mass (MT) 0.000195

Template Decay Time 5 years

Estimated

Canister usage

18"x10"

0.04

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	9.16	18.33	0.00E+00	7.81E-09	1.56E-08	Avg MeV	
Am-241	1.8331E-03	9.16	18.33	0.00E+00	1.68E-02	3.36E-02	0.0150	2.962E+12
Am-242m	1.4129E-07	9.16	18.33	0.00E+00	1.29E-05	2.59E-05	0.0250	6.518E+11
Am-243	1.4774E-06	9.16	18.33	0.00E+00	1.35E-06	2.71E-06	0.0375	5.551E+11
C-14	1.2871E-04	9.16	18.33	0.00E+00	1.18E-03	2.36E-03	0.0575	5.698E+11
Cl-36	2.8120E-06	9.16	18.33	0.00E+00	2.58E-05	5.15E-05	0.0850	3.530E+11
Cm-243	1.7940E-07	9.16	18.33	0.00E+00	1.64E-06	3.29E-06	0.1250	2.563E+11
Cm-244	1.6962E-06	9.16	18.33	0.00E+00	1.55E-05	3.11E-05	0.2250	2.994E+11
Co-60	1.2839E+00	9.16	18.33	0.00E+00	1.18E+01	2.35E+01	0.3750	1.520E+11
Cs-134	9.0541E-02	9.16	18.33	0.00E+00	8.30E-01	1.66E+00	0.5750	2.020E+12
Cs-135	3.2195E-05	9.16	18.33	0.00E+00	2.95E-04	5.90E-04	0.8500	8.670E+10
Cs-137	2.7564E+00	9.16	18.33	0.00E+00	2.53E+01	5.05E+01	1.2500	1.761E+12
Eu-154	1.5368E-02	9.16	18.33	0.00E+00	1.41E-01	2.82E-01	1.7500	1.174E+09
Eu-155	2.9293E-02	9.16	18.33	0.00E+00	2.68E-01	5.37E-01	2.2500	1.892E+09
Fe-55	7.7158E-01	9.16	18.33	0.00E+00	7.07E+00	1.41E+01	2.7500	1.501E+07
H-3	1.1111E-02	9.16	18.33	0.00E+00	1.02E-01	2.04E-01	3.5000	1.747E+06
I-129	7.3684E-07	9.16	18.33	0.00E+00	6.75E-06	1.35E-05	5.0000	9.905E+00
Kr-85	2.5263E-01	9.16	18.33	0.00E+00	2.32E+00	4.63E+00	7.0000	1.122E+00
Np-237	1.2427E-06	9.16	18.33	0.00E+00	1.14E-05	2.28E-05	11.0000	1.278E-01
Pa-231	3.8511E-09	9.16	18.33	0.00E+00	3.53E-08	7.06E-08		
Pb-210	7.3880E-15	9.16	18.33	0.00E+00	6.77E-14	1.35E-13		
Pm-147	2.1023E+00	9.16	18.33	0.00E+00	1.93E+01	3.85E+01		
Pu-238	1.0383E-03	9.16	18.33	0.00E+00	9.52E-03	1.90E-02		
Pu-239	5.5293E-03	9.16	18.33	0.00E+00	5.07E-02	1.01E-01		
Pu-240	2.1278E-03	9.16	18.33	0.00E+00	1.95E-02	3.90E-02		
Pu-241	1.0195E-01	9.16	18.33	0.00E+00	9.34E-01	1.87E+00		
Pu-242	2.3128E-07	9.16	18.33	0.00E+00	2.12E-06	4.24E-06		
Ra-226	5.2782E-14	9.16	18.33	0.00E+00	4.84E-13	9.67E-13		
Ra-228	1.9338E-10	9.16	18.33	0.00E+00	1.77E-09	3.54E-09		
Ru-106	9.1684E-02	9.16	18.33	0.00E+00	8.40E-01	1.68E+00		
Se-79	1.3018E-05	9.16	18.33	0.00E+00	1.19E-04	2.39E-04		
Sn-126	1.2167E-05	9.16	18.33	0.00E+00	1.12E-04	2.23E-04		
Sr-90	2.6045E+00	9.16	18.33	0.00E+00	2.39E+01	4.77E+01		
Tc-99	4.4241E-04	9.16	18.33	0.00E+00	4.05E-03	8.11E-03		
Th-229	1.3713E-10	9.16	18.33	0.00E+00	1.26E-09	2.51E-09		
Th-230	1.8090E-11	9.16	18.33	0.00E+00	1.66E-10	3.32E-10		
Th-232	2.5278E-10	9.16	18.33	0.00E+00	2.32E-09	4.63E-09		
Ti-208	1.6947E-08	9.16	18.33	0.00E+00	1.55E-07	3.11E-07		
U-232	4.8737E-08	9.16	18.33	0.00E+00	4.47E-07	8.93E-07		
U-233	1.2203E-07	9.16	18.33	0.00E+00	1.12E-06	2.24E-06		
U-234	1.5925E-07	9.16	18.33	0.00E+00	1.46E-06	2.92E-06		
U-235	2.6194E-06	9.16	0.00	2.05E-04	1.81E-04	2.05E-04		
U-236	1.2693E-05	9.16	18.33	0.00E+00	1.16E-04	2.33E-04		
U-238	3.6331E-08	9.16	0.00	1.29E-04	1.29E-04	1.29E-04		
Y-90	2.6060E+00	9.16	18.33	0.00E+00	2.39E+01	4.78E+01		
Other Radionuclides					3.30E+01	6.61E+01		

Thermal Power		
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
5.33E-01	1.07E+00	
Total	Total	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	19.7916875	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		9.16	
Bounding		18.33	
			Nominal burnup assumed to be 2% of BOL heavy metal mass
			Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.56		
Bounding	1.12		
			0.98

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information:

Fuel Name: TRIGA 8.5/20 FFCR ZAIRE
SNF ID #: 735
Fuel Units & Descr: 4 - ELEMENT
Heavy Metal Mass: BOL=0.638kg; EOL=0.638kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.04

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CvMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	6.22	12.44	0.00E+00	5.30E-09	1.06E-08	Avg MeV	
Am-241	1.8331E-03	6.22	12.44	0.00E+00	1.14E-02	2.28E-02	0.0150	2.010E+12
Am-242m	1.4129E-06	6.22	12.44	0.00E+00	8.79E-06	1.76E-05	0.0250	4.423E+11
Am-243	1.4774E-07	6.22	12.44	0.00E+00	9.19E-07	1.84E-06	0.0375	3.766E+11
C-14	1.2871E-04	6.22	12.44	0.00E+00	8.00E-04	1.60E-03	0.0575	3.866E+11
Cl-36	2.8120E-06	6.22	12.44	0.00E+00	1.75E-05	3.50E-05	0.0850	2.395E+11
Cm-243	1.7940E-07	6.22	12.44	0.00E+00	1.12E-06	2.23E-06	0.1250	1.739E+11
Cm-244	1.6962E-06	6.22	12.44	0.00E+00	1.05E-05	2.11E-05	0.2250	2.032E+11
Co-60	1.2839E+00	6.22	12.44	0.00E+00	7.98E+00	1.60E+01	0.3750	1.031E+11
Cs-134	9.0541E-02	6.22	12.44	0.00E+00	5.63E-01	1.13E+00	0.5750	1.371E+12
Cs-135	3.2195E-05	6.22	12.44	0.00E+00	2.00E-04	4.00E-04	0.8500	5.883E+10
Cs-137	2.7564E+00	6.22	12.44	0.00E+00	1.71E+01	3.43E+01	1.2500	1.195E+12
Eu-154	1.5368E-02	6.22	12.44	0.00E+00	9.56E-02	1.91E-01	1.7500	7.963E+08
Eu-155	2.9293E-02	6.22	12.44	0.00E+00	1.82E-01	3.64E-01	2.2500	1.284E+09
Fe-55	7.7158E-01	6.22	12.44	0.00E+00	4.80E+00	9.60E+00	2.7500	1.019E+07
H-3	1.1111E-02	6.22	12.44	0.00E+00	6.91E-02	1.38E-01	3.5000	1.185E+06
I-129	7.3684E-07	6.22	12.44	0.00E+00	4.58E-06	9.16E-06	5.0000	6.914E+00
Kr-85	2.5263E-01	6.22	12.44	0.00E+00	1.57E+00	3.14E+00	7.0000	7.832E-01
Np-237	1.2427E-06	6.22	12.44	0.00E+00	7.73E-06	1.55E-05	11.0000	8.926E-02
Pa-231	3.8511E-09	6.22	12.44	0.00E+00	2.39E-08	4.79E-08		
Pb-210	7.3880E-15	6.22	12.44	0.00E+00	4.59E-14	9.19E-14		
Pm-147	2.1023E+00	6.22	12.44	0.00E+00	1.31E+01	2.61E+01		
Pu-238	1.0383E-03	6.22	12.44	0.00E+00	6.46E-03	1.29E-02		
Pu-239	5.5293E-03	6.22	12.44	0.00E+00	3.44E-02	6.88E-02		
Pu-240	2.1278E-03	6.22	12.44	0.00E+00	1.32E-02	2.65E-02		
Pu-241	1.0195E-01	6.22	12.44	0.00E+00	6.34E-01	1.27E+00		
Pu-242	2.3128E-07	6.22	12.44	0.00E+00	1.44E-06	2.88E-06		
Ra-226	5.2782E-14	6.22	12.44	0.00E+00	3.28E-13	6.56E-13		
Ra-228	1.9338E-10	6.22	12.44	0.00E+00	1.20E-09	2.40E-09		
Ru-106	9.1684E-02	6.22	12.44	0.00E+00	5.70E-01	1.14E+00		
Se-79	1.3018E-05	6.22	12.44	0.00E+00	8.09E-05	1.62E-04		
Sn-126	1.2167E-05	6.22	12.44	0.00E+00	7.57E-05	1.51E-04		
Sr-90	2.6045E+00	6.22	12.44	0.00E+00	1.62E+01	3.24E+01		
Tc-99	4.4241E-04	6.22	12.44	0.00E+00	2.75E-03	5.50E-03		
Th-229	1.3713E-10	6.22	12.44	0.00E+00	8.53E-10	1.71E-09		
Th-230	1.8090E-11	6.22	12.44	0.00E+00	1.12E-10	2.25E-10		
Th-232	2.5278E-10	6.22	12.44	0.00E+00	1.57E-09	3.14E-09		
Ti-208	1.6947E-08	6.22	12.44	0.00E+00	1.05E-07	2.11E-07		
U-232	4.8737E-08	6.22	12.44	0.00E+00	3.03E-07	6.06E-07		
U-233	1.2203E-07	6.22	12.44	0.00E+00	7.59E-07	1.52E-06		
U-234	1.5925E-07	6.22	12.44	0.00E+00	9.90E-07	1.98E-06		
U-235	-2.6194E-06	6.22	0.00	2.76E-04	2.59E-04	2.76E-04		
U-236	1.2693E-05	6.22	12.44	0.00E+00	7.89E-05	1.58E-04		
U-238	-3.6331E-08	6.22	0.00	1.72E-04	1.71E-04	1.72E-04		
Y-90	2.6060E+00	6.22	12.44	0.00E+00	1.62E+01	3.24E+01		
Other Radionuclides					2.24E+01	4.48E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20.0000041	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	6.22		
Bounding		12.44	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.29	0.00	
Bounding	0.57		0.99

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD (ACPR)
SNF ID # 895
Fuel Units & Descr 182 - ELEMENT
Heavy Metal Mass BOL=48.357kg, EOL=48.357kg
ROD Storage Site INEEL
Fuel decay start date 2035
Estimates as of 2010
Template TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
Template Burnup(MWd) 6.65
Template BOL Heavy Metal Mass (MT) 0.000195
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
1.64

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CvMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	Avg MeV	
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0150	5.162E+08
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0250	0.000E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0375	7.043E+05
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0575	4.276E+05
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0850	6.017E+07
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.1250	1.188E+08
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.2250	4.204E+08
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.3750	1.049E+06
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.5750	5.161E+04
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.8500	8.046E+03
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.2500	4.756E+02
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.7500	2.327E+02
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.2500	1.348E+02
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.7500	7.832E+01
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	3.5000	7.002E+01
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	5.0000	3.008E+01
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	7.0000	3.463E+00
Np-237	1.2427E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	11.0000	3.981E-01
Pa-231	3.8511E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pb-210	7.3880E-15	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pm-147	2.1023E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-238	1.0383E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-239	5.5293E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-240	2.1278E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-241	1.0195E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-242	2.3128E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-226	5.2782E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-228	1.9338E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ru-106	9.1684E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Se-79	1.3018E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sn-126	1.2167E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sr-90	2.6045E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Tc-99	4.4241E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-229	1.3713E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-230	1.8090E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-232	2.5278E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ti-208	1.6947E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-232	4.8737E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-233	1.2203E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-234	1.5925E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-235	-2.6194E-06	0.00	0.00	2.08E-02	2.08E-02	2.08E-02		
U-236	1.2693E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-238	-3.6331E-08	0.00	0.00	1.30E-02	1.30E-02	1.30E-02		
Y-90	2.6060E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Other Radionuclides					0.00E+00	0.00E+00		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences ¹
Reactor Moderator	From SFD	Used	
Fuel Cladding	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
BOL HM Constituents	SST	SST	
BOL Enrichment %	U	U	
	19.95031243	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	0.00		
Bounding			Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.00		
Bounding	0.00		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) ARRR

SNF ID #: 238

Fuel Units & Descr: 71 - ELEMENT

Heavy Metal Mass: BOL=13.376kg, EOL=9.322kg

ROD Storage Site: INEEL

¹Fuel decay start date: 2035

Estimates as of: 2010

Template: TRIGA-AI (LW/U-Zr, Alum, 10 to 20%, U)

²Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.00018

Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0.64

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	CvMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	3,869.71	7,739.43	0.00E+00	3.12E-06	6.24E-06	Avg. MeV	
Am-241	2.2586E-03	3,869.71	7,739.43	0.00E+00	8.74E+00	1.75E+01	0.0150	1.310E+15
Am-242m	1.9925E-06	3,869.71	7,739.43	0.00E+00	7.71E-03	1.54E-02	0.0250	2.843E+14
Am-243	2.3323E-07	3,869.71	7,739.43	0.00E+00	9.03E-04	1.81E-03	0.0375	3.541E+14
C-14	4.3308E-05	3,869.71	7,739.43	0.00E+00	1.68E-01	3.35E-01	0.0575	2.715E+14
Cl-36	4.3023E-08	3,869.71	7,739.43	0.00E+00	1.66E-04	3.33E-04	0.0850	1.900E+14
Co-243	2.7429E-07	3,869.71	7,739.43	0.00E+00	1.06E-03	2.12E-03	0.1250	2.842E+14
Co-244	3.1504E-06	3,869.71	7,739.43	0.00E+00	1.22E-02	2.44E-02	0.2250	1.586E+14
Co-60	3.1008E-02	3,869.71	7,739.43	0.00E+00	1.20E+02	2.40E+02	0.3750	7.061E+13
Cs-134	1.0367E-01	3,869.71	7,739.43	0.00E+00	4.01E+02	8.02E+02	0.5750	8.952E+14
Cs-135	3.1549E-05	3,869.71	7,739.43	0.00E+00	1.22E-01	2.44E-01	0.8500	2.204E+14
Cs-137	2.7564E+00	3,869.71	7,739.43	0.00E+00	1.07E+04	2.13E+04	1.2500	2.284E+14
Eu-154	1.3490E+00	3,869.71	7,739.43	0.00E+00	5.22E+03	1.04E+04	1.7500	6.537E+12
Eu-155	4.3880E-01	3,869.71	7,739.43	0.00E+00	1.70E+03	3.40E+03	2.2500	7.946E+11
Fe-55	8.6782E-03	3,869.71	7,739.43	0.00E+00	3.36E+01	6.72E+01	2.7500	6.454E+09
H-3	1.0805E-02	3,869.71	7,739.43	0.00E+00	4.18E+01	8.36E+01	3.5000	7.543E+08
I-129	7.3805E-07	3,869.71	7,739.43	0.00E+00	2.86E-03	5.71E-03	5.0000	4.423E+03
Kr-85	2.5218E-01	3,869.71	7,739.43	0.00E+00	9.76E+02	1.95E+03	7.0000	5.006E+02
Np-237	1.4463E-06	3,869.71	7,739.43	0.00E+00	5.60E-03	1.12E-02	11.0000	5.701E+01
Pa-231	3.5970E-09	3,869.71	7,739.43	0.00E+00	1.39E-05	2.78E-05		
Pb-210	8.2511E-15	3,869.71	7,739.43	0.00E+00	3.19E-11	6.39E-11		
Pm-147	2.0767E+00	3,869.71	7,739.43	0.00E+00	8.04E+03	1.61E+04		
Pu-238	1.3514E-03	3,869.71	7,739.43	0.00E+00	5.23E+00	1.05E+01		
Pu-239	5.6947E-03	3,869.71	7,739.43	0.00E+00	2.20E+01	4.41E+01		
Pu-240	2.2647E-03	3,869.71	7,739.43	0.00E+00	8.76E+00	1.75E+01		
Pu-241	1.2574E-01	3,869.71	7,739.43	0.00E+00	4.87E+02	9.73E+02		
Pu-242	3.0602E-07	3,869.71	7,739.43	0.00E+00	1.18E-03	2.37E-03		
Ra-226	5.7353E-14	3,869.71	7,739.43	0.00E+00	2.22E-10	4.44E-10		
Ra-228	1.8150E-10	3,869.71	7,739.43	0.00E+00	7.02E-07	1.40E-06		
Ru-106	9.3744E-02	3,869.71	7,739.43	0.00E+00	3.63E+02	7.26E+02		
Se-79	1.2938E-05	3,869.71	7,739.43	0.00E+00	5.01E-02	1.00E-01		
Sn-126	1.2239E-05	3,869.71	7,739.43	0.00E+00	4.74E-02	9.47E-02		
Sr-90	2.6000E+00	3,869.71	7,739.43	0.00E+00	1.01E+04	2.01E+04		
Tc-99	4.4120E-04	3,869.71	7,739.43	0.00E+00	1.71E+00	3.41E+00		
Th-229	1.4749E-10	3,869.71	7,739.43	0.00E+00	5.71E-07	1.14E-06		
Th-230	1.9549E-11	3,869.71	7,739.43	0.00E+00	7.56E-08	1.51E-07		
Th-232	2.3744E-10	3,869.71	7,739.43	0.00E+00	9.19E-07	1.84E-06		
Th-208	1.9459E-08	3,869.71	7,739.43	0.00E+00	7.53E-05	1.51E-04		
U-232	5.6015E-08	3,869.71	7,739.43	0.00E+00	2.17E-04	4.34E-04		
U-233	1.3132E-07	3,869.71	7,739.43	0.00E+00	5.08E-04	1.02E-03		
U-234	1.7323E-07	3,869.71	7,739.43	0.00E+00	6.70E-04	1.34E-03		
U-235	-2.6159E-06	3,869.71	0.00	5.67E-03	0.00E+00	5.67E-03		
U-236	1.2717E-05	3,869.71	7,739.43	0.00E+00	4.92E-02	9.84E-02		
U-238	-3.8857E-08	3,869.71	0.00	3.61E-03	3.46E-03	3.61E-03		
Y-90	2.6015E+00	3,869.71	7,739.43	0.00E+00	1.01E+04	2.01E+04		
Other Radionuclides					1.47E+04	2.94E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.94E+02	3.89E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	ALUM	ALUM
BOL HM Constituents	U	U
BOL Enrichment %	19.62614987	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	494.30	3.869.71
Bounding		7.739.43

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	7.83	7.83
Bounding	15.66	

Estimated EOL HM/Given EOL HM

1.23

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD (ALUM) AUSTRIA
 SNF ID # 462
 Fuel Units & Descr 66 - ELEMENT
 Heavy Metal Mass BOL=11.88kg EOL=11.814kg
 ROD Storage Site INEEL

¹Fuel decay start date 2010
 Estimates as of 2010
 Template TRIGA-AI (LW/U-Zrx, Alum, 10 to 20%, U)
²Template Burnup(MWd) 665
 Template BOL Heavy Metal Mass (MT) 0.00018
 Template Decay Time 5 years

Estimated
 Canister usage
 18"x10"
 0.59

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	63.00	126.00	0.00E+00	5.08E-08	1.02E-07	Avg MeV	
Am-241	2.2586E-03	63.00	126.00	0.00E+00	1.42E-01	2.85E-01	0.0150	2.132E+13
Am-242m	1.9925E-06	63.00	126.00	0.00E+00	1.26E-04	2.51E-04	0.0250	4.628E+12
Am-243	2.3323E-07	63.00	126.00	0.00E+00	1.47E-05	2.94E-05	0.0375	5.765E+12
C-14	4.3308E-05	63.00	126.00	0.00E+00	2.73E-03	5.46E-03	0.0575	4.420E+12
Cl-36	4.3023E-08	63.00	126.00	0.00E+00	2.71E-06	5.42E-06	0.0850	3.094E+12
Cm-243	2.7429E-07	63.00	126.00	0.00E+00	1.73E-05	3.46E-05	0.1250	4.627E+12
Cm-244	3.1504E-06	63.00	126.00	0.00E+00	1.98E-04	3.97E-04	0.2250	2.583E+12
Co-60	3.1008E-02	63.00	126.00	0.00E+00	1.95E+00	3.91E+00	0.3750	1.149E+12
Cs-134	1.0367E-01	63.00	126.00	0.00E+00	6.53E+00	1.31E+01	0.5750	1.457E+13
Cs-135	3.1549E-05	63.00	126.00	0.00E+00	1.99E-03	3.98E-03	0.8500	3.587E+12
Cs-137	2.7564E+00	63.00	126.00	0.00E+00	1.74E+02	3.47E+02	1.2500	3.718E+12
Eu-154	1.3490E+00	63.00	126.00	0.00E+00	8.50E+01	1.70E+02	1.7500	1.064E+11
Eu-155	4.3880E-01	63.00	126.00	0.00E+00	2.76E+01	5.53E+01	2.2500	1.294E+10
Fe-55	8.6782E-03	63.00	126.00	0.00E+00	5.47E-01	1.09E+00	2.7500	1.051E+08
H-3	1.0805E-02	63.00	126.00	0.00E+00	6.81E-01	1.36E+00	3.5000	1.228E+07
I-129	7.3805E-07	63.00	126.00	0.00E+00	4.65E-05	9.30E-05	5.0000	7.926E+01
Kr-85	2.5218E-01	63.00	126.00	0.00E+00	1.59E+01	3.18E+01	7.0000	8.983E+00
Np-237	1.4463E-06	63.00	126.00	0.00E+00	9.11E-05	1.82E-04	11.0000	1.024E+00
Pa-231	3.5970E-09	63.00	126.00	0.00E+00	2.27E-07	4.53E-07		
Pb-210	8.2511E-15	63.00	126.00	0.00E+00	5.20E-13	1.04E-12		
Pm-147	2.0767E+00	63.00	126.00	0.00E+00	1.31E+02	2.62E+02		
Pu-238	1.3514E-03	63.00	126.00	0.00E+00	8.51E-02	1.70E-01		
Pu-239	5.6947E-03	63.00	126.00	0.00E+00	3.59E-01	7.18E-01		
Pu-240	2.2647E-03	63.00	126.00	0.00E+00	1.43E-01	2.85E-01		
Pu-241	1.2574E-01	63.00	126.00	0.00E+00	7.92E+00	1.58E+01		
Pu-242	3.0602E-07	63.00	126.00	0.00E+00	1.93E-05	3.86E-05		
Ra-226	5.7353E-14	63.00	126.00	0.00E+00	3.61E-12	7.23E-12		
Ra-228	1.8150E-10	63.00	126.00	0.00E+00	1.14E-08	2.29E-08		
Ru-106	9.3744E-02	63.00	126.00	0.00E+00	5.91E+00	1.18E+01		
Se-79	1.2938E-05	63.00	126.00	0.00E+00	8.15E-04	1.63E-03		
Sn-126	1.2239E-05	63.00	126.00	0.00E+00	7.71E-04	1.54E-03		
Sr-90	2.6000E+00	63.00	126.00	0.00E+00	1.64E+02	3.28E+02		
Tc-99	4.4120E-04	63.00	126.00	0.00E+00	2.78E-02	5.56E-02		
Th-229	1.4749E-10	63.00	126.00	0.00E+00	9.29E-09	1.86E-08		
Th-230	1.9549E-11	63.00	126.00	0.00E+00	1.23E-09	2.46E-09		
Th-232	2.3744E-10	63.00	126.00	0.00E+00	1.50E-08	2.99E-08		
Ti-208	1.9459E-08	63.00	126.00	0.00E+00	1.23E-06	2.45E-06		
U-232	5.6015E-08	63.00	126.00	0.00E+00	3.53E-06	7.06E-06		
U-233	1.3132E-07	63.00	126.00	0.00E+00	8.27E-06	1.65E-05		
U-234	1.7323E-07	63.00	126.00	0.00E+00	1.09E-05	2.18E-05		
U-235	-2.6159E-06	63.00	0.00	5.13E-03	4.97E-03	5.13E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.2717E-05	63.00	126.00	0.00E+00	8.01E-04	1.60E-03	3.17E+00	6.33E+00
U-238	-3.8857E-08	63.00	0.00	3.19E-03	3.19E-03	3.19E-03	Total	Total
Y-90	2.6015E+00	63.00	126.00	0.00E+00	1.64E+02	3.28E+02		
Other Radionuclides					2.39E+02	4.79E+02		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %	20	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	57.89	63.00
Bounding		126.00

Basis for burnup used in estimate

Nominal burnup calculated from the heavy metal mass destroyed.
 Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.14	1.09
Bounding	0.29	

Estimated EOL HM/Given EOL HM
 1.00

¹Reactor shutdown core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) BRAZIL
SNF ID #: 471

Fuel Units & Descr: 59 - ELEMENT

Heavy Metal Mass: BOL=11 086kg; EOL=10 585kg

ROD Storage Site: INEEL

¹Fuel decay start date 2006

Estimates as of: 2010

Template: TRIGA-AI (LW/U-Zr, Alum, 10 to 20%, U)

²Template Burnup(MWd): 6 65

Template BOL Heavy Metal Mass (MT): 0 00018

Template Decay Time*: 5 years

Estimated
Canister usage:
18"x10"
0.53

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 0632E-10	478 69	957 38	0 00E+00	3 86E-07	7 72E-07	Avg MeV	
Am-241	2 2586E-03	478 69	957 38	0 00E+00	1 08E+00	2 16E+00	0 0150	1 620E+14
Am-242m	1 9925E-06	478 69	957 38	0 00E+00	9 54E-04	1 91E-03	0 0250	3 517E+13
Am-243	2 3323E-07	478 69	957 38	0 00E+00	1 12E-04	2 23E-04	0 0375	4 381E+13
C-14	4 3308E-05	478 69	957 38	0 00E+00	2 07E-02	4 15E-02	0 0575	3 358E+13
Cl-36	4 3023E-08	478 69	957 38	0 00E+00	2 06E-05	4 12E-05	0 0850	2 351E+13
Cm-243	2 7429E-07	478 69	957 38	0 00E+00	1 31E-04	2 63E-04	0 1250	3 516E+13
Cm-244	3 1504E-06	478 69	957 38	0 00E+00	1 51E-03	3 02E-03	0 2250	1 962E+13
Co-60	3 1008E-02	478 69	957 38	0 00E+00	1 48E+01	2 97E+01	0 3750	8 734E+12
Cs-134	1 0367E-01	478 69	957 38	0 00E+00	4 96E+01	9 93E+01	0 5750	1 107E+14
Cs-135	3 1549E-05	478 69	957 38	0 00E+00	1 51E-02	3 02E-02	0 8500	2 726E+13
Cs-137	2 7564E+00	478 69	957 38	0 00E+00	1 32E+03	2 64E+03	1 2500	2 825E+13
Eu-154	1 3490E+00	478 69	957 38	0 00E+00	6 46E+02	1 29E+03	1 7500	8 066E+11
Eu-155	4 3880E-01	478 69	957 38	0 00E+00	2 10E+02	4 20E+02	2 2500	9 829E+10
Fe-55	8 6782E-03	478 69	957 38	0 00E+00	4 15E+00	8 31E+00	2 7500	7 983E+08
H-3	1 0805E-02	478 69	957 38	0 00E+00	5 17E+00	1 03E+01	3 5000	9 331E+07
I-129	7 3805E-07	478 69	957 38	0 00E+00	3 53E-04	7 07E-04	5 0000	5 531E+02
Kr-85	2 5218E-01	478 69	957 38	0 00E+00	1 21E+02	2 41E+02	7 0000	6 260E+01
Np-237	1 4463E-06	478 69	957 38	0 00E+00	6 92E-04	1 38E-03	11 0000	7 130E+00
Pa-231	3 5970E-09	478 69	957 38	0 00E+00	1 72E-06	3 44E-06		
Pb-210	8 2511E-15	478 69	957 38	0 00E+00	3 95E-12	7 90E-12		
Pm-147	2 0767E+00	478 69	957 38	0 00E+00	9 94E+02	1 99E+03		
Pu-238	1 3514E-03	478 69	957 38	0 00E+00	6 47E-01	1 29E+00		
Pu-239	5 6947E-03	478 69	957 38	0 00E+00	2 73E+00	5 45E+00		
Pu-240	2 2647E-03	478 69	957 38	0 00E+00	1 08E+00	2 17E+00		
Pu-241	1 2574E-01	478 69	957 38	0 00E+00	6 02E+01	1 20E+02		
Pu-242	3 0602E-07	478 69	957 38	0 00E+00	1 46E-04	2 93E-04		
Ra-226	5 7353E-14	478 69	957 38	0 00E+00	2 75E-11	5 49E-11		
Ra-228	1 8150E-10	478 69	957 38	0 00E+00	8 69E-08	1 74E-07		
Ru-106	9 3744E-02	478 69	957 38	0 00E+00	4 49E+01	8 97E+01		
Se-79	1 2938E-05	478 69	957 38	0 00E+00	6 19E-03	1 24E-02		
Sn-126	1 2239E-05	478 69	957 38	0 00E+00	5 86E-03	1 17E-02		
Sr-90	2 6000E+00	478 69	957 38	0 00E+00	1 24E+03	2 49E+03		
Tc-99	4 4120E-04	478 69	957 38	0 00E+00	2 11E-01	4 22E-01		
Th-229	1 4749E-10	478 69	957 38	0 00E+00	7 06E-08	1 41E-07		
Th-230	1 9549E-11	478 69	957 38	0 00E+00	9 36E-09	1 87E-08		
Th-232	2 3744E-10	478 69	957 38	0 00E+00	1 14E-07	2 27E-07		
Th-208	1 9459E-08	478 69	957 38	0 00E+00	9 31E-06	1 86E-05		
U-232	5 6015E-08	478 69	957 38	0 00E+00	2 68E-05	5 36E-05		
U-233	1 3132E-07	478 69	957 38	0 00E+00	6 29E-05	1 26E-04		
U-234	1 7323E-07	478 69	957 38	0 00E+00	8 29E-05	1 66E-04		
U-235	-2 6159E-06	478 69	0 00	4 75E-03	3 49E-03	4 75E-03		
U-236	1 2717E-06	478 69	957 38	0 00E+00	6 09E-03	1 22E-02		
U-238	-3 8857E-08	478 69	0 00	2 99E-03	2 97E-03	2 99E-03		
Y-90	2 6015E+00	478 69	957 38	0 00E+00	1 25E+03	2 49E+03		
Other Radionuclides					1 82E+03	3 64E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19 81	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	108 05	478 69	
Bounding		957 38	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	1 17	4 43	
Bounding	2 34		1 00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD (ALUM) CORNELL
SNF ID # 1047
Fuel Units & Descr. 7 - ELEMENT
Heavy Metal Mass BOL=1.295kg EOL=1.263kg
ROD Storage Site INEEL

¹Fuel decay start date 2002
Estimates as of. 2010
Template: TRIGA-AI (LW/U-Zr, Alum, 10 to 20% U)
²Template Burnup(MWd) 6.65
Template BOL Heavy Metal Mass (MT) 0.00018
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0.06

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	8.0632E-10	30.07	60.13	0.00E+00	2.42E-08	4.85E-08	0.0150	1.017E+13
Am-241	2.2586E-03	30.07	60.13	0.00E+00	6.79E-02	1.36E-01	0.0250	2.209E+12
Am-242m	1.9925E-06	30.07	60.13	0.00E+00	5.99E-05	1.20E-04	0.0375	2.752E+12
Am-243	2.3323E-07	30.07	60.13	0.00E+00	7.01E-06	1.40E-05	0.0575	2.109E+12
C-14	4.3308E-05	30.07	60.13	0.00E+00	1.30E-03	2.60E-03	0.0850	1.477E+12
Cl-36	4.3023E-08	30.07	60.13	0.00E+00	1.29E-06	2.59E-06	0.1250	2.208E+12
Cm-243	2.7429E-07	30.07	60.13	0.00E+00	8.25E-06	1.65E-05	0.2250	1.233E+12
Cm-244	3.1504E-06	30.07	60.13	0.00E+00	9.47E-05	1.89E-04	0.3750	5.486E+11
Co-60	3.1008E-02	30.07	60.13	0.00E+00	9.32E-01	1.86E+00	0.5750	6.955E+12
Cs-134	1.0367E-01	30.07	60.13	0.00E+00	3.12E+00	6.23E+00	0.8500	1.712E+12
Cs-135	3.1549E-05	30.07	60.13	0.00E+00	9.49E-04	1.90E-03	1.2500	1.775E+12
Cs-137	2.7564E+00	30.07	60.13	0.00E+00	8.29E+01	1.66E+02	1.7500	5.079E+10
Eu-154	1.3490E+00	30.07	60.13	0.00E+00	4.06E+01	8.11E+01	2.2500	6.174E+09
Eu-155	4.3880E-01	30.07	60.13	0.00E+00	1.32E+01	2.64E+01	2.7500	5.015E+07
Fe-55	8.6782E-03	30.07	60.13	0.00E+00	2.61E-01	5.22E-01	3.5000	5.861E+06
H-3	1.0805E-02	30.07	60.13	0.00E+00	3.25E-01	6.50E-01	5.0000	3.511E+01
I-129	7.3805E-07	30.07	60.13	0.00E+00	2.22E-05	4.44E-05	7.0000	3.974E+00
Kr-85	2.5218E-01	30.07	60.13	0.00E+00	7.58E+00	1.52E+01	11.0000	4.527E-01
Np-237	1.4463E-06	30.07	60.13	0.00E+00	4.35E-05	8.70E-05		
Pa-231	3.5970E-09	30.07	60.13	0.00E+00	1.08E-07	2.16E-07		
Pb-210	8.2511E-15	30.07	60.13	0.00E+00	2.48E-13	4.96E-13		
Pm-147	2.0767E+00	30.07	60.13	0.00E+00	6.24E+01	1.25E+02		
Pu-238	1.3514E-03	30.07	60.13	0.00E+00	4.06E-02	8.13E-02		
Pu-239	5.6947E-03	30.07	60.13	0.00E+00	1.71E-01	3.42E-01		
Pu-240	2.2647E-03	30.07	60.13	0.00E+00	6.81E-02	1.36E-01		
Pu-241	1.2574E-01	30.07	60.13	0.00E+00	3.78E+00	7.56E+00		
Pu-242	3.0602E-07	30.07	60.13	0.00E+00	9.20E-06	1.84E-05		
Ra-226	5.7353E-14	30.07	60.13	0.00E+00	1.72E-12	3.45E-12		
Ra-228	1.8150E-10	30.07	60.13	0.00E+00	5.46E-09	1.09E-08		
Ru-106	9.3744E-02	30.07	60.13	0.00E+00	2.82E+00	5.64E+00		
Se-79	1.2938E-05	30.07	60.13	0.00E+00	3.89E-04	7.78E-04		
Sn-126	1.2239E-05	30.07	60.13	0.00E+00	3.68E-04	7.36E-04		
Sr-90	2.6000E+00	30.07	60.13	0.00E+00	7.82E+01	1.56E+02		
Tc-99	4.4120E-04	30.07	60.13	0.00E+00	1.33E-02	2.65E-02		
Th-229	1.4749E-10	30.07	60.13	0.00E+00	4.43E-09	8.87E-09		
Th-230	1.9549E-11	30.07	60.13	0.00E+00	5.88E-10	1.18E-09		
Th-232	2.3744E-10	30.07	60.13	0.00E+00	7.14E-09	1.43E-08		
Ti-208	1.9459E-08	30.07	60.13	0.00E+00	5.85E-07	1.17E-06		
U-232	5.6015E-08	30.07	60.13	0.00E+00	1.68E-06	3.37E-06		
U-233	1.3132E-07	30.07	60.13	0.00E+00	3.95E-06	7.90E-06		
U-234	1.7323E-07	30.07	60.13	0.00E+00	5.21E-06	1.04E-05		
U-235	-2.6159E-06	30.07	0.00	5.60E-04	4.81E-04	5.60E-04		
U-236	1.2717E-05	30.07	60.13	0.00E+00	3.82E-04	7.65E-04		
U-238	-3.8857E-08	30.07	0.00	3.48E-04	3.47E-04	3.48E-04		
Y-90	2.6015E+00	30.07	60.13	0.00E+00	7.82E+01	1.56E+02		
Other Radionuclides					1.14E+02	2.29E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	20	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	6.31	30.07	
Bounding		60.13	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.63	4.76	
Bounding	1.26		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) CORNELL UNIV
SNF ID #: 235
Fuel Units & Descr: 65 - ELEMENT
Heavy Metal Mass: BOL=12.025kg; EOL=11.94kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1973
Estimates as of: 2010
Template: TRIGA-AI (LW/U-Zr, Alum 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 35 years

Estimated
Canister usage
18"x10"
0.59

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1504E-09	80.66	161.31	0.00E+00	4.96E-07	9.92E-07	Avg. MeV	
Am-241	4.8165E-03	80.66	161.31	0.00E+00	3.88E-01	7.77E-01	0.0150	1.138E+13
Am-242m	1.7383E-06	80.66	161.31	0.00E+00	1.40E-04	2.80E-04	0.0250	2.355E+12
Am-243	2.3263E-07	80.66	161.31	0.00E+00	1.88E-05	3.75E-05	0.0375	2.222E+12
C-14	4.3158E-05	80.66	161.31	0.00E+00	3.48E-03	6.96E-03	0.0575	2.239E+12
Cl-36	4.3023E-08	80.66	161.31	0.00E+00	3.47E-06	6.94E-06	0.0850	1.336E+12
Cm-243	1.3229E-07	80.66	161.31	0.00E+00	1.07E-05	2.13E-05	0.1250	1.154E+12
Cm-244	1.0000E-06	80.66	161.31	0.00E+00	8.07E-05	1.61E-04	0.2250	1.194E+12
Co-60	6.0120E-04	80.66	161.31	0.00E+00	4.85E-02	9.70E-02	0.3750	5.067E+11
Cs-134	4.3534E-06	80.66	161.31	0.00E+00	3.51E-04	7.02E-04	0.5750	8.346E+12
Cs-135	3.1549E-05	80.66	161.31	0.00E+00	2.54E-03	5.09E-03	0.8500	4.259E+11
Cs-137	1.3788E+00	80.66	161.31	0.00E+00	1.11E+02	2.22E+02	1.2500	4.178E+11
Eu-154	1.2041E-01	80.66	161.31	0.00E+00	9.71E+00	1.94E+01	1.7500	1.344E+10
Eu-155	6.6451E-03	80.66	161.31	0.00E+00	5.36E-01	1.07E+00	2.2500	2.652E+05
Fe-55	2.9338E-06	80.66	161.31	0.00E+00	2.37E-04	4.73E-04	2.7500	8.973E+04
H-3	2.0075E-03	80.66	161.31	0.00E+00	1.62E-01	3.24E-01	3.5000	2.310E+02
I-129	7.3805E-07	80.66	161.31	0.00E+00	5.95E-05	1.19E-04	5.0000	9.729E+01
Kr-85	3.6301E-02	80.66	161.31	0.00E+00	2.93E+00	5.86E+00	7.0000	1.098E+01
Np-237	1.4977E-06	80.66	161.31	0.00E+00	1.21E-04	2.42E-04	11.0000	1.249E+00
Pa-231	1.1275E-08	80.66	161.31	0.00E+00	9.09E-07	1.82E-06		
Pb-210	3.8932E-13	80.66	161.31	0.00E+00	3.14E-11	6.28E-11		
Pm-147	7.5383E-04	80.66	161.31	0.00E+00	6.08E-02	1.22E-01		
Pu-238	1.0668E-03	80.66	161.31	0.00E+00	8.60E-02	1.72E-01		
Pu-239	5.6902E-03	80.66	161.31	0.00E+00	4.59E-01	9.18E-01		
Pu-240	2.2571E-03	80.66	161.31	0.00E+00	1.82E-01	3.64E-01		
Pu-241	2.9699E-02	80.66	161.31	0.00E+00	2.40E+00	4.79E+00		
Pu-242	3.0602E-07	80.66	161.31	0.00E+00	2.47E-05	4.94E-05		
Ra-226	1.0704E-12	80.66	161.31	0.00E+00	8.63E-11	1.73E-10		
Ra-228	2.3654E-10	80.66	161.31	0.00E+00	1.91E-08	3.82E-08		
Ru-106	1.0444E-10	80.66	161.31	0.00E+00	8.42E-09	1.68E-08		
Se-79	1.2934E-05	80.66	161.31	0.00E+00	1.04E-03	2.09E-03		
Sn-126	1.2236E-05	80.66	161.31	0.00E+00	9.87E-04	1.97E-03		
Sr-90	1.2740E+00	80.66	161.31	0.00E+00	1.03E+02	2.06E+02		
Tc-99	4.4120E-04	80.66	161.31	0.00E+00	3.56E-02	7.12E-02		
Th-229	6.4226E-10	80.66	161.31	0.00E+00	5.18E-08	1.04E-07		
Th-230	1.0594E-10	80.66	161.31	0.00E+00	8.54E-09	1.71E-08		
Th-232	2.3744E-10	80.66	161.31	0.00E+00	1.92E-08	3.83E-08		
Ti-208	1.5774E-08	80.66	161.31	0.00E+00	1.27E-06	2.54E-06		
U-232	4.2511E-08	80.66	161.31	0.00E+00	3.43E-06	6.86E-06		
U-233	1.3155E-07	80.66	161.31	0.00E+00	1.06E-05	2.12E-05		
U-234	3.0030E-07	80.66	161.31	0.00E+00	2.42E-05	4.84E-05		
U-235	-2.6144E-06	80.66	0.00	5.20E-03	4.99E-03	5.20E-03		
U-236	1.2720E-05	80.66	161.31	0.00E+00	1.03E-03	2.06E-03		
U-238	-3.8857E-08	80.66	0.00	3.23E-03	3.23E-03	3.23E-03		
Y-90	1.2744E+00	80.66	161.31	0.00E+00	1.03E+02	2.06E+02		
Other Radionuclides					1.23E+02	2.46E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	20	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	58.60	80.66	
Bounding		161.31	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.18	1.38	
Bounding	0.36		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD (ALUM) DOW

SNF ID # 970

Fuel Units & Descr 1 - ELEMENT

Heavy Metal Mass BOL=0 19kg; EOL=0 18kg

ROD Storage Site INEEL

Fuel decay start date 2035

Estimates as of 2010

Template: TRIGA-AI (LW/U-Zr, Alum, 10 to 20% U)

Template Burnup(MWd) 6.65

Template BOL Heavy Metal Mass (MT): 0.00018

Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0.01

II. Estimates

	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	9.55	19.09	0.00E+00	7.70E-09	1.54E-08	Avg MeV	
Am-241	2.2586E-03	9.55	19.09	0.00E+00	2.16E-02	4.31E-02	0.0150	3.230E+12
Am-242m	1.9925E-06	9.55	19.09	0.00E+00	1.90E-05	3.80E-05	0.0250	7.013E+11
Am-243	2.3323E-07	9.55	19.09	0.00E+00	2.23E-06	4.45E-06	0.0375	8.735E+11
C-14	4.3308E-05	9.55	19.09	0.00E+00	4.13E-04	8.27E-04	0.0575	6.697E+11
Cl-36	4.3023E-08	9.55	19.09	0.00E+00	4.11E-07	8.21E-07	0.0850	4.687E+11
Cm-243	2.7429E-07	9.55	19.09	0.00E+00	2.62E-06	5.24E-06	0.1250	7.011E+11
Cm-244	3.1504E-06	9.55	19.09	0.00E+00	3.01E-05	6.01E-05	0.2250	3.913E+11
Co-60	3.1008E-02	9.55	19.09	0.00E+00	2.96E-01	5.92E-01	0.3750	1.742E+11
Cs-134	1.0367E-01	9.55	19.09	0.00E+00	9.90E-01	1.98E+00	0.5750	2.208E+12
Cs-135	3.1549E-05	9.55	19.09	0.00E+00	3.01E-04	6.02E-04	0.8500	5.435E+11
Cs-137	2.7564E+00	9.55	19.09	0.00E+00	2.63E+01	5.26E+01	1.2500	5.634E+11
Eu-154	1.3490E+00	9.55	19.09	0.00E+00	1.29E+01	2.58E+01	1.7500	1.612E+10
Eu-155	4.3880E-01	9.55	19.09	0.00E+00	4.19E+00	8.38E+00	2.2500	1.960E+09
Fe-55	8.6782E-03	9.55	19.09	0.00E+00	8.28E-02	1.66E-01	2.7500	1.592E+07
H-3	1.0805E-02	9.55	19.09	0.00E+00	1.03E-01	2.06E-01	3.5000	1.861E+06
I-129	7.3805E-07	9.55	19.09	0.00E+00	7.04E-06	1.41E-05	5.0000	1.101E+01
Kr-85	2.5218E-01	9.55	19.09	0.00E+00	2.41E+00	4.81E+00	7.0000	1.246E+00
Np-237	1.4463E-06	9.55	19.09	0.00E+00	1.38E-05	2.76E-05	11.0000	1.419E-01
Pa-231	3.5970E-09	9.55	19.09	0.00E+00	3.43E-08	6.87E-08		
Pb-210	8.2511E-15	9.55	19.09	0.00E+00	7.88E-14	1.58E-13		
Pm-147	2.0767E+00	9.55	19.09	0.00E+00	1.98E+01	3.96E+01		
Pu-238	1.3514E-03	9.55	19.09	0.00E+00	1.29E-02	2.58E-02		
Pu-239	5.6947E-03	9.55	19.09	0.00E+00	5.44E-02	1.09E-01		
Pu-240	2.2647E-03	9.55	19.09	0.00E+00	2.16E-02	4.32E-02		
Pu-241	1.2574E-01	9.55	19.09	0.00E+00	1.20E+00	2.40E+00		
Pu-242	3.0602E-07	9.55	19.09	0.00E+00	2.92E-06	5.84E-06		
Ra-226	5.7353E-14	9.55	19.09	0.00E+00	5.47E-13	1.09E-12		
Ra-228	1.8150E-10	9.55	19.09	0.00E+00	1.73E-09	3.46E-09		
Ru-106	9.3744E-02	9.55	19.09	0.00E+00	8.95E-01	1.79E+00		
Se-79	1.2938E-05	9.55	19.09	0.00E+00	1.23E-04	2.47E-04		
Sn-126	1.2239E-05	9.55	19.09	0.00E+00	1.17E-04	2.34E-04		
Sr-90	2.6000E+00	9.55	19.09	0.00E+00	2.48E+01	4.96E+01		
Tc-99	4.4120E-04	9.55	19.09	0.00E+00	4.21E-03	8.42E-03		
Th-229	1.4749E-10	9.55	19.09	0.00E+00	1.41E-09	2.82E-09		
Th-230	1.9549E-11	9.55	19.09	0.00E+00	1.87E-10	3.73E-10		
Th-232	2.3744E-10	9.55	19.09	0.00E+00	2.27E-09	4.53E-09		
Ti-208	1.9459E-08	9.55	19.09	0.00E+00	1.86E-07	3.71E-07		
U-232	5.6015E-08	9.55	19.09	0.00E+00	5.35E-07	1.07E-06		
U-233	1.3132E-07	9.55	19.09	0.00E+00	1.25E-06	2.51E-06		
U-234	1.7323E-07	9.55	19.09	0.00E+00	1.65E-06	3.31E-06		
U-235	2.6159E-06	9.55	0.00	8.21E-05	5.71E-05	8.21E-05		
U-236	1.2717E-05	9.55	19.09	0.00E+00	1.21E-04	2.43E-04		
U-238	3.8857E-08	9.55	0.00	5.11E-05	5.07E-05	5.11E-05		
Y-90	2.6015E+00	9.55	19.09	0.00E+00	2.48E+01	4.97E+01		
Other Radionuclides					3.63E+01	7.26E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	20	10 to 20.1	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	1.85	9.55	
Bounding		19.09	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	1.36	5.15	
Bounding	2.72		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) FINLAND
SNF ID #: 463
Fuel Units & Descr: 69 - ELEMENT
Heavy Metal Mass: BOL=12.42kg, EOL=12.344kg
ROD Storage Site: INEEL

¹Fuel decay start date:

2010

Estimates as of:

2010

Template: TRIGA-AI (LW/U-Zr, Alum, 10 to 20%, U)

²Template Burnup(MWd):

6.65

Template BOL Heavy Metal Mass (MT):

0.00018

Template Decay Time:

5 years

Estimated

Canister usage,

18"x10"

0.62

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	72.45	144.90	0.00E+00	5.84E-08	1.17E-07	Avg. MeV	
Am-241	2.2586E-03	72.45	144.90	0.00E+00	1.64E-01	3.27E-01	0.0150	2.452E+13
Am-242m	1.9925E-06	72.45	144.90	0.00E+00	1.44E-04	2.89E-04	0.0250	5.323E+12
Am-243	2.3323E-07	72.45	144.90	0.00E+00	1.69E-05	3.38E-05	0.0375	6.630E+12
C-14	4.3308E-05	72.45	144.90	0.00E+00	3.14E-03	6.28E-03	0.0575	5.083E+12
Cl-36	4.3023E-08	72.45	144.90	0.00E+00	3.12E-06	6.23E-06	0.0850	3.558E+12
Cm-243	2.7429E-07	72.45	144.90	0.00E+00	1.99E-05	3.97E-05	0.1250	5.321E+12
Cm-244	3.1504E-06	72.45	144.90	0.00E+00	2.28E-04	4.56E-04	0.2250	2.970E+12
Co-60	3.1008E-02	72.45	144.90	0.00E+00	2.25E+00	4.49E+00	0.3750	1.322E+12
Cs-134	1.0367E-01	72.45	144.90	0.00E+00	7.51E+00	1.50E+01	0.5750	1.676E+13
Cs-135	3.1549E-05	72.45	144.90	0.00E+00	2.29E-03	4.57E-03	0.8500	4.125E+12
Cs-137	2.7564E+00	72.45	144.90	0.00E+00	2.00E+02	3.99E+02	1.2500	4.276E+12
Eu-154	1.3490E+00	72.45	144.90	0.00E+00	9.77E+01	1.95E+02	1.7500	1.224E+11
Eu-155	4.3880E-01	72.45	144.90	0.00E+00	3.18E+01	6.36E+01	2.2500	1.488E+10
Fe-55	8.6782E-03	72.45	144.90	0.00E+00	6.29E-01	1.26E+00	2.7500	1.208E+08
H-3	1.0805E-02	72.45	144.90	0.00E+00	7.83E-01	1.57E+00	3.5000	1.412E+07
I-129	7.3805E-07	72.45	144.90	0.00E+00	5.35E-05	1.07E-04	5.0000	9.038E+01
Kr-85	2.5218E-01	72.45	144.90	0.00E+00	1.83E+01	3.65E+01	7.0000	1.024E+01
Np-237	1.4463E-06	72.45	144.90	0.00E+00	1.05E-04	2.10E-04	11.0000	1.167E+00
Pa-231	3.5970E-09	72.45	144.90	0.00E+00	2.61E-07	5.21E-07		
Pb-210	8.2511E-15	72.45	144.90	0.00E+00	5.98E-13	1.20E-12		
Pm-147	2.0767E+00	72.45	144.90	0.00E+00	1.50E+02	3.01E+02		
Pu-238	1.3514E-03	72.45	144.90	0.00E+00	9.79E-02	1.96E-01		
Pu-239	5.6947E-03	72.45	144.90	0.00E+00	4.13E-01	8.25E-01		
Pu-240	2.2647E-03	72.45	144.90	0.00E+00	1.64E-01	3.28E-01		
Pu-241	1.2574E-01	72.45	144.90	0.00E+00	9.11E+00	1.82E+01		
Pu-242	3.0602E-07	72.45	144.90	0.00E+00	2.22E-05	4.43E-05		
Ra-226	5.7353E-14	72.45	144.90	0.00E+00	4.16E-12	8.31E-12		
Ra-228	1.8150E-10	72.45	144.90	0.00E+00	1.31E-08	2.63E-08		
Ru-106	9.3744E-02	72.45	144.90	0.00E+00	6.79E+00	1.36E+01		
Sa-79	1.2938E-05	72.45	144.90	0.00E+00	9.37E-04	1.87E-03		
Sn-126	1.2239E-05	72.45	144.90	0.00E+00	8.87E-04	1.77E-03		
Sr-90	2.6000E+00	72.45	144.90	0.00E+00	1.88E+02	3.77E+02		
Tc-99	4.4120E-04	72.45	144.90	0.00E+00	3.20E-02	6.39E-02		
Th-229	1.4749E-10	72.45	144.90	0.00E+00	1.07E-08	2.14E-08		
Th-230	1.9549E-11	72.45	144.90	0.00E+00	1.42E-09	2.83E-09		
Th-232	2.3744E-10	72.45	144.90	0.00E+00	1.72E-08	3.44E-08		
Th-208	1.9459E-08	72.45	144.90	0.00E+00	1.41E-06	2.82E-06		
U-232	5.6015E-08	72.45	144.90	0.00E+00	4.06E-06	8.12E-06		
U-233	1.3132E-07	72.45	144.90	0.00E+00	9.51E-06	1.90E-05		
U-234	1.7323E-07	72.45	144.90	0.00E+00	1.26E-05	2.51E-05		
U-235	-2.6159E-06	72.45	0.00	5.37E-03	5.18E-03	5.37E-03		
U-236	1.2717E-05	72.45	144.90	0.00E+00	9.21E-04	1.84E-03		
U-238	-3.8857E-08	72.45	0.00	3.34E-03	3.34E-03	3.34E-03		
Y-90	2.6015E+00	72.45	144.90	0.00E+00	1.88E+02	3.77E+02		
Other Radionuclides					2.75E+02	5.51E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	60.52	72.45	
Bounding		144.90	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.16	1.20	
Bounding	0.32		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD (ALUM) GA
SNF ID # 728
Fuel Units & Descr: 52 - ELEMENT
Heavy Metal Mass BOL=9 412kg EOL=9 329kg
ROD Storage Site INEEL

Fuel decay start date: 2035
Estimates as of 2010
Template TRIGA-AI (LW/U-Zr, Alum 10 to 20% U)
Template Burnup(MWd): 6 65
Template BOL Heavy Metal Mass (MT) 0 00018
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0 47

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	91 73	183 46	0 00E+00	7 40E-08	1 48E-07	Avg MeV	
Am-241	2.2586E-03	91 73	183 46	0 00E+00	2 07E-01	4 14E-01	0 0150	3 104E+13
Am-242m	1.9925E-06	91 73	183 46	0 00E+00	1 83E-04	3 66E-04	0 0250	6 739E+12
Am-243	2.3323E-07	91 73	183 46	0 00E+00	2 14E-05	4 28E-05	0 0375	8 395E+12
C-14	4.3308E-05	91 73	183 46	0 00E+00	3 97E-03	7 95E-03	0 0575	6 435E+12
Cl-36	4.3023E-08	91 73	183 46	0 00E+00	3 95E-06	7 89E-06	0 0850	4 505E+12
Cm-243	2 7429E-07	91 73	183 46	0 00E+00	2 52E-05	5 03E-05	0 1250	6 737E+12
Cm-244	3 1504E-06	91 73	183 46	0 00E+00	2 89E-04	5 78E-04	0 2250	3 761E+12
Co-60	3 1008E-02	91 73	183 46	0 00E+00	2 84E+00	5 69E+00	0 3750	1 674E+12
Cs-134	1.0367E-01	91 73	183 46	0 00E+00	9 51E+00	1 90E+01	0 5750	2 122E+13
Cs-135	3.1549E-05	91 73	183 46	0 00E+00	2 89E-03	5 79E-03	0 8500	5 223E+12
Cs-137	2.7564E+00	91 73	183 46	0 00E+00	2 53E+02	5 06E+02	1 2500	5 414E+12
Eu-154	1.3490E+00	91 73	183 46	0 00E+00	1 24E+02	2 47E+02	1 7500	1 550E+11
Eu-155	4.3880E-01	91 73	183 46	0 00E+00	4 03E+01	8 05E+01	2 2500	1 884E+10
Fe-55	8 6782E-03	91 73	183 46	0 00E+00	7 96E-01	1 59E+00	2 7500	1 530E+08
H-3	1 0805E-02	91 73	183 46	0 00E+00	9 91E-01	1 98E+00	3 5000	1 788E+07
I-129	7.3805E-07	91 73	183 46	0 00E+00	6 77E-05	1 35E-04	5 0000	1 105E+02
Kr-85	2 5218E-01	91 73	183 46	0 00E+00	2 31E+01	4 63E+01	7 0000	1 252E+01
Np-237	1 4463E-06	91 73	183 46	0 00E+00	1 33E-04	2 65E-04	11 0000	1 426E+00
Pa-231	3 5970E-09	91 73	183 46	0 00E+00	3 30E-07	6 60E-07		
Pb-210	8 2511E-15	91 73	183 46	0 00E+00	7 57E-13	1 51E-12		
Pm-147	2 0767E+00	91 73	183 46	0 00E+00	1 90E+02	3 81E+02		
Pu-238	1 3514E-03	91 73	183 46	0 00E+00	1 24E-01	2 48E-01		
Pu-239	5 6947E-03	91 73	183 46	0 00E+00	5 22E-01	1 04E+00		
Pu-240	2 2647E-03	91 73	183 46	0 00E+00	2 08E-01	4 15E-01		
Pu-241	1 2574E-01	91 73	183 46	0 00E+00	1 15E+01	2 31E+01		
Pu-242	3 0602E-07	91 73	183 46	0 00E+00	2 81E-05	5 61E-05		
Ra-226	5 7353E-14	91 73	183 46	0 00E+00	5 26E-12	1 05E-11		
Ra-228	1 8150E-10	91 73	183 46	0 00E+00	1 66E-08	3 33E-08		
Ru-106	9 3744E-02	91 73	183 46	0 00E+00	8 60E+00	1 72E+01		
Se-79	1 2938E-06	91 73	183 46	0 00E+00	1 19E-03	2 37E-03		
Sn-126	1 2239E-05	91 73	183 46	0 00E+00	1 12E-03	2 25E-03		
Sr-90	2 6000E+00	91 73	183 46	0 00E+00	2 38E+02	4 77E+02		
Tc-99	4 4120E-04	91 73	183 46	0 00E+00	4 05E-02	8 09E-02		
Th-229	1 4749E-10	91 73	183 46	0 00E+00	1 35E-08	2 71E-08		
Th-230	1 9549E-11	91 73	183 46	0 00E+00	1 79E-09	3 59E-09		
Th-232	2 3744E-10	91 73	183 46	0 00E+00	2 18E-08	4 36E-08		
Ti-208	1 9459E-08	91 73	183 46	0 00E+00	1 78E-06	3 57E-06		
U-232	5 6015E-08	91 73	183 46	0 00E+00	5 14E-06	1 03E-05		
U-233	1 3132E-07	91 73	183 46	0 00E+00	1 20E-05	2 41E-05		
U-234	1 7323E-07	91 73	183 46	0 00E+00	1 59E-05	3 18E-05		
U-235	-2 6159E-06	91 73	0 00	4 03E-03	3 79E-03	4 03E-03		
U-236	1 2717E-05	91 73	183 46	0 00E+00	1 17E-03	2 33E-03		
U-238	-3 8857E-08	91 73	0 00	2 54E-03	2 53E-03	2 54E-03		
Y-90	2 6015E+00	91 73	183 46	0 00E+00	2 39E+02	4 77E+02		
Other Radionuclides					3 49E+02	6 97E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	ALUM	ALUM
BOL HM Constituents	U	U
BOL Enrichment %	19 8109242	10 to 20 1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	91 73	79 42
Bounding		183 46

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 26	0 87
Bounding	0 53	

Estimated EOL HM/Given EOL HM

1 00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) GA
SNF ID #: 870
Fuel Units & Descr: 246 - ELEMENT
Heavy Metal Mass: BOL=46 74kg, EOL=45 19kg
ROD Storage Site: INEEL

¹Fuel decay start date 1973
Estimates as of: 2010

Template: TRIGA-AI (LW/U-Zrx, Alum., 10 to 20%, U)

²Template Burnup(MWd)³ 6 65
Template BOL Heavy Metal Mass (MT). 0 00018
Template Decay Time 35 years

Estimated
Canister usage:
18"x10"
2 22

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6 1504E-09	1,479 31	2,958 63	0 00E+00	9 10E-06	1 82E-05	Avg MeV	
Am-241	4 8165E-03	1,479 31	2,958 63	0 00E+00	7 13E+00	1 43E+01	0 0150	2 087E+14
Am-242m	1 7383E-06	1,479 31	2,958 63	0 00E+00	2 57E-03	5 14E-03	0 0250	4 319E+13
Am-243	2 3263E-07	1,479 31	2,958 63	0 00E+00	3 44E-04	6 88E-04	0 0375	4 075E+13
C-14	4 3158E-05	1,479 31	2,958 63	0 00E+00	6 38E-02	1 28E-01	0 0575	4 106E+13
Cl-36	4 3023E-08	1,479 31	2,958 63	0 00E+00	6 36E-05	1 27E-04	0 0850	2 451E+13
Cm-243	1 3229E-07	1,479 31	2,958 63	0 00E+00	1 96E-04	3 91E-04	0 1250	2 117E+13
Cm-244	1 0000E-06	1,479 31	2,958 63	0 00E+00	1 48E-03	2 96E-03	0 2250	2 189E+13
Co-60	6 0120E-04	1,479 31	2,958 63	0 00E+00	8 89E-01	1 78E+00	0 3750	9 292E+12
Cs-134	4 3534E-06	1,479 31	2,958 63	0 00E+00	6 44E-03	1 29E-02	0 5750	1 531E+14
Cs-135	3 1549E-05	1,479 31	2,958 63	0 00E+00	4 67E-02	9 33E-02	0 8500	7 811E+12
Cs-137	1 3788E+00	1,479 31	2,958 63	0 00E+00	2 04E+03	4 08E+03	1 2500	7 664E+12
Eu-154	1 2041E-01	1,479 31	2,958 63	0 00E+00	1 78E+02	3 56E+02	1 7500	2 466E+11
Eu-155	6 6451E-03	1,479 31	2,958 63	0 00E+00	9 83E+00	1 97E+01	2 2500	4 863E+06
Fe-55	2 9338E-06	1,479 31	2,958 63	0 00E+00	4 34E-03	8 68E-03	2 7500	1 645E+06
H-3	2 0075E-03	1,479 31	2,958 63	0 00E+00	2 97E+00	5 94E+00	3 5000	3 984E+03
I-129	7 3805E-07	1,479 31	2,958 63	0 00E+00	1 09E-03	2 18E-03	5 0000	1 676E+03
Kr-85	3 6301E-02	1,479 31	2,958 63	0 00E+00	5 37E+01	1 07E+02	7 0000	1 890E+02
Np-237	1 4977E-06	1,479 31	2,958 63	0 00E+00	2 22E-03	4 43E-03	11 0000	2 148E+01
Pa-231	1 1275E-08	1,479 31	2,958 63	0 00E+00	1 67E-05	3 34E-05		
Pb-210	3 8932E-13	1,479 31	2,958 63	0 00E+00	5 76E-10	1 15E-09		
Pm-147	7 5383E-04	1,479 31	2,958 63	0 00E+00	1 12E+00	2 23E+00		
Pu-238	1 0668E-03	1,479 31	2,958 63	0 00E+00	1 58E+00	3 16E+00		
Pu-239	5 6902E-03	1,479 31	2,958 63	0 00E+00	8 42E+00	1 68E+01		
Pu-240	2 2571E-03	1,479 31	2,958 63	0 00E+00	3 34E+00	6 68E+00		
Pu-241	2 9699E-02	1,479 31	2,958 63	0 00E+00	4 39E+01	8 79E+01		
Pu-242	3 0602E-07	1,479 31	2,958 63	0 00E+00	4 53E-04	9 05E-04		
Ra-226	1 0704E-12	1,479 31	2,958 63	0 00E+00	1 58E-09	3 17E-09		
Ra-228	2 3654E-10	1,479 31	2,958 63	0 00E+00	3 50E-07	7 00E-07		
Ru-106	1 0444E-10	1,479 31	2,958 63	0 00E+00	1 54E-07	3 09E-07		
Se-79	1 2934E-05	1,479 31	2,958 63	0 00E+00	1 91E-02	3 83E-02		
Sn-126	1 2236E-05	1,479 31	2,958 63	0 00E+00	1 81E-02	3 62E-02		
Sr-90	1 2740E+00	1,479 31	2,958 63	0 00E+00	1 88E+03	3 77E+03		
Tc-99	4 4120E-04	1,479 31	2,958 63	0 00E+00	6 53E-01	1 31E+00		
Th-229	6 4226E-10	1,479 31	2,958 63	0 00E+00	9 50E-07	1 90E-06		
Th-230	1 0594E-10	1,479 31	2,958 63	0 00E+00	1 57E-07	3 13E-07		
Th-232	2 3744E-10	1,479 31	2,958 63	0 00E+00	3 51E-07	7 03E-07		
Tl-208	1 5774E-08	1,479 31	2,958 63	0 00E+00	2 33E-05	4 67E-05		
U-232	4 2511E-08	1,479 31	2,958 63	0 00E+00	6 29E-05	1 26E-04		
U-233	1 3155E-07	1,479 31	2,958 63	0 00E+00	1 95E-04	3 89E-04		
U-234	3 0030E-07	1,479 31	2,958 63	0 00E+00	4 44E-04	8 88E-04		
U-235	-2 6144E-06	1,479 31	0 00	2 01E-02	1 62E-02	2 01E-02		
U-236	1 2720E-05	1,479 31	2,958 63	0 00E+00	1 88E-02	3 76E-02		
U-238	-3 8857E-08	1,479 31	0 00	1 26E-02	1 25E-02	1 26E-02		
Y-90	1 2744E+00	1,479 31	2,958 63	0 00E+00	1 89E+03	3 77E+03		
Other Radionuclides					2 25E+03	4 51E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
Reactor Moderator:	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19 9	10 to 20 1	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	455.53	1,479 31	
Bounding		2 958 63	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 86	3.25	
Bounding	1 71		1 00

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

³Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD (ALUM) GERMANY
 SNF ID # 465
 Fuel Units & Descr 65 - ELEMENT
 Heavy Metal Mass BOL=11 7kg EOL=11 635kg
 ROD Storage Site INEEL

¹Fuel decay start date: 2010
 Estimates as of 2010
 Template TRIGA-AI (LW/U-Zrx, Alum, 10 to 20%, U)
²Template Burnup(MWd) 6 65
 Template BOL Heavy Metal Mass (MT) 0.00018
 Template Decay Time 5 years

Estimated
 Canister usage
 18"x10"
 0.59

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	62.04	124.09	0.00E+00	5.00E-08	1.00E-07	Avg MeV	
Am-241	2.2586E-03	62.04	124.09	0.00E+00	1.40E-01	2.80E-01	0.0150	2.100E+13
Am-242m	1.9925E-06	62.04	124.09	0.00E+00	1.24E-04	2.47E-04	0.0250	4.558E+12
Am-243	2.3323E-07	62.04	124.09	0.00E+00	1.45E-05	2.89E-05	0.0375	5.678E+12
C-14	4.3308E-05	62.04	124.09	0.00E+00	2.69E-03	5.37E-03	0.0575	4.353E+12
Cl-36	4.3023E-08	62.04	124.09	0.00E+00	2.67E-06	5.34E-06	0.0850	3.047E+12
Cm-243	2.7429E-07	62.04	124.09	0.00E+00	1.70E-05	3.40E-05	0.1250	4.557E+12
Cm-244	3.1504E-06	62.04	124.09	0.00E+00	1.95E-04	3.91E-04	0.2250	2.544E+12
Co-60	3.1008E-02	62.04	124.09	0.00E+00	1.92E+00	3.85E+00	0.3750	1.132E+12
Cs-134	1.0367E-01	62.04	124.09	0.00E+00	6.43E+00	1.29E+01	0.5750	1.435E+13
Cs-135	3.1549E-05	62.04	124.09	0.00E+00	1.96E-03	3.91E-03	0.8500	3.533E+12
Cs-137	2.7564E+00	62.04	124.09	0.00E+00	1.71E+02	3.42E+02	1.2500	3.662E+12
Eu-154	1.3490E+00	62.04	124.09	0.00E+00	8.37E+01	1.67E+02	1.7500	1.048E+11
Eu-155	4.3880E-01	62.04	124.09	0.00E+00	2.72E+01	5.44E+01	2.2500	1.274E+10
Fe-55	8.6782E-03	62.04	124.09	0.00E+00	5.38E-01	1.08E+00	2.7500	1.035E+08
H-3	1.0805E-02	62.04	124.09	0.00E+00	6.70E-01	1.34E+00	3.5000	1.209E+07
I-129	7.3805E-07	62.04	124.09	0.00E+00	4.58E-05	9.16E-05	5.0000	7.806E+01
Kr-85	2.5218E-01	62.04	124.09	0.00E+00	1.56E+01	3.13E+01	7.0000	8.847E+00
Np-237	1.4463E-06	62.04	124.09	0.00E+00	8.97E-05	1.79E-04	11.0000	1.009E+00
Pa-231	3.5970E-09	62.04	124.09	0.00E+00	2.23E-07	4.46E-07		
Pb-210	8.2511E-15	62.04	124.09	0.00E+00	5.12E-13	1.02E-12		
Pm-147	2.0767E+00	62.04	124.09	0.00E+00	1.29E+02	2.58E+02		
Pu-238	1.3514E-03	62.04	124.09	0.00E+00	8.38E-02	1.68E-01		
Pu-239	5.6947E-03	62.04	124.09	0.00E+00	3.53E-01	7.07E-01		
Pu-240	2.2647E-03	62.04	124.09	0.00E+00	1.41E-01	2.81E-01		
Pu-241	1.2574E-01	62.04	124.09	0.00E+00	7.80E+00	1.56E+01		
Pu-242	3.0602E-07	62.04	124.09	0.00E+00	1.90E-05	3.80E-05		
Ra-226	5.7353E-14	62.04	124.09	0.00E+00	3.56E-12	7.12E-12		
Ra-228	1.8150E-10	62.04	124.09	0.00E+00	1.13E-08	2.25E-08		
Ru-106	9.3744E-02	62.04	124.09	0.00E+00	5.82E+00	1.16E+01		
Se-79	1.2938E-05	62.04	124.09	0.00E+00	8.03E-04	1.61E-03		
Sn-126	1.2239E-05	62.04	124.09	0.00E+00	7.59E-04	1.52E-03		
Sr-90	2.6000E+00	62.04	124.09	0.00E+00	1.61E+02	3.23E+02		
Tc-99	4.4120E-04	62.04	124.09	0.00E+00	2.74E-02	5.47E-02		
Th-229	1.4749E-10	62.04	124.09	0.00E+00	9.15E-09	1.83E-08		
Th-230	1.9549E-11	62.04	124.09	0.00E+00	1.21E-09	2.43E-09		
Th-232	2.3744E-10	62.04	124.09	0.00E+00	1.47E-08	2.95E-08		
Ti-208	1.9459E-08	62.04	124.09	0.00E+00	1.21E-06	2.41E-06		
U-232	5.6015E-08	62.04	124.09	0.00E+00	3.48E-06	6.95E-06		
U-233	1.3132E-07	62.04	124.09	0.00E+00	8.15E-06	1.63E-05		
U-234	1.7323E-07	62.04	124.09	0.00E+00	1.07E-05	2.15E-05		
U-235	-2.6159E-06	62.04	0.00	5.06E-03	4.89E-03	5.06E-03		
U-236	1.2717E-05	62.04	124.09	0.00E+00	7.89E-04	1.58E-03		
U-238	-3.8857E-08	62.04	0.00	3.15E-03	3.14E-03	3.15E-03		
Y-90	2.6015E+00	62.04	124.09	0.00E+00	1.61E+02	3.23E+02		
Other Radionuclides					2.36E+02	4.72E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	20	10 to 20.1	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	57.01	62.04	
Bounding:		124.09	Nominal burnup calculated from the heavy metal mass desolved Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.14	1.09	
Bounding	0.29		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) HANFORD
SNF ID #: 876
Fuel Units & Descr: 59 - ELEMENT
Heavy Metal Mass: BOL=10 915kg, EOL=10 838kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1973
Estimates as of: 2010
Template: TRIGA-AI (LW/U-Zrx, Alum, 10 to 20%, U)
²Template Burnup(MWd): 6 65
Template BOL Heavy Metal Mass (MT): 0 00018
Template Decay Time: 35 years

Estimated
Canister usage
18"x10"
0 53

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	6 1504E-09	73.21	146 42	0 00E+00	4 50E-07	9 01E-07	Avg MeV	
Am-241	4 8165E-03	73.21	146 42	0 00E+00	3 53E-01	7 05E-01	0 0150	1 033E+13
Am-242m	1 7383E-06	73.21	146 42	0 00E+00	1 27E-04	2 55E-04	0 0250	2 138E+12
Am-243	2 3263E-07	73.21	146 42	0 00E+00	1 70E-05	3 41E-05	0 0375	2 017E+12
C-14	4 3158E-05	73.21	146 42	0 00E+00	3 16E-03	6 32E-03	0 0575	2 032E+12
Cl-36	4 3023E-08	73.21	146 42	0 00E+00	3 15E-06	6 30E-06	0 0850	1 213E+12
Cm-243	1 3229E-07	73.21	146 42	0 00E+00	9 68E-06	1 94E-05	0 1250	1 048E+12
Cm-244	1 0000E-06	73.21	146 42	0 00E+00	7 32E-05	1 46E-04	0 2250	1 084E+12
Co-60	6 0120E-04	73.21	146 42	0 00E+00	4 40E-02	8 80E-02	0 3750	4 599E+11
Cs-134	4 3534E-06	73.21	146 42	0 00E+00	3 19E-04	6 37E-04	0 5750	7 576E+12
Cs-135	3 1549E-05	73.21	146 42	0 00E+00	2 31E-03	4 62E-03	0 8500	3 866E+11
Cs-137	1 3788E+00	73.21	146 42	0 00E+00	1 01E+02	2 02E+02	1 2500	3 793E+11
Eu-154	1 2041E-01	73.21	146 42	0 00E+00	8 82E+00	1 76E+01	1 7500	1 220E+10
Eu-155	6 6451E-03	73.21	146 42	0 00E+00	4 86E-01	9 73E-01	2 2500	2 407E+05
Fe-55	2 9338E-06	73.21	146 42	0 00E+00	2 15E-04	4 30E-04	2 7500	8 145E+04
H-3	2 0075E-03	73.21	146 42	0 00E+00	1 47E-01	2 94E-01	3 5000	2 096E+02
I-129	7 3805E-07	73.21	146 42	0 00E+00	5 40E-05	1 08E-04	5 0000	8 831E+01
Kr-85	3 6301E-02	73.21	146 42	0 00E+00	2 66E+00	5 32E+00	7 0000	9 970E+00
Np-237	1 4977E-06	73.21	146 42	0 00E+00	1 10E-04	2 19E-04	11 0000	1 134E+00
Pa-231	1 1275E-08	73.21	146 42	0 00E+00	8 25E-07	1 65E-06		
Pb-210	3 8932E-13	73.21	146 42	0 00E+00	2 85E-11	5 70E-11		
Pm-147	7 5383E-04	73.21	146 42	0 00E+00	5 52E-02	1 10E-01		
Pu-238	1 0668E-03	73.21	146 42	0 00E+00	7 81E-02	1 56E-01		
Pu-239	5 6902E-03	73.21	146 42	0 00E+00	4 17E-01	8 33E-01		
Pu-240	2 2571E-03	73.21	146 42	0 00E+00	1 65E-01	3 30E-01		
Pu-241	2 9699E-02	73.21	146 42	0 00E+00	2 17E+00	4 35E+00		
Pu-242	3 0602E-07	73.21	146 42	0 00E+00	2 24E-05	4 48E-05		
Ra-226	1 0704E-12	73.21	146 42	0 00E+00	7 84E-11	1 57E-10		
Ra-228	2 3654E-10	73.21	146 42	0 00E+00	1 73E-08	3 46E-08		
Ru-106	1 0444E-10	73.21	146 42	0 00E+00	7 65E-09	1 53E-08		
Se-79	1 2934E-05	73.21	146 42	0 00E+00	9 47E-04	1 89E-03		
Sn-126	1 2236E-05	73.21	146 42	0 00E+00	8 96E-04	1 79E-03		
Sr-90	1 2740E+00	73.21	146 42	0 00E+00	9 33E+01	1 87E+02		
Tc-99	4 4120E-04	73.21	146 42	0 00E+00	3 23E-02	6 46E-02		
Th-229	6 4226E-10	73.21	146 42	0 00E+00	4 70E-08	9 40E-08		
Th-230	1 0594E-10	73.21	146 42	0 00E+00	7 76E-09	1 55E-08		
Th-232	2 3744E-10	73.21	146 42	0 00E+00	1 74E-08	3 48E-08		
Ti-208	1 5774E-08	73.21	146 42	0 00E+00	1 15E-06	2 31E-06		
U-232	4 2511E-08	73.21	146 42	0 00E+00	3 11E-06	6 22E-06		
U-233	1 3155E-07	73.21	146 42	0 00E+00	9 63E-06	1 93E-05		
U-234	3 0030E-07	73.21	146 42	0 00E+00	2 20E-05	4 40E-05		
U-235	-2 6144E-06	73.21	0 00	4 72E-03	4 53E-03	4 72E-03		
U-236	1 2720E-05	73.21	146 42	0 00E+00	9 31E-04	1 86E-03		
U-238	-3 8857E-08	73.21	0 00	2 93E-03	2 93E-03	2 93E-03		
Y-90	1 2744E+00	73.21	146 42	0 00E+00	9 33E+01	1 87E+02		
Other Radionuclides					1 12E+02	2 23E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20	10 to 20 1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	53 19	73.21	
Bounding		146 42	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 18	1.38	
Bounding	0 36		1 00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD (ALUM) HANNOVER
SNF ID # 303
Fuel Units & Descr 71 - ELEMENT
Heavy Metal Mass BOL=13 561kg EOL=13 419kg
ROD Storage Site INEEL

¹Fuel decay start date 1996
Estimates as of. 2010
Template TRIGA-AI (LW/U-Zrx, Alum., 10 to 20%, U)
²Template Burnup(MWd) 665
Template BOL Heavy Metal Mass (MT) 0.00018
Template Decay Time 10 years

Estimated
Canister usage
18"x10"
0.64

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.2892E-09	135.54	271.08	0.00E+00	1.75E-07	3.49E-07	Avg MeV	
Am-241	2.9429E-03	135.54	271.08	0.00E+00	3.99E-01	7.98E-01	0.0150	3.644E+13
Am-242m	1.9489E-06	135.54	271.08	0.00E+00	2.64E-04	5.28E-04	0.0250	7.622E+12
Am-243	2.3308E-07	135.54	271.08	0.00E+00	3.16E-05	6.32E-05	0.0375	9.000E+12
C-14	4.3278E-05	135.54	271.08	0.00E+00	5.87E-03	1.17E-02	0.0575	7.443E+12
Cl-36	4.3023E-08	135.54	271.08	0.00E+00	5.83E-06	1.17E-05	0.0850	4.838E+12
Cm-243	2.4286E-07	135.54	271.08	0.00E+00	3.29E-05	6.58E-05	0.1250	6.695E+12
Cm-244	2.6015E-06	135.54	271.08	0.00E+00	3.53E-04	7.05E-04	0.2250	4.247E+12
Co-60	1.6075E-02	135.54	271.08	0.00E+00	2.18E+00	4.36E+00	0.3750	1.748E+12
Cs-134	1.9323E-02	135.54	271.08	0.00E+00	2.62E+00	5.24E+00	0.5750	2.604E+13
Cs-135	3.1549E-05	135.54	271.08	0.00E+00	4.28E-03	8.55E-03	0.8500	4.744E+12
Cs-137	2.4556E+00	135.54	271.08	0.00E+00	3.33E+02	6.66E+02	1.2500	5.215E+12
Eu-154	9.0180E-01	135.54	271.08	0.00E+00	1.22E+02	2.44E+02	1.7500	1.495E+11
Eu-155	2.1820E-01	135.54	271.08	0.00E+00	2.96E+01	5.91E+01	2.2500	3.558E+08
Fe-55	2.2902E-03	135.54	271.08	0.00E+00	3.10E-01	6.21E-01	2.7500	6.976E+06
H-3	8.1609E-03	135.54	271.08	0.00E+00	1.11E+00	2.21E+00	3.5000	8.510E+05
I-129	7.3805E-07	135.54	271.08	0.00E+00	1.00E-04	2.00E-04	5.0000	1.620E+02
Kr-85	1.8256E-01	135.54	271.08	0.00E+00	2.47E+01	4.95E+01	7.0000	1.833E+01
Np-237	1.4505E-06	135.54	271.08	0.00E+00	1.97E-04	3.93E-04	11.0000	2.087E+00
Pa-231	4.5564E-09	135.54	271.08	0.00E+00	6.18E-07	1.24E-06		
Pb-210	1.8842E-14	135.54	271.08	0.00E+00	2.55E-12	5.11E-12		
Pm-147	5.5459E-01	135.54	271.08	0.00E+00	7.52E+01	1.50E+02		
Pu-238	1.2992E-03	135.54	271.08	0.00E+00	1.76E-01	3.52E-01		
Pu-239	5.6932E-03	135.54	271.08	0.00E+00	7.72E-01	1.54E+00		
Pu-240	2.2632E-03	135.54	271.08	0.00E+00	3.07E-01	6.14E-01		
Pu-241	9.8857E-02	135.54	271.08	0.00E+00	1.34E+01	2.68E+01		
Pu-242	3.0602E-07	135.54	271.08	0.00E+00	4.15E-05	8.30E-05		
Ra-226	1.0823E-13	135.54	271.08	0.00E+00	1.47E-11	2.93E-11		
Ra-228	2.0406E-10	135.54	271.08	0.00E+00	2.77E-08	5.53E-08		
Ru-106	3.0180E-03	135.54	271.08	0.00E+00	4.09E-01	8.18E-01		
Se-79	1.2937E-05	135.54	271.08	0.00E+00	1.75E-03	3.51E-03		
Sn-126	1.2238E-05	135.54	271.08	0.00E+00	1.66E-03	3.32E-03		
Sr-90	2.3098E+00	135.54	271.08	0.00E+00	3.13E+02	6.26E+02		
Tc-99	4.4120E-04	135.54	271.08	0.00E+00	5.98E-02	1.20E-01		
Th-229	2.0932E-10	135.54	271.08	0.00E+00	2.84E-08	5.67E-08		
Th-230	2.7744E-11	135.54	271.08	0.00E+00	3.76E-09	7.52E-09		
Th-232	2.3744E-10	135.54	271.08	0.00E+00	3.22E-08	6.44E-08		
Ti-208	1.9459E-08	135.54	271.08	0.00E+00	2.64E-06	5.27E-06		
U-232	5.3850E-08	135.54	271.08	0.00E+00	7.30E-06	1.46E-05	Thermal Power	
U-233	1.3135E-07	135.54	271.08	0.00E+00	1.78E-05	3.56E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.9143E-07	135.54	271.08	0.00E+00	2.59E-05	5.19E-05	5.03E+00	1.01E+01
U-235	-2.6159E-06	135.54	0.00	5.86E-03	5.51E-03	5.86E-03	Total	Total
U-236	1.2719E-05	135.54	271.08	0.00E+00	1.72E-03	3.45E-03		
U-238	-3.8857E-08	135.54	0.00	3.65E-03	3.64E-03	3.65E-03		
Y-90	2.3098E+00	135.54	271.08	0.00E+00	3.13E+02	6.26E+02		
Other Radionuclides					3.58E+02	7.15E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences
Reactor Moderator	From SFD	Used	
Fuel Cladding	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	20.00391594	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	132.17	135.54	
Bounding		271.08	

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.27	1.03	
Bounding	0.54		

Estimated EOL HM/Given EOL HM: 1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) HEIDELBERG
SNF ID #: 464
Fuel Units & Descr: 65 - ELEMENT
Heavy Metal Mass: BOL=11 648kg; EOL=11 401kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-AI (LW/U-Zr, Alum, 10 to 20% U)
²Template Burnup(MWd): 6 65
Template BOL Heavy Metal Mass (MT): 0 00018
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0 59

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CvMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 0632E-10	283 80	567 61	0 00E+00	2 29E-07	4 58E-07	Avg MeV	
Am-241	2 2586E-03	283 80	567 61	0 00E+00	6 41E-01	1 28E+00	0 0150	9 604E+13
Am-242m	1 9925E-06	283 80	567 61	0 00E+00	5 65E-04	1 13E-03	0 0250	2 085E+13
Am-243	2 3323E-07	283 80	567 61	0 00E+00	6 62E-05	1 32E-04	0 0375	2 597E+13
C-14	4 3308E-05	283 80	567 61	0 00E+00	1 23E-02	2 46E-02	0 0675	1 991E+13
Cl-36	4 3023E-08	283 80	567 61	0 00E+00	1 22E-05	2 44E-05	0 0850	1 394E+13
Cm-243	2 7429E-07	283 80	567 61	0 00E+00	7 78E-05	1 56E-04	0 1250	2 084E+13
Cm-244	3 1504E-06	283 80	567 61	0 00E+00	8 94E-04	1 79E-03	0 2250	1 163E+13
Co-60	3 1008E-02	283 80	567 61	0 00E+00	8 80E+00	1 76E+01	0 3750	5 178E+12
Cs-134	1 0367E-01	283 80	567 61	0 00E+00	2 94E+01	5 88E+01	0 5750	6 565E+13
Cs-135	3 1549E-05	283 80	567 61	0 00E+00	8 95E-03	1 79E-02	0 8500	1 616E+13
Cs-137	2 7564E+00	283 80	567 61	0 00E+00	7 82E+02	1 56E+03	1 2500	1 675E+13
Eu-154	1 3490E+00	283 80	567 61	0 00E+00	3 83E+02	7 66E+02	1 7500	4 794E+11
Eu-155	4 3880E-01	283 80	567 61	0 00E+00	1 25E+02	2 49E+02	2 2500	5 828E+10
Fe-55	8 6782E-03	283 80	567 61	0 00E+00	2 46E+00	4 93E+00	2 7500	4 733E+08
H-3	1 0805E-02	283 80	567 61	0 00E+00	3 07E+00	6 13E+00	3 5000	5 532E+07
I-129	7 3805E-07	283 80	567 61	0 00E+00	2 09E-04	4 19E-04	5 0000	3 310E+02
Kr-85	2 5218E-01	283 80	567 61	0 00E+00	7 16E+01	1 43E+02	7 0000	3 747E+01
Np-237	1 4463E-06	283 80	567 61	0 00E+00	4 10E-04	8 21E-04	11 0000	4 269E+00
Pa-231	3 5970E-09	283 80	567 61	0 00E+00	1 02E-06	2 04E-06		
Pb-210	8 2511E-15	283 80	567 61	0 00E+00	2 34E-12	4 68E-12		
Pm-147	2 0767E+00	283 80	567 61	0 00E+00	5 89E+02	1 18E+03		
Pu-238	1 3514E-03	283 80	567 61	0 00E+00	3 84E-01	7 67E-01		
Pu-239	5 6947E-03	283 80	567 61	0 00E+00	1 62E+00	3 23E+00		
Pu-240	2 2647E-03	283 80	567 61	0 00E+00	6 43E-01	1 29E+00		
Pu-241	1 2574E-01	283 80	567 61	0 00E+00	3 57E+01	7 14E+01		
Pu-242	3 0602E-07	283 80	567 61	0 00E+00	8 68E-05	1 74E-04		
Ra-226	5 7353E-14	283 80	567 61	0 00E+00	1 63E-11	3 26E-11		
Ra-228	1 8150E-10	283 80	567 61	0 00E+00	5 15E-08	1 03E-07		
Ru-106	9 3744E-02	283 80	567 61	0 00E+00	2 66E+01	5 32E+01		
Se-79	1 2938E-05	283 80	567 61	0 00E+00	3 67E-03	7 34E-03		
Sn-126	1 2239E-05	283 80	567 61	0 00E+00	3 47E-03	6 95E-03		
Sr-90	2 6000E+00	283 80	567 61	0 00E+00	7 38E+02	1 48E+03		
Tc-99	4 4120E-04	283 80	567 61	0 00E+00	1 25E-01	2 50E-01		
Th-229	1 4749E-10	283 80	567 61	0 00E+00	4 19E-08	8 37E-08		
Th-230	1 9549E-11	283 80	567 61	0 00E+00	5 55E-09	1 11E-08		
Th-232	2 3744E-10	283 80	567 61	0 00E+00	6 74E-08	1 35E-07		
Tl-208	1 9459E-08	283 80	567 61	0 00E+00	5 52E-06	1 10E-05		
U-232	5 6015E-08	283 80	567 61	0 00E+00	1 59E-05	3 18E-05		
U-233	1 3132E-07	283 80	567 61	0 00E+00	3 73E-05	7 45E-05		
U-234	1 7323E-07	283 80	567 61	0 00E+00	4 92E-05	9 83E-05		
U-235	-2 6159E-06	283 80	0 00	5 06E-03	4 31E-03	5 06E-03		
U-236	1 2717E-05	283 80	567 61	0 00E+00	3 61E-03	7 22E-03		
U-238	-3 8857E-08	283 80	0 00	3 13E-03	3 12E-03	3 13E-03		
Y-90	2 6015E+00	283 80	567 61	0 00E+00	7 38E+02	1 48E+03		
Other Radionuclides					1 08E+03	2 16E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	ALUM	ALUM
BOL HM Constituents	U	U
BOL Enrichment %	20 08410778	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal	283 80	235 77
Bounding		567 61

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 66	0 83
Bounding	1 32	

Estimated EOL HM/Given EOL HM

1 00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD (ALUM) ITALY
SNF ID # 466
Fuel Units & Descr: 60 - ELEMENT
Heavy Metal Mass: BOL=10.8kg EOL=10.74kg
ROD Storage Site INEEL

¹Fuel decay start date 2010
Estimates as of 2010
Template TRIGA-AI (LW/U-ZrX Alum, 10 to 20%, U)
²Template Burnup(MWd) 6.65
Template BOL Heavy Metal Mass (MT) 0.00018
Template Decay Time 5 years

Estimated
Canister usage:
18"x10"
0.54

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	57.27	114.54	0.00E+00	4.62E-08	9.24E-08	Avg MeV	
Am-241	2.2586E-03	57.27	114.54	0.00E+00	1.29E-01	2.59E-01	0.0150	1.938E+13
Am-242m	1.9925E-06	57.27	114.54	0.00E+00	1.14E-04	2.28E-04	0.0250	4.208E+12
Am-243	2.3323E-07	57.27	114.54	0.00E+00	1.34E-05	2.67E-05	0.0375	5.241E+12
C-14	4.3308E-05	57.27	114.54	0.00E+00	2.48E-03	4.96E-03	0.0575	4.018E+12
Cl-36	4.3023E-08	57.27	114.54	0.00E+00	2.46E-06	4.93E-06	0.0850	2.812E+12
Cm-243	2.7429E-07	57.27	114.54	0.00E+00	1.57E-05	3.14E-05	0.1250	4.206E+12
Cm-244	3.1504E-06	57.27	114.54	0.00E+00	1.80E-04	3.61E-04	0.2250	2.348E+12
Co-60	3.1008E-02	57.27	114.54	0.00E+00	1.78E+00	3.55E+00	0.3750	1.045E+12
Cs-134	1.0367E-01	57.27	114.54	0.00E+00	5.94E+00	1.19E+01	0.5750	1.325E+13
Cs-135	3.1549E-05	57.27	114.54	0.00E+00	1.81E-03	3.61E-03	0.8500	3.261E+12
Cs-137	2.7564E+00	57.27	114.54	0.00E+00	1.58E+02	3.16E+02	1.2500	3.380E+12
Eu-154	1.3490E+00	57.27	114.54	0.00E+00	7.73E+01	1.55E+02	1.7500	9.675E+10
Eu-155	4.3880E-01	57.27	114.54	0.00E+00	2.51E+01	5.03E+01	2.2500	1.176E+10
Fe-55	6.6782E-03	57.27	114.54	0.00E+00	4.97E-01	9.94E-01	2.7500	9.552E+07
H-3	1.0805E-02	57.27	114.54	0.00E+00	6.19E-01	1.24E+00	3.5000	1.116E+07
I-129	7.3805E-07	57.27	114.54	0.00E+00	4.23E-05	8.45E-05	5.0000	7.206E+01
Kr-85	2.5218E-01	57.27	114.54	0.00E+00	1.44E+01	2.89E+01	7.0000	8.167E+00
Np-237	1.4463E-06	57.27	114.54	0.00E+00	8.28E-05	1.66E-04	11.0000	9.309E-01
Pa-231	3.5970E-09	57.27	114.54	0.00E+00	2.06E-07	4.12E-07		
Pb-210	8.2511E-15	57.27	114.54	0.00E+00	4.73E-13	9.45E-13		
Pm-147	2.0767E+00	57.27	114.54	0.00E+00	1.19E+02	2.38E+02		
Pu-238	1.3514E-03	57.27	114.54	0.00E+00	7.74E-02	1.55E-01		
Pu-239	5.6947E-03	57.27	114.54	0.00E+00	3.26E-01	6.52E-01		
Pu-240	2.2647E-03	57.27	114.54	0.00E+00	1.30E-01	2.59E-01		
Pu-241	1.2574E-01	57.27	114.54	0.00E+00	7.20E+00	1.44E+01		
Pu-242	3.0602E-07	57.27	114.54	0.00E+00	1.75E-05	3.51E-05		
Ra-226	5.7353E-14	57.27	114.54	0.00E+00	3.28E-12	6.57E-12		
Ra-228	1.8150E-10	57.27	114.54	0.00E+00	1.04E-08	2.08E-08		
Ru-106	9.3744E-02	57.27	114.54	0.00E+00	5.37E+00	1.07E+01		
Se-79	1.2938E-05	57.27	114.54	0.00E+00	7.41E-04	1.48E-03		
Sn-126	1.2239E-05	57.27	114.54	0.00E+00	7.01E-04	1.40E-03		
Sr-90	2.6000E+00	57.27	114.54	0.00E+00	1.49E+02	2.98E+02		
Tc-99	4.4120E-04	57.27	114.54	0.00E+00	2.53E-02	5.05E-02		
Th-229	1.4749E-10	57.27	114.54	0.00E+00	8.45E-09	1.69E-08		
Th-230	1.9549E-11	57.27	114.54	0.00E+00	1.12E-09	2.24E-09		
Th-232	2.3744E-10	57.27	114.54	0.00E+00	1.36E-08	2.72E-08		
Ti-208	1.9459E-08	57.27	114.54	0.00E+00	1.11E-06	2.23E-06		
U-232	5.6015E-08	57.27	114.54	0.00E+00	3.21E-06	6.42E-06		
U-233	1.3132E-07	57.27	114.54	0.00E+00	7.52E-06	1.50E-05		
U-234	1.7323E-07	57.27	114.54	0.00E+00	9.92E-06	1.98E-05		
U-235	-2.6159E-06	57.27	0.00	4.67E-03	4.52E-03	4.67E-03		
U-236	1.2717E-05	57.27	114.54	0.00E+00	7.28E-04	1.46E-03		
U-238	-3.8857E-08	57.27	0.00	2.90E-03	2.90E-03	2.90E-03		
Y-90	2.6015E+00	57.27	114.54	0.00E+00	1.49E+02	2.98E+02		
Other Radionuclides					2.18E+02	4.35E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences*
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	20	10 to 20.1	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate*
Nominal	52.63	57.27	Nominal burnup calculated from the heavy metal mass destroyed
Bounding		114.54	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.14	1.09	1.00
Bounding	0.29		

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) ITALY

SNF ID #: 467

Fuel Units & Descr: 64 - ELEMENT

Heavy Metal Mass: BOL=11 93kg, EOL=11 904kg

ROD Storage Site: INEEL

¹Fuel decay start date: 1997

Estimates as of 2010

Template TRIGA-AI (LW/U-Zrx, Alum., 10 to 20%, U)

²Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT) 0.00018

Template Decay Time 10 years

Estimated
Canister usage:

18"x10"

0.58

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.2892E-09	58.13	116.27	0.00E+00	7.49E-08	1.50E-07	Avg. MeV	
Am-241	2.9429E-03	58.13	116.27	0.00E+00	1.71E-01	3.42E-01	0.0150	1.563E+13
Am-242m	1.9489E-06	58.13	116.27	0.00E+00	1.13E-04	2.27E-04	0.0250	3.269E+12
Am-243	2.3308E-07	58.13	116.27	0.00E+00	1.35E-05	2.71E-05	0.0375	3.866E+12
C-14	4.3278E-05	58.13	116.27	0.00E+00	2.52E-03	5.03E-03	0.0575	3.192E+12
Cl-36	4.3023E-08	58.13	116.27	0.00E+00	2.50E-06	5.00E-06	0.0850	2.075E+12
Cm-243	2.4286E-07	58.13	116.27	0.00E+00	1.41E-05	2.82E-05	0.1250	2.871E+12
Cm-244	2.6015E-06	58.13	116.27	0.00E+00	1.51E-04	3.02E-04	0.2250	1.822E+12
Co-60	1.6075E-02	58.13	116.27	0.00E+00	9.34E-01	1.87E+00	0.3750	7.496E+11
Cs-134	1.9323E-02	58.13	116.27	0.00E+00	1.12E+00	2.25E+00	0.5750	1.117E+13
Cs-135	3.1549E-05	58.13	116.27	0.00E+00	1.83E-03	3.67E-03	0.8500	2.035E+12
Cs-137	2.4556E+00	58.13	116.27	0.00E+00	1.43E+02	2.86E+02	1.2500	2.237E+12
Eu-154	9.0180E-01	58.13	116.27	0.00E+00	5.24E+01	1.05E+02	1.7500	6.414E+10
Eu-155	2.1820E-01	58.13	116.27	0.00E+00	1.27E+01	2.54E+01	2.2500	1.526E+08
Fe-55	2.2902E-03	58.13	116.27	0.00E+00	1.33E-01	2.66E-01	2.7500	2.992E+06
H-3	8.1609E-03	58.13	116.27	0.00E+00	4.74E-01	9.49E-01	3.5000	3.650E+05
I-129	7.3805E-07	58.13	116.27	0.00E+00	4.29E-05	8.58E-05	5.0000	7.331E+01
Kr-85	1.8256E-01	58.13	116.27	0.00E+00	1.06E+01	2.12E+01	7.0000	8.302E+00
Np-237	1.4505E-06	58.13	116.27	0.00E+00	8.43E-05	1.69E-04	11.0000	9.459E-01
Pa-231	4.5564E-09	58.13	116.27	0.00E+00	2.65E-07	5.30E-07		
Pb-210	1.8842E-14	58.13	116.27	0.00E+00	1.10E-12	2.19E-12		
Pm-147	5.5459E-01	58.13	116.27	0.00E+00	3.22E+01	6.45E+01		
Pu-238	1.2992E-03	58.13	116.27	0.00E+00	7.55E-02	1.51E-01		
Pu-239	5.6932E-03	58.13	116.27	0.00E+00	3.31E-01	6.62E-01		
Pu-240	2.2632E-03	58.13	116.27	0.00E+00	1.32E-01	2.63E-01		
Pu-241	9.8857E-02	58.13	116.27	0.00E+00	5.75E+00	1.15E+01		
Pu-242	3.0602E-07	58.13	116.27	0.00E+00	1.78E-05	3.56E-05		
Ra-226	1.0823E-13	58.13	116.27	0.00E+00	6.29E-12	1.26E-11		
Ra-228	2.0406E-10	58.13	116.27	0.00E+00	1.19E-08	2.37E-08		
Ru-106	3.0180E-03	58.13	116.27	0.00E+00	1.75E-01	3.51E-01		
Se-79	1.2937E-05	58.13	116.27	0.00E+00	7.52E-04	1.50E-03		
Sn-126	1.2238E-05	58.13	116.27	0.00E+00	7.11E-04	1.42E-03		
Sr-90	2.3098E+00	58.13	116.27	0.00E+00	1.34E+02	2.69E+02		
Tc-99	4.4120E-04	58.13	116.27	0.00E+00	2.56E-02	5.13E-02		
Th-229	2.0932E-10	58.13	116.27	0.00E+00	1.22E-08	2.43E-08		
Th-230	2.7744E-11	58.13	116.27	0.00E+00	1.61E-09	3.23E-09		
Th-232	2.3744E-10	58.13	116.27	0.00E+00	1.38E-08	2.76E-08		
Ti-208	1.9459E-08	58.13	116.27	0.00E+00	1.13E-06	2.26E-06		
U-232	5.3850E-08	58.13	116.27	0.00E+00	3.13E-06	6.26E-06		
U-233	1.3135E-07	58.13	116.27	0.00E+00	7.64E-06	1.53E-05		
U-234	1.9143E-07	58.13	116.27	0.00E+00	1.11E-05	2.23E-05		
U-235	-2.6159E-06	58.13	0.00	5.10E-03	4.94E-03	5.10E-03		
U-236	1.2719E-05	58.13	116.27	0.00E+00	7.39E-04	1.48E-03		
U-238	-3.8857E-08	58.13	0.00	3.22E-03	3.21E-03	3.22E-03		
Y-90	2.3098E+00	58.13	116.27	0.00E+00	1.34E+02	2.69E+02		
Other Radionuclides					1.53E+02	3.07E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %	19.76448407	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	58.13	24.44
Bounding		116.27

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd)
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.13	0.42
Bounding	0.26	

Estimated EOL HM/Given EOL HM

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD (ALUM) JAPAN
SNF ID # 481

Fuel Units & Descr 71 - ELEMENT

Heavy Metal Mass BOL=13.845kg EOL=13 774kg

ROD Storage Site: INEEL

¹Fuel decay start date

2010

Estimates as of

2010

Template

TRIGA-AI (LW/U-Zrx Alum, 10 to 20%, U)

²Template Burnup(MWd)

6 65

Template BOL Heavy Metal Mass (MT)

0 00018

Template Decay Time

5 years

Estimated

Canister usage

18"x10"

0 64

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 0632E-10	134 93	269 87	0 00E+00	1 09E-07	2 18E-07	Avg MeV	
Am-241	2 2586E-03	134 93	269 87	0 00E+00	3 05E-01	6 10E-01	0 0150	4.566E+13
Am-242m	1 9925E-06	134 93	269 87	0 00E+00	2 69E-04	5 38E-04	0 0250	9 913E+12
Am-243	2 3323E-07	134 93	269 87	0 00E+00	3 15E-05	6 29E-05	0 0375	1.235E+13
C-14	4 3308E-05	134 93	269 87	0 00E+00	5 84E-03	1 17E-02	0 0575	9 466E+12
Cl-36	4 3023E-08	134 93	269 87	0 00E+00	5 81E-06	1 16E-05	0 0850	6 626E+12
Cm-243	2 7429E-07	134 93	269 87	0 00E+00	3 70E-05	7 40E-05	0 1250	9 911E+12
Cm-244	3 1504E-06	134 93	269 87	0 00E+00	4 25E-04	8 50E-04	0 2250	5.532E+12
Co-60	3 1008E-02	134 93	269 87	0 00E+00	4 18E+00	8 37E+00	0 3750	2.462E+12
Cs-134	1 0367E-01	134 93	269 87	0 00E+00	1 40E+01	2 80E+01	0 5750	3 121E+13
Cs-135	3 1549E-05	134 93	269 87	0 00E+00	4 26E-03	8 51E-03	0 8500	7.683E+12
Cs-137	2 7564E+00	134 93	269 87	0 00E+00	3 72E+02	7 44E+02	1 2500	7.965E+12
Eu-154	1 3490E+00	134 93	269 87	0 00E+00	1 82E+02	3 64E+02	1 7500	2.279E+11
Eu-155	4 3880E-01	134 93	269 87	0 00E+00	5 92E+01	1 18E+02	2 2500	2 771E+10
Fe-55	8 6782E-03	134 93	269 87	0 00E+00	1 17E+00	2 34E+00	2 7500	2.250E+08
H-3	1 0805E-02	134 93	269 87	0 00E+00	1 46E+00	2 92E+00	3 5000	2 630E+07
I-129	7 3805E-07	134 93	269 87	0 00E+00	9 96E-05	1 99E-04	5 0000	1 626E+02
Kr-85	2 5218E-01	134 93	269 87	0 00E+00	3 40E+01	6 81E+01	7 0000	1 841E+01
Np-237	1 4463E-06	134 93	269 87	0 00E+00	1 95E-04	3 90E-04	11 0000	2.098E+00
Pa-231	3 5970E-09	134 93	269 87	0 00E+00	4 85E-07	9 71E-07		
Pb-210	8 2511E-15	134 93	269 87	0 00E+00	1 11E-12	2 23E-12		
Pm-147	2 0767E+00	134 93	269 87	0 00E+00	2 80E+02	5 60E+02		
Pu-238	1 3514E-03	134 93	269 87	0 00E+00	1 82E-01	3 65E-01		
Pu-239	5 6947E-03	134 93	269 87	0 00E+00	7 68E-01	1 54E+00		
Pu-240	2 2647E-03	134 93	269 87	0 00E+00	3 06E-01	6 11E-01		
Pu-241	1 2574E-01	134 93	269 87	0 00E+00	1 70E+01	3 39E+01		
Pu-242	3 0602E-07	134 93	269 87	0 00E+00	4 13E-05	8 26E-05		
Ra-226	5 7353E-14	134 93	269 87	0 00E+00	7 74E-12	1 55E-11		
Ra-228	1 8150E-10	134 93	269 87	0 00E+00	2 45E-08	4 90E-08		
Ru-106	9 3744E-02	134 93	269 87	0 00E+00	1 26E+01	2 53E+01		
Se-79	1 2938E-05	134 93	269 87	0 00E+00	1 75E-03	3 49E-03		
Sn-126	1 2239E-05	134 93	269 87	0 00E+00	1 65E-03	3 30E-03		
Sr-90	2 6000E+00	134 93	269 87	0 00E+00	3 51E+02	7 02E+02		
Tc-99	4 4120E-04	134 93	269 87	0 00E+00	5 95E-02	1 19E-01		
Th-229	1 4749E-10	134 93	269 87	0 00E+00	1 99E-08	3 98E-08		
Th-230	1 9549E-11	134 93	269 87	0 00E+00	2 64E-09	5 28E-09		
Th-232	2 3744E-10	134 93	269 87	0 00E+00	3 20E-08	6 41E-08		
Ti-208	1 9459E-08	134 93	269 87	0 00E+00	2 63E-06	5 25E-06		
U-232	5 6015E-08	134 93	269 87	0 00E+00	7 56E-06	1 51E-05		
U-233	1 3132E-07	134 93	269 87	0 00E+00	1 77E-05	3 54E-05		
U-234	1 7323E-07	134 93	269 87	0 00E+00	2 34E-05	4 67E-05		
U-235	-2 6159E-06	134 93	0 00	5 98E-03	5 63E-03	5 98E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1 2717E-05	134 93	269 87	0 00E+00	1 72E-03	3 43E-03	6 78E+00	1.36E+01
U-238	-3 8857E-08	134 93	0 00	3 72E-03	3 72E-03	3 72E-03	Total	Total
Y-90	2 6015E+00	134 93	269 87	0 00E+00	3 51E+02	7 02E+02		
Other Radionuclides					5 13E+02	1 03E+03		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences*
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	20 00000073	10 to 20 1	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	134 93	67 77	
Bounding		269 87	
			Nominal burnup taken directly from SFD (converted to MWd)
			Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal	0.26	0.50	
Bounding	0.53		
			1 00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) KANSAS STATE UNIV
 SNF ID #: 804
 Fuel Units & Descr: 3 - ELEMENT
 Heavy Metal Mass: BOL=0.54kg; EOL=0.513kg
 ROD Storage Site, INEEL

¹Fuel decay start date: 2035
 Estimates as of: 2010
 Template: TRIGA-AI (LWAJ-Zrx, Alum, 10 to 20%, U)
²Template Burnup(MWd): 6.65
 Template BOL Heavy Metal Mass (MT): 0.00018
 Template Decay Time: 5 years

Estimated
 Canister usage
 18"x10"
 0.03

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	25.77	51.54	0.00E+00	2.08E-08	4.16E-08	Avg MeV	
Am-241	2.2586E-03	25.77	51.54	0.00E+00	5.82E-02	1.16E-01	0.0150	8.721E+12
Am-242m	1.9925E-06	25.77	51.54	0.00E+00	5.14E-05	1.03E-04	0.0250	1.893E+12
Am-243	2.3323E-07	25.77	51.54	0.00E+00	6.01E-06	1.20E-05	0.0375	2.359E+12
C-14	4.3308E-05	25.77	51.54	0.00E+00	1.12E-03	2.23E-03	0.0575	1.808E+12
Cl-36	4.3023E-08	25.77	51.54	0.00E+00	1.11E-06	2.22E-06	0.0850	1.266E+12
Cm-243	2.7429E-07	25.77	51.54	0.00E+00	7.07E-06	1.41E-05	0.1250	1.893E+12
Cm-244	3.1504E-06	25.77	51.54	0.00E+00	8.12E-05	1.62E-04	0.2250	1.057E+12
Co-60	3.1008E-02	25.77	51.54	0.00E+00	7.99E-01	1.60E+00	0.3750	4.702E+11
Cs-134	1.0367E-01	25.77	51.54	0.00E+00	2.67E+00	5.34E+00	0.5750	5.962E+12
Cs-135	3.1549E-05	25.77	51.54	0.00E+00	8.13E-04	1.63E-03	0.8500	1.468E+12
Cs-137	2.7564E+00	25.77	51.54	0.00E+00	7.10E+01	1.42E+02	1.2500	1.521E+12
Eu-154	1.3490E+00	25.77	51.54	0.00E+00	3.48E+01	6.95E+01	1.7500	4.354E+10
Eu-155	4.3880E-01	25.77	51.54	0.00E+00	1.13E+01	2.26E+01	2.2500	5.292E+09
Fe-55	8.6782E-03	25.77	51.54	0.00E+00	2.24E-01	4.47E-01	2.7500	4.298E+07
H-3	1.0805E-02	25.77	51.54	0.00E+00	2.78E-01	5.57E-01	3.5000	5.024E+06
I-129	7.3805E-07	25.77	51.54	0.00E+00	1.90E-05	3.80E-05	5.0000	2.974E+01
Kr-85	2.5218E-01	25.77	51.54	0.00E+00	6.50E+00	1.30E+01	7.0000	3.366E+00
Np-237	1.4463E-06	25.77	51.54	0.00E+00	3.73E-05	7.45E-05	11.0000	3.834E-01
Pa-231	3.5970E-09	25.77	51.54	0.00E+00	9.27E-08	1.85E-07		
Pb-210	8.2511E-15	25.77	51.54	0.00E+00	2.13E-13	4.25E-13		
Pm-147	2.0767E+00	25.77	51.54	0.00E+00	5.35E+01	1.07E+02		
Pu-238	1.3514E-03	25.77	51.54	0.00E+00	3.48E-02	6.97E-02		
Pu-239	5.6947E-03	25.77	51.54	0.00E+00	1.47E-01	2.94E-01		
Pu-240	2.2647E-03	25.77	51.54	0.00E+00	5.84E-02	1.17E-01		
Pu-241	1.2574E-01	25.77	51.54	0.00E+00	3.24E+00	6.48E+00		
Pu-242	3.0602E-07	25.77	51.54	0.00E+00	7.89E-06	1.58E-05		
Ra-226	5.7353E-14	25.77	51.54	0.00E+00	1.48E-12	2.96E-12		
Ra-228	1.8150E-10	25.77	51.54	0.00E+00	4.68E-09	9.36E-09		
Ru-106	9.3744E-02	25.77	51.54	0.00E+00	2.42E+00	4.83E+00		
Se-79	1.2938E-05	25.77	51.54	0.00E+00	3.33E-04	6.67E-04		
Sn-126	1.2239E-05	25.77	51.54	0.00E+00	3.15E-04	6.31E-04		
Sr-90	2.6000E+00	25.77	51.54	0.00E+00	6.70E+01	1.34E+02		
Tc-99	4.4120E-04	25.77	51.54	0.00E+00	1.14E-02	2.27E-02		
Th-229	1.4749E-10	25.77	51.54	0.00E+00	3.80E-09	7.60E-09		
Th-230	1.9549E-11	25.77	51.54	0.00E+00	5.04E-10	1.01E-09		
Th-232	2.3744E-10	25.77	51.54	0.00E+00	6.12E-09	1.22E-08		
Ti-208	1.9459E-08	25.77	51.54	0.00E+00	5.01E-07	1.00E-06		
U-232	5.6015E-08	25.77	51.54	0.00E+00	1.44E-06	2.89E-06		
U-233	1.3132E-07	25.77	51.54	0.00E+00	3.38E-06	6.77E-06		
U-234	1.7323E-07	25.77	51.54	0.00E+00	4.46E-06	8.93E-06		
U-235	-2.6159E-06	25.77	0.00	2.33E-04	1.66E-04	2.33E-04		
U-236	1.2717E-05	25.77	51.54	0.00E+00	3.28E-04	6.55E-04		
U-238	-3.8857E-08	25.77	0.00	1.45E-04	1.44E-04	1.45E-04		
Y-90	2.6015E+00	25.77	51.54	0.00E+00	6.70E+01	1.34E+02		
Other Radionuclides					9.80E+01	1.96E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19.99999834	10 to 20.1	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		25.77	
Bounding		51.54	

Nominal burnup calculated from the heavy metal mass destroyed.
 Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	1.29		
Bounding	2.58		

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) KSU
SNF ID #: 871
Fuel Units & Descr: 61 - ELEMENT
Heavy Metal Mass: BOL=11.285kg EOL=11.206kg
ROD Storage Site: INEEL

Fuel decay start date: 1973
Estimates as of: 2010
Template: TRIGA-AI (LW/U-Zr Alum, 10 to 20% U)
Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 35 years

Estimated
Canister usage
18"x10"
0.55

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1504E-09	109.98	219.97	0.00E+00	6.76E-07	1.35E-06	Avg MeV	
Am-241	4.8165E-03	109.98	219.97	0.00E+00	5.30E-01	1.06E+00	0.0150	1.551E+13
Am-242m	1.7383E-06	109.98	219.97	0.00E+00	1.91E-04	3.82E-04	0.0250	3.211E+12
Am-243	2.3263E-07	109.98	219.97	0.00E+00	2.56E-05	5.12E-05	0.0375	3.030E+12
C-14	4.3158E-05	109.98	219.97	0.00E+00	4.75E-03	9.49E-03	0.0575	3.053E+12
Cl-36	4.3023E-08	109.98	219.97	0.00E+00	4.73E-06	9.46E-06	0.0850	1.822E+12
Cm-243	1.3229E-07	109.98	219.97	0.00E+00	1.45E-05	2.91E-05	0.1250	1.574E+12
Cm-244	1.0000E-06	109.98	219.97	0.00E+00	1.10E-04	2.20E-04	0.2250	1.628E+12
Co-60	6.0120E-04	109.98	219.97	0.00E+00	6.61E-02	1.32E-01	0.3750	6.909E+11
Cs-134	4.3534E-06	109.98	219.97	0.00E+00	4.79E-04	9.58E-04	0.5750	1.138E+13
Cs-135	3.1549E-05	109.98	219.97	0.00E+00	3.47E-03	6.94E-03	0.8500	5.807E+11
Cs-137	1.3788E+00	109.98	219.97	0.00E+00	1.52E+02	3.03E+02	1.2500	5.698E+11
Eu-154	1.2041E-01	109.98	219.97	0.00E+00	1.32E+01	2.65E+01	1.7500	1.833E+10
Eu-155	6.6451E-03	109.98	219.97	0.00E+00	7.31E-01	1.46E+00	2.2500	3.616E+05
Fe-55	2.9338E-06	109.98	219.97	0.00E+00	3.23E-04	6.45E-04	2.7500	1.223E+05
H-3	2.0075E-03	109.98	219.97	0.00E+00	2.21E-01	4.42E-01	3.5000	3.075E+02
I-129	7.3805E-07	109.98	219.97	0.00E+00	8.12E-05	1.62E-04	5.0000	1.295E+02
Kr-85	3.6301E-02	109.98	219.97	0.00E+00	3.99E+00	7.98E+00	7.0000	1.461E+01
Np-237	1.4977E-06	109.98	219.97	0.00E+00	1.65E-04	3.29E-04	11.0000	1.661E+00
Pa-231	1.1275E-08	109.98	219.97	0.00E+00	1.24E-06	2.48E-06		
Pb-210	3.8932E-13	109.98	219.97	0.00E+00	4.28E-11	8.56E-11		
Pm-147	7.5383E-04	109.98	219.97	0.00E+00	8.29E-02	1.66E-01		
Pu-238	1.0668E-03	109.98	219.97	0.00E+00	1.17E-01	2.35E-01		
Pu-239	5.6902E-03	109.98	219.97	0.00E+00	6.26E-01	1.25E+00		
Pu-240	2.2571E-03	109.98	219.97	0.00E+00	2.48E-01	4.96E-01		
Pu-241	2.9699E-02	109.98	219.97	0.00E+00	3.27E+00	6.53E+00		
Pu-242	3.0602E-07	109.98	219.97	0.00E+00	3.37E-05	6.73E-05		
Ra-226	1.0704E-12	109.98	219.97	0.00E+00	1.18E-10	2.35E-10		
Ra-228	2.3654E-10	109.98	219.97	0.00E+00	2.60E-08	5.20E-08		
Ru-106	1.0444E-10	109.98	219.97	0.00E+00	1.15E-08	2.30E-08		
Se-79	1.2934E-05	109.98	219.97	0.00E+00	1.42E-03	2.85E-03		
Sn-126	1.2236E-05	109.98	219.97	0.00E+00	1.35E-03	2.69E-03		
Sr-90	1.2740E+00	109.98	219.97	0.00E+00	1.40E+02	2.80E+02		
Tc-99	4.4120E-04	109.98	219.97	0.00E+00	4.85E-02	9.71E-02		
Th-229	6.4226E-10	109.98	219.97	0.00E+00	7.06E-08	1.41E-07		
Th-230	1.0594E-10	109.98	219.97	0.00E+00	1.17E-08	2.33E-08		
Th-232	2.3744E-10	109.98	219.97	0.00E+00	2.61E-08	5.22E-08		
Ti-208	1.5774E-08	109.98	219.97	0.00E+00	1.73E-06	3.47E-06		
U-232	4.2511E-08	109.98	219.97	0.00E+00	4.68E-06	9.35E-06		
U-233	1.3155E-07	109.98	219.97	0.00E+00	1.45E-05	2.89E-05		
U-234	3.0030E-07	109.98	219.97	0.00E+00	3.30E-05	6.61E-05		
U-235	2.6144E-06	109.98	0.00	4.88E-03	4.59E-03	4.88E-03		
U-236	1.2720E-05	109.98	219.97	0.00E+00	1.40E-03	2.80E-03		
U-238	3.8857E-08	109.98	0.00	3.03E-03	3.03E-03	3.03E-03		
Y-90	1.2744E+00	109.98	219.97	0.00E+00	1.40E+02	2.80E+02		
Other Radionuclides					1.68E+02	3.35E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences
	From SFD	Used	
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	20	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	109.98	75.69	Nominal burnup taken directly from SFD (converted to MWd)
Bounding		219.97	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.26	0.69	1.00
Bounding	0.53		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) MSU
SNF ID #: 878

Fuel Units & Descr: 58 - ELEMENT

Heavy Metal Mass: BOL=10 73kg; EOL=10 655kg

ROD Storage Site: INEEL

Fuel decay start date: 1973

Estimates as of: 2010

Template: TRIGA-AI (LW/U-Zrx, Alum, 10 to 20%, U)

Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.00018

Template Decay Time: 35 years

Estimated
Canister usage
18"x10"
0.52

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1504E-09	71.97	143.94	0.00E+00	4.43E-07	8.85E-07	Avg MeV	
Am-241	4.8165E-03	71.97	143.94	0.00E+00	3.47E-01	6.93E-01	0.0150	1.015E+13
Am-242m	1.7383E-06	71.97	143.94	0.00E+00	1.25E-04	2.50E-04	0.0250	2.101E+12
Am-243	2.3263E-07	71.97	143.94	0.00E+00	1.67E-05	3.35E-05	0.0375	1.983E+12
C-14	4.3158E-05	71.97	143.94	0.00E+00	3.11E-03	6.21E-03	0.0575	1.998E+12
Cl-36	4.3023E-08	71.97	143.94	0.00E+00	3.10E-06	6.19E-06	0.0850	1.192E+12
Cm-243	1.3229E-07	71.97	143.94	0.00E+00	9.52E-06	1.90E-05	0.1250	1.030E+12
Cm-244	1.0000E-06	71.97	143.94	0.00E+00	7.20E-05	1.44E-04	0.2250	1.065E+12
Co-60	6.0120E-04	71.97	143.94	0.00E+00	4.33E-02	8.65E-02	0.3750	4.521E+11
Cs-134	4.3534E-06	71.97	143.94	0.00E+00	3.13E-04	6.27E-04	0.5750	7.447E+12
Cs-135	3.1549E-05	71.97	143.94	0.00E+00	2.27E-03	4.54E-03	0.8500	3.800E+11
Cs-137	1.3788E+00	71.97	143.94	0.00E+00	9.92E+01	1.98E+02	1.2500	3.728E+11
Eu-154	1.2041E-01	71.97	143.94	0.00E+00	8.67E+00	1.73E+01	1.7500	1.200E+10
Eu-155	6.6451E-03	71.97	143.94	0.00E+00	4.78E-01	9.57E-01	2.2500	2.366E+05
Fe-55	2.9338E-06	71.97	143.94	0.00E+00	2.11E-04	4.22E-04	2.7500	8.007E+04
H-3	2.0075E-03	71.97	143.94	0.00E+00	1.44E-01	2.89E-01	3.5000	2.061E+02
I-129	7.3805E-07	71.97	143.94	0.00E+00	5.31E-05	1.06E-04	5.0000	8.681E+01
Kr-85	3.6301E-02	71.97	143.94	0.00E+00	2.61E+00	5.23E+00	7.0000	9.801E+00
Np-237	1.4977E-06	71.97	143.94	0.00E+00	1.08E-04	2.16E-04	11.0000	1.115E+00
Pa-231	1.1275E-08	71.97	143.94	0.00E+00	8.11E-07	1.62E-06		
Pb-210	3.8932E-13	71.97	143.94	0.00E+00	2.80E-11	5.60E-11		
Pm-147	7.5383E-04	71.97	143.94	0.00E+00	5.43E-02	1.09E-01		
Pu-238	1.0668E-03	71.97	143.94	0.00E+00	7.68E-02	1.54E-01		
Pu-239	5.6902E-03	71.97	143.94	0.00E+00	4.10E-01	8.19E-01		
Pu-240	2.2571E-03	71.97	143.94	0.00E+00	1.62E-01	3.25E-01		
Pu-241	2.9699E-02	71.97	143.94	0.00E+00	2.14E+00	4.27E+00		
Pu-242	3.0602E-07	71.97	143.94	0.00E+00	2.20E-05	4.40E-05		
Ra-226	1.0704E-12	71.97	143.94	0.00E+00	7.70E-11	1.54E-10		
Ra-228	2.3654E-10	71.97	143.94	0.00E+00	1.70E-08	3.40E-08		
Ru-106	1.0444E-10	71.97	143.94	0.00E+00	7.52E-09	1.50E-08		
Se-79	1.2934E-05	71.97	143.94	0.00E+00	9.31E-04	1.86E-03		
Sn-126	1.2236E-05	71.97	143.94	0.00E+00	8.81E-04	1.76E-03		
Sr-90	1.2740E+00	71.97	143.94	0.00E+00	9.17E+01	1.83E+02		
Tc-99	4.4120E-04	71.97	143.94	0.00E+00	3.18E-02	6.35E-02		
Th-229	6.4226E-10	71.97	143.94	0.00E+00	4.62E-08	9.24E-08		
Th-230	1.0594E-10	71.97	143.94	0.00E+00	7.62E-09	1.52E-08		
Th-232	2.3744E-10	71.97	143.94	0.00E+00	1.71E-08	3.42E-08		
Ti-208	1.5774E-08	71.97	143.94	0.00E+00	1.14E-06	2.27E-06		
U-232	4.2511E-08	71.97	143.94	0.00E+00	3.06E-06	6.12E-06		
U-233	1.3155E-07	71.97	143.94	0.00E+00	9.47E-06	1.89E-05		
U-234	3.0030E-07	71.97	143.94	0.00E+00	2.16E-05	4.32E-05		
U-235	-2.6144E-06	71.97	0.00	4.64E-03	4.45E-03	4.64E-03		
U-236	1.2720E-05	71.97	143.94	0.00E+00	9.15E-04	1.83E-03		
U-238	-3.8857E-08	71.97	0.00	2.89E-03	2.88E-03	2.89E-03		
Y-90	1.2744E+00	71.97	143.94	0.00E+00	9.17E+01	1.83E+02		
Other Radionuclides					1.10E+02	2.19E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	20	10 to 20 %	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	52.29	71.97	
Bounding		143.94	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.18	1.38	
Bounding	0.36		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) REED COLLEGE
SNF ID #: 256
Fuel Units & Descr: 58 - ELEMENT
Heavy Metal Mass BOL=10.927kg EOL=10.887kg
ROD Storage Site INEEL

¹Fuel decay start date 2026
Estimates as of: 2010
Template TRIGA-AI (LW/U-Zrx Alum, 10 to 20%, U)
²Template Burnup(MWd) 6.65
Template BOL Heavy Metal Mass (MT) 0.00018
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0.52

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	53.25	106.50	0.00E+00	4.29E-08	8.59E-08	Avg MeV	
Am-241	2.2586E-03	53.25	106.50	0.00E+00	1.20E-01	2.41E-01	0.0150	1.802E+13
Am-242m	1.9925E-06	53.25	106.50	0.00E+00	1.06E-04	2.12E-04	0.0250	3.912E+12
Am-243	2.3323E-07	53.25	106.50	0.00E+00	1.24E-05	2.48E-05	0.0375	4.873E+12
C-14	4.3308E-05	53.25	106.50	0.00E+00	2.31E-03	4.61E-03	0.0675	3.736E+12
Cf-36	4.3023E-08	53.25	106.50	0.00E+00	2.29E-06	4.58E-06	0.0850	2.615E+12
Cm-243	2.7429E-07	53.25	106.50	0.00E+00	1.46E-05	2.92E-05	0.1250	3.911E+12
Cm-244	3.1504E-06	53.25	106.50	0.00E+00	1.68E-04	3.36E-04	0.2250	2.183E+12
Co-60	3.1008E-02	53.25	106.50	0.00E+00	1.65E+00	3.30E+00	0.3750	9.716E+11
Cs-134	1.0367E-01	53.25	106.50	0.00E+00	5.52E+00	1.10E+01	0.5750	1.232E+13
Cs-135	3.1549E-05	53.25	106.50	0.00E+00	1.68E-03	3.36E-03	0.8500	3.032E+12
Cs-137	2.7564E+00	53.25	106.50	0.00E+00	1.47E+02	2.94E+02	1.2500	3.143E+12
Eu-154	1.3490E+00	53.25	106.50	0.00E+00	7.18E+01	1.44E+02	1.7500	8.995E+10
Eu-155	4.3880E-01	53.25	106.50	0.00E+00	2.34E+01	4.67E+01	2.2500	1.093E+10
Fe-55	8.6782E-03	53.25	106.50	0.00E+00	4.62E-01	9.24E-01	2.7500	8.881E+07
H-3	1.0805E-02	53.25	106.50	0.00E+00	5.75E-01	1.15E+00	3.5000	1.038E+07
I-129	7.3805E-07	53.25	106.50	0.00E+00	3.93E-05	7.86E-05	5.0000	6.755E+01
Kr-85	2.5218E-01	53.25	106.50	0.00E+00	1.34E+01	2.69E+01	7.0000	7.658E+00
Np-237	1.4463E-06	53.25	106.50	0.00E+00	7.70E-05	1.54E-04	11.0000	8.730E-01
Pa-231	3.5970E-09	53.25	106.50	0.00E+00	1.92E-07	3.83E-07		
Pb-210	8.2511E-15	53.25	106.50	0.00E+00	4.39E-13	8.79E-13		
Pm-147	2.0767E+00	53.25	106.50	0.00E+00	1.11E+02	2.21E+02		
Pu-238	1.3514E-03	53.25	106.50	0.00E+00	7.20E-02	1.44E-01		
Pu-239	5.6947E-03	53.25	106.50	0.00E+00	3.03E-01	6.06E-01		
Pu-240	2.2647E-03	53.25	106.50	0.00E+00	1.21E-01	2.41E-01		
Pu-241	1.2574E-01	53.25	106.50	0.00E+00	6.70E+00	1.34E+01		
Pu-242	3.0602E-07	53.25	106.50	0.00E+00	1.63E-05	3.26E-05		
Ra-226	5.7353E-14	53.25	106.50	0.00E+00	3.05E-12	6.11E-12		
Ra-228	1.8150E-10	53.25	106.50	0.00E+00	9.66E-09	1.93E-08		
Ru-106	9.3744E-02	53.25	106.50	0.00E+00	4.99E+00	9.98E+00		
Se-79	1.2938E-05	53.25	106.50	0.00E+00	6.89E-04	1.38E-03		
Sn-126	1.2239E-05	53.25	106.50	0.00E+00	6.52E-04	1.30E-03		
Sr-90	2.6000E+00	53.25	106.50	0.00E+00	1.38E+02	2.77E+02		
Tc-99	4.4120E-04	53.25	106.50	0.00E+00	2.35E-02	4.70E-02		
Th-229	1.4749E-10	53.25	106.50	0.00E+00	7.85E-09	1.57E-08		
Th-230	1.9549E-11	53.25	106.50	0.00E+00	1.04E-09	2.08E-09		
Th-232	2.3744E-10	53.25	106.50	0.00E+00	1.26E-08	2.53E-08		
Ti-208	1.9459E-08	53.25	106.50	0.00E+00	1.04E-06	2.07E-06		
U-232	5.6015E-08	53.25	106.50	0.00E+00	2.98E-06	5.97E-06		
U-233	1.3132E-07	53.25	106.50	0.00E+00	6.99E-06	1.40E-05		
U-234	1.7323E-07	53.25	106.50	0.00E+00	9.22E-06	1.84E-05		
U-235	-2.6159E-06	53.25	0.00	4.70E-03	4.56E-03	4.70E-03		
U-236	1.2717E-05	53.25	106.50	0.00E+00	6.77E-04	1.35E-03		
U-238	-3.8857E-08	53.25	0.00	2.94E-03	2.94E-03	2.94E-03		
Y-90	2.6015E+00	53.25	106.50	0.00E+00	1.39E+02	2.77E+02		
Other Radionuclides					2.02E+02	4.05E+02		

Thermal Power
Nominal Heat Output (Watts) 2.68E+00
Bounding Heat Output (Watts) 5.35E+00
Total Total

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19.89205598	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	53.25	38.75	
Bounding		106.50	

Nominal burnup taken directly from SFD (converted to MWd)
Bounding burnup assumed to be twice nominal burnup

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.13	0.73
Bounding	0.26	

Estimated EOL HM/Given EOL HM 1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) SLOVENIA
 SNF ID #: 468
 Fuel Units & Descr: 67 - ELEMENT
 Heavy Metal Mass: BOL=11 879kg, EOL=11 531kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1999
 Estimates as of: 2010
 Template: TRIGA-AI (LW/U-Zrx, Alum, 10 to 20%, U)
²Template Burnup(MWd)*: 6.65
 Template BOL Heavy Metal Mass (MT)*: 0.00018
 Template Decay Time*: 10 years

Estimated
 Canister usage:
 18"x10"
 0.60

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.2892E-09	405.21	810.42	0.00E+00	5.22E-07	1.04E-06	Avg MeV	
Am-241	2.9429E-03	405.21	810.42	0.00E+00	1.19E+00	2.38E+00	0.0150	1.090E+14
Am-242m	1.9489E-06	405.21	810.42	0.00E+00	7.90E-04	1.58E-03	0.0250	2.279E+13
Am-243	2.3308E-07	405.21	810.42	0.00E+00	9.44E-05	1.89E-04	0.0375	2.691E+13
C-14	4.3278E-05	405.21	810.42	0.00E+00	1.75E-02	3.51E-02	0.0675	2.225E+13
Cl-36	4.3023E-08	405.21	810.42	0.00E+00	1.74E-05	3.49E-05	0.0850	1.446E+13
Cm-243	2.4286E-07	405.21	810.42	0.00E+00	9.84E-05	1.97E-04	0.1250	2.001E+13
Cm-244	2.6015E-06	405.21	810.42	0.00E+00	1.05E-03	2.11E-03	0.2250	1.270E+13
Co-60	1.6075E-02	405.21	810.42	0.00E+00	6.51E+00	1.30E+01	0.3750	5.225E+12
Cs-134	1.9323E-02	405.21	810.42	0.00E+00	7.83E+00	1.57E+01	0.5750	7.784E+13
Cs-135	3.1549E-05	405.21	810.42	0.00E+00	1.28E-02	2.56E-02	0.8500	1.418E+13
Cs-137	2.4556E+00	405.21	810.42	0.00E+00	9.95E+02	1.99E+03	1.2500	1.559E+13
Eu-154	9.0180E-01	405.21	810.42	0.00E+00	3.65E+02	7.31E+02	1.7500	4.471E+11
Eu-155	2.1820E-01	405.21	810.42	0.00E+00	8.84E+01	1.77E+02	2.2500	1.064E+09
Fe-55	2.2902E-03	405.21	810.42	0.00E+00	9.28E-01	1.86E+00	2.7500	2.086E+07
H-3	8.1609E-03	405.21	810.42	0.00E+00	3.31E+00	6.61E+00	3.5000	2.544E+06
I-129	7.3805E-07	405.21	810.42	0.00E+00	2.99E-04	5.98E-04	5.0000	4.665E+02
Kr-85	1.8256E-01	405.21	810.42	0.00E+00	7.40E+01	1.48E+02	7.0000	5.275E+01
Np-237	1.4505E-06	405.21	810.42	0.00E+00	5.88E-04	1.18E-03	11.0000	6.005E+00
Pa-231	4.5564E-09	405.21	810.42	0.00E+00	1.85E-06	3.69E-06		
Pb-210	1.8842E-14	405.21	810.42	0.00E+00	7.63E-12	1.53E-11		
Pm-147	5.5459E-01	405.21	810.42	0.00E+00	2.25E+02	4.49E+02		
Pu-238	1.2992E-03	405.21	810.42	0.00E+00	5.26E-01	1.05E+00		
Pu-239	5.6932E-03	405.21	810.42	0.00E+00	2.31E+00	4.61E+00		
Pu-240	2.2632E-03	405.21	810.42	0.00E+00	9.17E-01	1.83E+00		
Pu-241	9.8857E-02	405.21	810.42	0.00E+00	4.01E+01	8.01E+01		
Pu-242	3.0602E-07	405.21	810.42	0.00E+00	1.24E-04	2.48E-04		
Ra-226	1.0823E-13	405.21	810.42	0.00E+00	4.39E-11	8.77E-11		
Ra-228	2.0406E-10	405.21	810.42	0.00E+00	8.27E-08	1.65E-07		
Ru-106	3.0180E-03	405.21	810.42	0.00E+00	1.22E+00	2.45E+00		
Se-79	1.2937E-05	405.21	810.42	0.00E+00	5.24E-03	1.05E-02		
Sn-126	1.2238E-05	405.21	810.42	0.00E+00	4.96E-03	9.92E-03		
Sr-90	2.3098E+00	405.21	810.42	0.00E+00	9.36E+02	1.87E+03		
Tc-99	4.4120E-04	405.21	810.42	0.00E+00	1.79E-01	3.58E-01		
Th-229	2.0932E-10	405.21	810.42	0.00E+00	8.48E-08	1.70E-07		
Th-230	2.7744E-11	405.21	810.42	0.00E+00	1.12E-08	2.25E-08		
Th-232	2.3744E-10	405.21	810.42	0.00E+00	9.62E-08	1.92E-07		
Ti-208	1.9459E-08	405.21	810.42	0.00E+00	7.88E-06	1.58E-05		
U-232	5.3850E-08	405.21	810.42	0.00E+00	2.18E-05	4.36E-05		
U-233	1.3135E-07	405.21	810.42	0.00E+00	5.32E-05	1.06E-04		
U-234	1.9143E-07	405.21	810.42	0.00E+00	7.76E-05	1.55E-04		
U-235	-2.6159E-06	405.21	0.00	5.14E-03	4.08E-03	5.14E-03		
U-236	1.2719E-05	405.21	810.42	0.00E+00	5.15E-03	1.03E-02		
U-238	-3.8857E-08	405.21	0.00	3.19E-03	3.18E-03	3.19E-03		
Y-90	2.3098E+00	405.21	810.42	0.00E+00	9.36E+02	1.87E+03		
Other Radionuclides					1.07E+03	2.14E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	ALUM	ALUM
BOL HM Constituents	U	U
BOL Enrichment %	20.00337313	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	405.21	332.55
Bounding		810.42

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd).
 Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.92	0.82
Bounding	1.85	

Estimated EOL HM/Given EOL HM

0.99

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD (ALUM) SO KOREA
SNF ID # 483
Fuel Units & Descr 69 - ELEMENT
Heavy Metal Mass: BOL=13.11kg EOL=12.958kg
ROD Storage Site INEEL

Fuel decay start date 1972
Estimates as of 2010
Template TRIGA-AI (LW/U-Zr, Alum, 10 to 20%, U)
*Template Burnup(MWd) 6.65
Template BOL Heavy Metal Mass (MT) 0.00018
Template Decay Time 35 years

Estimated
Canister usage
18"x10"
0.62

II. Estimates							Gamma Sources	
	m	x _n	x _b	b	y _n	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	6.1504E-09	383.31	766.62	0.00E+00	2.36E-06	4.72E-06	0.0150	5.407E+13
Am-241	4.8165E-03	383.31	766.62	0.00E+00	1.85E+00	3.69E+00	0.0250	1.119E+13
Am-242m	1.7383E-06	383.31	766.62	0.00E+00	6.66E-04	1.33E-03	0.0375	1.056E+13
Am-243	2.3263E-07	383.31	766.62	0.00E+00	8.92E-05	1.78E-04	0.0575	1.064E+13
C-14	4.3158E-05	383.31	766.62	0.00E+00	1.65E-02	3.31E-02	0.0850	6.350E+12
Cl-36	4.3023E-08	383.31	766.62	0.00E+00	1.65E-05	3.30E-05	0.1250	5.485E+12
Cm-243	1.3229E-07	383.31	766.62	0.00E+00	5.07E-05	1.01E-04	0.2250	5.673E+12
Cm-244	1.0000E-06	383.31	766.62	0.00E+00	3.83E-04	7.67E-04	0.3750	2.408E+12
Co-60	6.0120E-04	383.31	766.62	0.00E+00	2.30E-01	4.61E-01	0.5750	3.966E+13
Cs-134	4.3534E-06	383.31	766.62	0.00E+00	1.67E-03	3.34E-03	0.8500	2.024E+12
Cs-135	3.1549E-05	383.31	766.62	0.00E+00	1.21E-02	2.42E-02	1.2500	1.986E+12
Cs-137	1.3788E+00	383.31	766.62	0.00E+00	5.29E+02	1.06E+03	1.7500	6.389E+10
Eu-154	1.2041E-01	383.31	766.62	0.00E+00	4.62E+01	9.23E+01	2.2500	1.260E+06
Eu-155	6.6451E-03	383.31	766.62	0.00E+00	2.55E+00	5.09E+00	2.7500	4.264E+05
Fe-55	2.9338E-06	383.31	766.62	0.00E+00	1.12E-03	2.25E-03	3.5000	1.034E+03
H-3	2.0075E-03	383.31	766.62	0.00E+00	7.70E-01	1.54E+00	5.0000	4.350E+02
I-129	7.3805E-07	383.31	766.62	0.00E+00	2.83E-04	5.66E-04	7.0000	4.905E+01
Kr-85	3.6301E-02	383.31	766.62	0.00E+00	1.39E+01	2.78E+01	11.0000	5.574E+00
Np-237	1.4977E-06	383.31	766.62	0.00E+00	5.74E-04	1.15E-03		
Pa-231	1.1275E-08	383.31	766.62	0.00E+00	4.32E-06	8.64E-06		
Pb-210	3.8932E-13	383.31	766.62	0.00E+00	1.49E-10	2.98E-10		
Pm-147	7.5383E-04	383.31	766.62	0.00E+00	2.89E-01	5.78E-01		
Pu-238	1.0668E-03	383.31	766.62	0.00E+00	4.09E-01	8.18E-01		
Pu-239	5.6902E-03	383.31	766.62	0.00E+00	2.18E+00	4.36E+00		
Pu-240	2.2571E-03	383.31	766.62	0.00E+00	8.65E-01	1.73E+00		
Pu-241	2.9699E-02	383.31	766.62	0.00E+00	1.14E+01	2.28E+01		
Pu-242	3.0602E-07	383.31	766.62	0.00E+00	1.17E-04	2.35E-04		
Ra-226	1.0704E-12	383.31	766.62	0.00E+00	4.10E-10	8.21E-10		
Ra-228	2.3654E-10	383.31	766.62	0.00E+00	9.07E-08	1.81E-07		
Ru-106	1.0444E-10	383.31	766.62	0.00E+00	4.00E-08	8.01E-08		
Se-79	1.2934E-05	383.31	766.62	0.00E+00	4.96E-03	9.92E-03		
Sn-126	1.2236E-05	383.31	766.62	0.00E+00	4.69E-03	9.38E-03		
Sr-90	1.2740E+00	383.31	766.62	0.00E+00	4.88E+02	9.77E+02		
Tc-99	4.4120E-04	383.31	766.62	0.00E+00	1.69E-01	3.38E-01		
Th-229	6.4226E-10	383.31	766.62	0.00E+00	2.46E-07	4.92E-07		
Th-230	1.0594E-10	383.31	766.62	0.00E+00	4.06E-08	8.12E-08		
Th-232	2.3744E-10	383.31	766.62	0.00E+00	9.10E-08	1.82E-07		
Ti-208	1.5774E-08	383.31	766.62	0.00E+00	6.05E-06	1.21E-05		
U-232	4.2511E-08	383.31	766.62	0.00E+00	1.63E-05	3.26E-05		
U-233	1.3155E-07	383.31	766.62	0.00E+00	5.04E-05	1.01E-04		
U-234	3.0030E-07	383.31	766.62	0.00E+00	1.15E-04	2.30E-04		
U-235	2.6144E-06	383.31	0.00	5.67E-03	4.66E-03	5.67E-03		
U-236	1.2720E-05	383.31	766.62	0.00E+00	4.88E-03	9.75E-03		
U-238	3.8857E-08	383.31	0.00	3.53E-03	5.51E-03	3.53E-03		
Y-90	1.2744E+00	383.31	766.62	0.00E+00	4.89E+02	9.77E+02		
Other Radionuclides					5.84E+02	1.17E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.45E+00	1.29E+01
Total	Total

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	ALUM	ALUM
BOL HM Constituents	U	U
BOL Enrichment %	20	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	383.31	144.90
Bounding		766.62

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd)
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.79	0.38
Bounding	1.58	

Estimated EOL HM/Given EOL HM

0.98

¹ Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

² Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) U OF IL
SNF ID #: 447
Fuel Units & Descr: 58 - ELEMENT
Heavy Metal Mass BOL=10 44kg; EOL=10 057kg
ROD Storage Site: INEEL
Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-AI (LW/U-Zr, Alum, 10 to 20%, U)
Template Burnup(MWd): 6 65
Template BOL Heavy Metal Mass (MT): 0 00018
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0 52

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 0632E-10	365 39	730 78	0 00E+00	2 95E-07	5 89E-07	Avg MeV	
Am-241	2 2586E-03	365 39	730 78	0 00E+00	8 25E-01	1 65E+00	0 0150	1 236E+14
Am-242m	1 9925E-06	365 39	730 78	0 00E+00	7 28E-04	1 46E-03	0 0250	2 684E+13
Am-243	2 3323E-07	365 39	730 78	0 00E+00	8 52E-05	1 70E-04	0 0375	3 344E+13
C-14	4 3308E-05	365 39	730 78	0 00E+00	1 58E-02	3 16E-02	0 0575	2 563E+13
Cl-36	4 3023E-08	365 39	730 78	0 00E+00	1 57E-05	3 14E-05	0 0850	1 794E+13
Cm-243	2 7429E-07	365 39	730 78	0 00E+00	1 00E-04	2 00E-04	0 1250	2 684E+13
Cm-244	3 1504E-06	365 39	730 78	0 00E+00	1 15E-03	2 30E-03	0 2250	1 498E+13
Co-60	3 1008E-02	365 39	730 78	0 00E+00	1 13E+01	2 27E+01	0 3750	6 667E+12
Cs-134	1 0367E-01	365 39	730 78	0 00E+00	3 79E+01	7 58E+01	0 5750	8 452E+13
Cs-135	3 1549E-05	365 39	730 78	0 00E+00	1 15E-02	2 31E-02	0 8500	2 081E+13
Cs-137	2 7564E+00	365 39	730 78	0 00E+00	1 01E+03	2 01E+03	1 2500	2 157E+13
Eu-154	1 3490E+00	365 39	730 78	0 00E+00	4 93E+02	9 86E+02	1 7500	6 172E+11
Eu-155	4 3880E-01	365 39	730 78	0 00E+00	1 60E+02	3 21E+02	2 2500	7 503E+10
Fe-55	8 6782E-03	365 39	730 78	0 00E+00	3 17E+00	6 34E+00	2 7500	6 094E+08
H-3	1 0805E-02	365 39	730 78	0 00E+00	3 95E+00	7 90E+00	3 5000	7 123E+07
I-129	7 3805E-07	365 39	730 78	0 00E+00	2 70E-04	5 39E-04	5 0000	4 234E+02
Kr-85	2 5218E-01	365 39	730 78	0 00E+00	9 21E+01	1 84E+02	7 0000	4 792E+01
Np-237	1 4463E-06	365 39	730 78	0 00E+00	5 28E-04	1 06E-03	11 0000	5 458E+00
Pa-231	3 5970E-09	365 39	730 78	0 00E+00	1 31E-06	2 63E-06		
Pb-210	8 2511E-15	365 39	730 78	0 00E+00	3 01E-12	6 03E-12		
Pm-147	2 0767E+00	365 39	730 78	0 00E+00	7 59E+02	1 52E+03		
Pu-238	1 3514E-03	365 39	730 78	0 00E+00	4 94E-01	9 88E-01		
Pu-239	5 6947E-03	365 39	730 78	0 00E+00	2 08E+00	4 16E+00		
Pu-240	2 2647E-03	365 39	730 78	0 00E+00	8 27E-01	1 65E+00		
Pu-241	1 2574E-01	365 39	730 78	0 00E+00	4 59E+01	9 19E+01		
Pu-242	3 0602E-07	365 39	730 78	0 00E+00	1 12E-04	2 24E-04		
Ra-226	5 7353E-14	365 39	730 78	0 00E+00	2 10E-11	4 19E-11		
Ra-228	1 8150E-10	365 39	730 78	0 00E+00	6 63E-08	1 33E-07		
Ru-106	9 3744E-02	365 39	730 78	0 00E+00	3 43E+01	6 85E+01		
Se-79	1 2938E-05	365 39	730 78	0 00E+00	4 73E-03	9 46E-03		
Sn-126	1 2239E-05	365 39	730 78	0 00E+00	4 47E-03	8 94E-03		
Sr-90	2 6000E+00	365 39	730 78	0 00E+00	9 50E+02	1 90E+03		
Tc-99	4 4120E-04	365 39	730 78	0 00E+00	1 61E-01	3 22E-01		
Th-229	1 4749E-10	365 39	730 78	0 00E+00	5 39E-08	1 08E-07		
Th-230	1 9549E-11	365 39	730 78	0 00E+00	7 14E-09	1 43E-08		
Th-232	2 3744E-10	365 39	730 78	0 00E+00	8 68E-08	1 74E-07		
Th-208	1 9459E-08	365 39	730 78	0 00E+00	7 11E-06	1 42E-05		
U-232	5 6015E-08	365 39	730 78	0 00E+00	2 05E-05	4 09E-05		
U-233	1 3132E-07	365 39	730 78	0 00E+00	4 80E-05	9 60E-05		
U-234	1 7323E-07	365 39	730 78	0 00E+00	6 33E-05	1 27E-04		
U-235	2 6159E-06	365 39	0 00	4 51E-03	3 56E-03	4 51E-03		
U-236	1 2717E-05	365 39	730 78	0 00E+00	4 65E-03	9 29E-03		
U-238	3 8857E-08	365 39	0 00	2 81E-03	2 79E-03	2 81E-03		
Y-90	2 6015E+00	365 39	730 78	0 00E+00	9 51E+02	1 90E+03		
Other Radionuclides					1 39E+03	2 78E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	ALUM	ALUM
BOL HM Constituents	U	U
BOL Enrichment %	19 9999834	10 to 20 1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	203 50	365 39
Bounding		730 78

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 95	1 80
Bounding	1 89	

Estimated EOL HM/Given EOL HM

1 00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD (ALUM) U OF IL
SNF ID # 501
Fuel Units & Descr 1 - ELEMENT
Heavy Metal Mass BOL=0 18kg EOL=0 173kg
ROD Storage Site: INEEL

¹Fuel decay start date. 2035
Estimates as of 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20% U)
²Template Burnup(MWd) 6.65
Template BOL Heavy Metal Mass (MT) 0.000195
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0.01

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	8.5173E-10	6.30	12.60	0.00E+00	5.37E-09	1.07E-08	0.0150	2.037E+12
Am-241	1.8331E-03	6.30	12.60	0.00E+00	1.15E-02	2.31E-02	0.0250	4.481E+11
Am-242m	1.4129E-06	6.30	12.60	0.00E+00	8.90E-06	1.78E-05	0.0375	3.816E+11
Am-243	1.4774E-07	6.30	12.60	0.00E+00	9.31E-07	1.86E-06	0.0575	3.917E+11
C-14	1.2871E-04	6.30	12.60	0.00E+00	8.11E-04	1.62E-03	0.0850	2.427E+11
Cl-36	2.8120E-06	6.30	12.60	0.00E+00	1.77E-05	3.54E-05	0.1250	1.762E+11
Cm-243	1.7940E-07	6.30	12.60	0.00E+00	1.13E-06	2.26E-06	0.2250	2.059E+11
Cm-244	1.6962E-06	6.30	12.60	0.00E+00	1.07E-05	2.14E-05	0.3750	1.045E+11
Co-60	1.2839E+00	6.30	12.60	0.00E+00	8.09E+00	1.62E+01	0.5750	1.389E+12
Cs-134	9.0541E-02	6.30	12.60	0.00E+00	5.70E-01	1.14E+00	0.8500	5.961E+10
Cs-135	3.2195E-05	6.30	12.60	0.00E+00	2.03E-04	4.06E-04	1.2500	1.211E+12
Cs-137	2.7564E+00	6.30	12.60	0.00E+00	1.74E+01	3.47E+01	1.7500	8.069E+08
Eu-154	1.5368E-02	6.30	12.60	0.00E+00	9.68E-02	1.94E-01	2.2500	1.301E+09
Eu-155	2.9293E-02	6.30	12.60	0.00E+00	1.85E-01	3.69E-01	2.7500	1.032E+07
Fe-55	7.7158E-01	6.30	12.60	0.00E+00	4.86E+00	9.72E+00	3.5000	1.201E+06
H-3	1.1111E-02	6.30	12.60	0.00E+00	7.00E-02	1.40E-01	5.0000	6.716E+00
I-129	7.3684E-07	6.30	12.60	0.00E+00	4.64E-06	9.28E-06	7.0000	7.602E-01
Kr-85	2.5263E-01	6.30	12.60	0.00E+00	1.59E+00	3.18E+00	11.0000	8.661E-02
Np-237	1.2427E-06	6.30	12.60	0.00E+00	7.83E-06	1.57E-05		
Pa-231	3.8511E-09	6.30	12.60	0.00E+00	2.43E-08	4.85E-08		
Pb-210	7.3880E-15	6.30	12.60	0.00E+00	4.65E-14	9.31E-14		
Pm-147	2.1023E+00	6.30	12.60	0.00E+00	1.32E+01	2.65E+01		
Pu-238	1.0383E-03	6.30	12.60	0.00E+00	6.54E-03	1.31E-02		
Pu-239	5.5293E-03	6.30	12.60	0.00E+00	3.48E-02	6.97E-02		
Pu-240	2.1278E-03	6.30	12.60	0.00E+00	1.34E-02	2.68E-02		
Pu-241	1.0195E-01	6.30	12.60	0.00E+00	6.42E-01	1.28E+00		
Pu-242	2.3128E-07	6.30	12.60	0.00E+00	1.46E-06	2.91E-06		
Ra-226	5.2782E-14	6.30	12.60	0.00E+00	3.33E-13	6.65E-13		
Ra-228	1.9338E-10	6.30	12.60	0.00E+00	1.22E-09	2.44E-09		
Ru-106	9.1684E-02	6.30	12.60	0.00E+00	5.78E-01	1.16E+00		
Se-79	1.3018E-05	6.30	12.60	0.00E+00	8.20E-05	1.64E-04		
Sn-126	1.2167E-05	6.30	12.60	0.00E+00	7.67E-05	1.53E-04		
Sr-90	2.6045E+00	6.30	12.60	0.00E+00	1.64E+01	3.28E+01		
Tc-99	4.4241E-04	6.30	12.60	0.00E+00	2.79E-03	5.57E-03		
Th-229	1.3713E-10	6.30	12.60	0.00E+00	8.64E-10	1.73E-09		
Th-230	1.8090E-11	6.30	12.60	0.00E+00	1.14E-10	2.28E-10		
Th-232	2.5278E-10	6.30	12.60	0.00E+00	1.59E-09	3.19E-09		
Ti-208	1.6947E-08	6.30	12.60	0.00E+00	1.07E-07	2.14E-07		
U-232	4.8737E-08	6.30	12.60	0.00E+00	3.07E-07	6.14E-07		
U-233	1.2203E-07	6.30	12.60	0.00E+00	7.69E-07	1.54E-06		
U-234	1.5925E-07	6.30	12.60	0.00E+00	1.00E-06	2.01E-06		
U-235	-2.6194E-06	6.30	0.00	7.78E-05	6.13E-05	7.78E-05		
U-236	1.2693E-05	6.30	12.60	0.00E+00	8.00E-05	1.60E-04		
U-238	-3.6331E-08	6.30	0.00	4.84E-05	4.82E-05	4.84E-05		
Y-90	2.6060E+00	6.30	12.60	0.00E+00	1.64E+01	3.28E+01		
Other Radionuclides					2.27E+01	4.54E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	19.9999834	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	3.51	6.30
Bounding		12.60

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	1.03	1.80
Bounding	2.05	

Estimated EOL HM/Given EOL HM

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) U OF UTAH
SNF ID #: 699
Fuel Units & Descr: 63 - ELEMENT
Heavy Metal Mass: BOL=11kg EOL=10 723kg
ROD Storage Site: INEEL

¹Fuel decay start date 2035
Estimates as of: 2010
Template: TRIGA-AJ (LW/U-Zr, Alum., 10 to 20%, U)
²Template Burnup(MWd). 6 65
Template BOL Heavy Metal Mass (MT). 0 00018
Template Decay Time. 5 years

Estimated
Canister usage:
18"x10"
0 57

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 0632E-10	264 59	529 19	0 00E+00	2 13E-07	4 27E-07	Avg MeV	
Am-241	2 2586E-03	264 59	529 19	0 00E+00	5 98E-01	1 20E+00	0 0150	8 954E+13
Am-242m	1 9925E-06	264 59	529 19	0 00E+00	5 27E-04	1 05E-03	0 0250	1 944E+13
Am-243	2 3323E-07	264 59	529 19	0 00E+00	6 17E-05	1 23E-04	0 0375	2 421E+13
C-14	4 3308E-05	264 59	529 19	0 00E+00	1 15E-02	2 29E-02	0 0575	1 856E+13
Cl-36	4 3023E-08	264 59	529 19	0 00E+00	1 14E-05	2 28E-05	0 0850	1 299E+13
Cm-243	2 7429E-07	264 59	529 19	0 00E+00	7 26E-05	1 45E-04	0 1250	1 943E+13
Cm-244	3 1504E-06	264 59	529 19	0 00E+00	8 34E-04	1 67E-03	0 2250	1 085E+13
Co-60	3 1008E-02	264 59	529 19	0 00E+00	8 20E+00	1 64E+01	0 3750	4 828E+12
Cs-134	1 0367E-01	264 59	529 19	0 00E+00	2 74E+01	5 49E+01	0 5750	6 121E+13
Cs-135	3 1549E-05	264 59	529 19	0 00E+00	8 35E-03	1 67E-02	0 8500	1 507E+13
Cs-137	2 7564E+00	264 59	529 19	0 00E+00	7 29E+02	1 46E+03	1 2500	1 562E+13
Eu-154	1 3490E+00	264 59	529 19	0 00E+00	3 57E+02	7 14E+02	1 7500	4 470E+11
Eu-155	4 3880E-01	264 59	529 19	0 00E+00	1 16E+02	2 32E+02	2 2500	5 433E+10
Fe-55	8 6782E-03	264 59	529 19	0 00E+00	2 30E+00	4 59E+00	2 7500	4 413E+08
H-3	1 0805E-02	264 59	529 19	0 00E+00	2 86E+00	5 72E+00	3 5000	5 158E+07
I-129	7 3805E-07	264 59	529 19	0 00E+00	1 95E-04	3 91E-04	5 0000	3 087E+02
Kr-85	2 5218E-01	264 59	529 19	0 00E+00	6 67E+01	1 33E+02	7 0000	3 495E+01
Np-237	1 4463E-06	264 59	529 19	0 00E+00	3 83E-04	7 65E-04	11 0000	3 981E+00
Pa-231	3 5970E-09	264 59	529 19	0 00E+00	9 52E-07	1 90E-06		
Pb-210	8 2511E-15	264 59	529 19	0 00E+00	2 18E-12	4 37E-12		
Pm-147	2 0767E+00	264 59	529 19	0 00E+00	5 49E+02	1 10E+03		
Pu-238	1 3514E-03	264 59	529 19	0 00E+00	3 58E-01	7 15E-01		
Pu-239	5 6947E-03	264 59	529 19	0 00E+00	1 51E+00	3 01E+00		
Pu-240	2 2647E-03	264 59	529 19	0 00E+00	5 99E-01	1 20E+00		
Pu-241	1 2574E-01	264 59	529 19	0 00E+00	3 33E+01	6 65E+01		
Pu-242	3 0602E-07	264 59	529 19	0 00E+00	8 10E-05	1 62E-04		
Ra-226	5 7353E-14	264 59	529 19	0 00E+00	1 52E-11	3 04E-11		
Ra-228	1 8150E-10	264 59	529 19	0 00E+00	4 80E-08	9 60E-08		
Ru-106	9 3744E-02	264 59	529 19	0 00E+00	2 48E+01	4 96E+01		
Se-79	1 2938E-05	264 59	529 19	0 00E+00	3 42E-03	6 85E-03		
Sn-126	1 2239E-05	264 59	529 19	0 00E+00	3 24E-03	6 48E-03		
Sr-90	2 6000E+00	264 59	529 19	0 00E+00	6 88E+02	1 38E+03		
Tc-99	4 4120E-04	264 59	529 19	0 00E+00	1 17E-01	2 33E-01		
Th-229	1 4749E-10	264 59	529 19	0 00E+00	3 90E-08	7 80E-08		
Th-230	1 9549E-11	264 59	529 19	0 00E+00	5 17E-09	1 03E-08		
Th-232	2 3744E-10	264 59	529 19	0 00E+00	6 28E-08	1 26E-07		
Ti-208	1 9459E-08	264 59	529 19	0 00E+00	5 15E-06	1 03E-05		
U-232	5 6015E-08	264 59	529 19	0 00E+00	1 48E-05	2 96E-05		
U-233	1 3132E-07	264 59	529 19	0 00E+00	3 47E-05	6 95E-05		
U-234	1 7323E-07	264 59	529 19	0 00E+00	4 58E-05	9 17E-05		
U-235	-2 6159E-06	264 59	0 00	4 73E-03	4 04E-03	4 73E-03		
U-236	1 2717E-05	264 59	529 19	0 00E+00	3 36E-03	6 73E-03		
U-238	-3 8857E-08	264 59	0 00	2 96E-03	2 95E-03	2 96E-03		
Y-90	2 6015E+00	264 59	529 19	0 00E+00	6 88E+02	1 38E+03		
Other Radionuclides					1 01E+03	2 01E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1 33E+01	2 66E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19 89699819	10 to 20 1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal	214 41	264 59	
Bounding		529 19	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0 65	1 23	
Bounding:	1 30		1 00

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) UNIV OF TEXAS
SNF ID #: 877
Fuel Units & Descr: 69 - ELEMENT
Heavy Metal Mass: BOL=12.765kg EOL=12.675kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1973
Estimates as of: 2010
Template: TRIGA-AJ (LW/U-Zrx, Alum, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 35 years

Estimated
Canister usage
18"x10"
0.62

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1504E-09	85.62	171.24	0.00E+00	5.27E-07	1.05E-06	Avg. MeV	
Am-241	4.8165E-03	85.62	171.24	0.00E+00	4.12E-01	8.25E-01	0.0150	1.208E+13
Am-242m	1.7383E-06	85.62	171.24	0.00E+00	1.49E-04	2.98E-04	0.0250	2.500E+12
Am-243	2.3263E-07	85.62	171.24	0.00E+00	1.99E-05	3.98E-05	0.0375	2.359E+12
C-14	4.3158E-05	85.62	171.24	0.00E+00	3.70E-03	7.39E-03	0.0575	2.376E+12
Cl-36	4.3023E-08	85.62	171.24	0.00E+00	3.68E-06	7.37E-06	0.0850	1.418E+12
Cm-243	1.3229E-07	85.62	171.24	0.00E+00	1.13E-05	2.27E-05	0.1250	1.225E+12
Cm-244	1.0000E-06	85.62	171.24	0.00E+00	8.56E-05	1.71E-04	0.2250	1.267E+12
Co-60	6.0120E-04	85.62	171.24	0.00E+00	5.15E-02	1.03E-01	0.3750	5.378E+11
Cs-134	4.3534E-06	85.62	171.24	0.00E+00	3.73E-04	7.45E-04	0.5750	8.860E+12
Cs-135	3.1549E-05	85.62	171.24	0.00E+00	2.70E-03	5.40E-03	0.8500	4.521E+11
Cs-137	1.3788E+00	85.62	171.24	0.00E+00	1.18E+02	2.36E+02	1.2500	4.436E+11
Eu-154	1.2041E-01	85.62	171.24	0.00E+00	1.03E+01	2.06E+01	1.7500	1.427E+10
Eu-155	6.6451E-03	85.62	171.24	0.00E+00	5.69E-01	1.14E+00	2.2500	2.815E+05
Fe-55	2.9338E-06	85.62	171.24	0.00E+00	2.51E-04	5.02E-04	2.7500	9.525E+04
H-3	2.0075E-03	85.62	171.24	0.00E+00	1.72E-01	3.44E-01	3.5000	2.452E+02
I-129	7.3805E-07	85.62	171.24	0.00E+00	6.32E-05	1.26E-04	5.0000	1.033E+02
Kr-85	3.6301E-02	85.62	171.24	0.00E+00	3.11E+00	6.22E+00	7.0000	1.166E+01
Np-237	1.4977E-06	85.62	171.24	0.00E+00	1.28E-04	2.56E-04	11.0000	1.326E+00
Pa-231	1.1275E-08	85.62	171.24	0.00E+00	9.65E-07	1.93E-06		
Pb-210	3.8932E-13	85.62	171.24	0.00E+00	3.33E-11	6.67E-11		
Pm-147	7.5383E-04	85.62	171.24	0.00E+00	6.45E-02	1.29E-01		
Pu-238	1.0668E-03	85.62	171.24	0.00E+00	9.13E-02	1.83E-01		
Pu-239	5.6902E-03	85.62	171.24	0.00E+00	4.87E-01	9.74E-01		
Pu-240	2.2571E-03	85.62	171.24	0.00E+00	1.93E-01	3.87E-01		
Pu-241	2.9699E-02	85.62	171.24	0.00E+00	2.54E+00	5.09E+00		
Pu-242	3.0602E-07	85.62	171.24	0.00E+00	2.62E-05	5.24E-05		
Ra-226	1.0704E-12	85.62	171.24	0.00E+00	9.16E-11	1.83E-10		
Ra-228	2.3654E-10	85.62	171.24	0.00E+00	2.03E-08	4.05E-08		
Ru-106	1.0444E-10	85.62	171.24	0.00E+00	8.94E-09	1.79E-08		
Se-79	1.2934E-05	85.62	171.24	0.00E+00	1.11E-03	2.21E-03		
Sn-126	1.2236E-05	85.62	171.24	0.00E+00	1.05E-03	2.10E-03		
Sr-90	1.2740E+00	85.62	171.24	0.00E+00	1.09E+02	2.18E+02		
Tc-99	4.4120E-04	85.62	171.24	0.00E+00	3.78E-02	7.56E-02		
Th-229	6.4226E-10	85.62	171.24	0.00E+00	5.50E-08	1.10E-07		
Th-230	1.0594E-10	85.62	171.24	0.00E+00	9.07E-09	1.81E-08		
Th-232	2.3744E-10	85.62	171.24	0.00E+00	2.03E-08	4.07E-08		
Th-208	1.5774E-08	85.62	171.24	0.00E+00	1.35E-06	2.70E-06		
U-232	4.2511E-08	85.62	171.24	0.00E+00	3.64E-06	7.28E-06		
U-233	1.3155E-07	85.62	171.24	0.00E+00	1.13E-05	2.25E-05		
U-234	3.0030E-07	85.62	171.24	0.00E+00	2.57E-05	5.14E-05		
U-235	-2.6144E-06	85.62	0.00	5.52E-03	5.29E-03	5.52E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.2720E-05	85.62	171.24	0.00E+00	1.09E-03	2.18E-03	1.44E+00	2.88E+00
U-238	-3.8857E-08	85.62	0.00	3.43E-03	3.43E-03	3.43E-03	Total	Total
Y-90	1.2744E+00	85.62	171.24	0.00E+00	1.09E+02	2.18E+02		
Other Radionuclides					1.30E+02	2.61E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20	10 to 20.1	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
	62.20	85.62	
Bounding		171.24	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0.18	1.38	
Bounding	0.36		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD (ALUM) USGS
SNF ID # 267
Fuel Units & Descr: 222 - ELEMENT
Heavy Metal Mass: BOL=42.224kg, EOL=41.292kg
ROD Storage Site INEEL

¹Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-AI (LW/U-Zr, Alum., 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT) 0.00018
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
2.00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	889.99	1,779.99	0.00E+00	7.18E-07	1.44E-06	Avg. MeV	
Am-241	2.2586E-03	889.99	1,779.99	0.00E+00	2.01E+00	4.02E+00	0.0150	3.012E+14
Am-242m	1.9925E-06	889.99	1,779.99	0.00E+00	1.77E-03	3.55E-03	0.0250	6.539E+13
Am-243	2.3323E-07	889.99	1,779.99	0.00E+00	2.08E-04	4.15E-04	0.0375	8.145E+13
C-14	4.3308E-05	889.99	1,779.99	0.00E+00	3.85E-02	7.71E-02	0.0575	6.244E+13
Cl-36	4.3023E-08	889.99	1,779.99	0.00E+00	3.83E-05	7.66E-05	0.0850	4.371E+13
Cm-243	2.7429E-07	889.99	1,779.99	0.00E+00	2.44E-04	4.88E-04	0.1250	6.537E+13
Cm-244	3.1504E-06	889.99	1,779.99	0.00E+00	2.80E-03	5.61E-03	0.2250	3.649E+13
Co-60	3.1008E-02	889.99	1,779.99	0.00E+00	2.76E+01	5.52E+01	0.3750	1.624E+13
Cs-134	1.0367E-01	889.99	1,779.99	0.00E+00	9.23E+01	1.85E+02	0.5750	2.059E+14
Cs-135	3.1549E-05	889.99	1,779.99	0.00E+00	2.81E-02	5.62E-02	0.8500	5.068E+13
Cs-137	2.7564E+00	889.99	1,779.99	0.00E+00	2.45E+03	4.91E+03	1.2500	5.253E+13
Eu-154	1.3490E+00	889.99	1,779.99	0.00E+00	1.20E+03	2.40E+03	1.7500	1.503E+12
Eu-155	4.3880E-01	889.99	1,779.99	0.00E+00	3.91E+02	7.81E+02	2.2500	1.827E+11
Fe-55	8.6782E-03	889.99	1,779.99	0.00E+00	7.72E+00	1.54E+01	2.7500	1.484E+09
H-3	1.0805E-02	889.99	1,779.99	0.00E+00	9.62E+00	1.92E+01	3.5000	1.735E+08
I-129	7.3805E-07	889.99	1,779.99	0.00E+00	6.57E-04	1.31E-03	5.0000	1.042E+03
Kr-85	2.5218E-01	889.99	1,779.99	0.00E+00	2.24E+02	4.49E+02	7.0000	1.179E+02
Np-237	1.4463E-06	889.99	1,779.99	0.00E+00	1.29E-03	2.57E-03	11.0000	1.343E+01
Pa-231	3.5970E-09	889.99	1,779.99	0.00E+00	3.20E-06	6.40E-06		
Pb-210	8.2511E-15	889.99	1,779.99	0.00E+00	7.34E-12	1.47E-11		
Pm-147	2.0767E+00	889.99	1,779.99	0.00E+00	1.85E+03	3.70E+03		
Pu-238	1.3514E-03	889.99	1,779.99	0.00E+00	1.20E+00	2.41E+00		
Pu-239	5.6947E-03	889.99	1,779.99	0.00E+00	5.07E+00	1.01E+01		
Pu-240	2.2647E-03	889.99	1,779.99	0.00E+00	2.02E+00	4.03E+00		
Pu-241	1.2574E-01	889.99	1,779.99	0.00E+00	1.12E+02	2.24E+02		
Pu-242	3.0602E-07	889.99	1,779.99	0.00E+00	2.72E-04	5.45E-04		
Ra-226	5.7353E-14	889.99	1,779.99	0.00E+00	5.10E-11	1.02E-10		
Ra-228	1.8150E-10	889.99	1,779.99	0.00E+00	1.62E-07	3.23E-07		
Ru-106	9.3744E-02	889.99	1,779.99	0.00E+00	8.34E+01	1.67E+02		
Se-79	1.2938E-05	889.99	1,779.99	0.00E+00	1.15E-02	2.30E-02		
Sn-126	1.2239E-05	889.99	1,779.99	0.00E+00	1.09E-02	2.18E-02		
Sr-90	2.6000E+00	889.99	1,779.99	0.00E+00	2.31E+03	4.63E+03		
Tc-99	4.4120E-04	889.99	1,779.99	0.00E+00	3.93E-01	7.85E-01		
Th-229	1.4749E-10	889.99	1,779.99	0.00E+00	1.31E-07	2.63E-07		
Th-230	1.9549E-11	889.99	1,779.99	0.00E+00	1.74E-08	3.48E-08		
Th-232	2.3744E-10	889.99	1,779.99	0.00E+00	2.11E-07	4.23E-07		
Ti-208	1.9459E-08	889.99	1,779.99	0.00E+00	1.73E-05	3.46E-05		
U-232	5.6015E-08	889.99	1,779.99	0.00E+00	4.99E-05	9.97E-05		
U-233	1.3132E-07	889.99	1,779.99	0.00E+00	1.17E-04	2.34E-04		
U-234	1.7323E-07	889.99	1,779.99	0.00E+00	1.54E-04	3.08E-04		
U-235	-2.6159E-06	889.99	0.00	1.82E-02	1.58E-02	1.82E-02		
U-236	1.2717E-05	889.99	1,779.99	0.00E+00	1.13E-02	2.26E-02		
U-238	-3.8857E-08	889.99	0.00	1.14E-02	1.13E-02	1.14E-02		
Y-90	2.6015E+00	889.99	1,779.99	0.00E+00	2.32E+03	4.63E+03		
Other Radionuclides					3.38E+03	6.77E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	ALUM	ALUM
BOL HM Constituents	U	U
BOL Enrichment %	19.898	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	102.86	889.99
Bounding		1,779.99

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.57	8.65
Bounding	1.14	

Estimated EOL HM/Given EOL HM

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) ZAIRE
SNF ID #: 487
Fuel Units & Descr: 56 - ELEMENT
Heavy Metal Mass: BOL=10.06kg; EOL=10.052kg
ROD Storage Site: INEEL
Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-AI (LW/U-Zr, Alum, 10 to 20%, U)
Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0.50

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	147.36	294.72	0.00E+00	1.19E-07	2.38E-07	Avg MeV	
Am-241	2.2586E-03	147.36	294.72	0.00E+00	3.33E-01	6.66E-01	0.0150	4.987E+13
Am-242m	1.9925E-06	147.36	294.72	0.00E+00	2.94E-04	5.87E-04	0.0250	1.083E+13
Am-243	2.3323E-07	147.36	294.72	0.00E+00	3.44E-05	6.87E-05	0.0375	1.349E+13
C-14	4.3308E-05	147.36	294.72	0.00E+00	6.38E-03	1.28E-02	0.0575	1.034E+13
Cl-36	4.3023E-08	147.36	294.72	0.00E+00	6.34E-06	1.27E-05	0.0850	7.237E+12
Cm-243	2.7429E-07	147.36	294.72	0.00E+00	4.04E-05	8.08E-05	0.1250	1.082E+13
Cm-244	3.1504E-06	147.36	294.72	0.00E+00	4.64E-04	9.28E-04	0.2250	6.041E+12
Co-60	3.1008E-02	147.36	294.72	0.00E+00	4.57E+00	9.14E+00	0.3750	2.689E+12
Cs-134	1.0367E-01	147.36	294.72	0.00E+00	1.53E+01	3.06E+01	0.5750	3.409E+13
Cs-135	3.1549E-05	147.36	294.72	0.00E+00	4.65E-03	9.30E-03	0.8500	8.391E+12
Cs-137	2.7564E+00	147.36	294.72	0.00E+00	4.06E+02	8.12E+02	1.2500	8.698E+12
Eu-154	1.3490E+00	147.36	294.72	0.00E+00	1.99E+02	3.98E+02	1.7500	2.489E+11
Eu-155	4.3880E-01	147.36	294.72	0.00E+00	6.47E+01	1.29E+02	2.2500	3.026E+10
Fe-55	8.6782E-03	147.36	294.72	0.00E+00	1.28E+00	2.56E+00	2.7500	2.458E+08
H-3	1.0805E-02	147.36	294.72	0.00E+00	1.59E+00	3.18E+00	3.5000	2.873E+07
I-129	7.3805E-07	147.36	294.72	0.00E+00	1.09E-04	2.18E-04	5.0000	1.744E+02
Kr-85	2.5218E-01	147.36	294.72	0.00E+00	3.72E+01	7.43E+01	7.0000	1.975E+01
Np-237	1.4463E-06	147.36	294.72	0.00E+00	2.13E-04	4.26E-04	11.0000	2.250E+00
Pa-231	3.5970E-09	147.36	294.72	0.00E+00	5.30E-07	1.06E-06		
Pb-210	8.2511E-15	147.36	294.72	0.00E+00	1.22E-12	2.43E-12		
Pm-147	2.0767E+00	147.36	294.72	0.00E+00	3.06E+02	6.12E+02		
Pu-238	1.3514E-03	147.36	294.72	0.00E+00	1.99E-01	3.98E-01		
Pu-239	5.6947E-03	147.36	294.72	0.00E+00	8.39E-01	1.68E+00		
Pu-240	2.2647E-03	147.36	294.72	0.00E+00	3.34E-01	6.67E-01		
Pu-241	1.2574E-01	147.36	294.72	0.00E+00	1.85E+01	3.71E+01		
Pu-242	3.0602E-07	147.36	294.72	0.00E+00	4.51E-05	9.02E-05		
Ra-226	5.7353E-14	147.36	294.72	0.00E+00	8.45E-12	1.69E-11		
Ra-228	1.8150E-10	147.36	294.72	0.00E+00	2.67E-08	5.35E-08		
Ru-106	9.3744E-02	147.36	294.72	0.00E+00	1.38E+01	2.76E+01		
Se-79	1.2938E-05	147.36	294.72	0.00E+00	1.91E-03	3.81E-03		
Sn-126	1.2239E-05	147.36	294.72	0.00E+00	1.80E-03	3.61E-03		
Sr-90	2.6000E+00	147.36	294.72	0.00E+00	3.83E+02	7.66E+02		
Tc-99	4.4120E-04	147.36	294.72	0.00E+00	6.50E-02	1.30E-01		
Th-229	1.4749E-10	147.36	294.72	0.00E+00	2.17E-08	4.35E-08		
Th-230	1.9549E-11	147.36	294.72	0.00E+00	2.88E-09	5.76E-09		
Th-232	2.3744E-10	147.36	294.72	0.00E+00	3.50E-08	7.00E-08		
Th-208	1.9459E-08	147.36	294.72	0.00E+00	2.87E-06	5.73E-06		
U-232	5.6015E-08	147.36	294.72	0.00E+00	8.25E-06	1.65E-05		
U-233	1.3132E-07	147.36	294.72	0.00E+00	1.94E-05	3.87E-05		
U-234	1.7323E-07	147.36	294.72	0.00E+00	2.55E-05	5.11E-05		
U-235	-2.6159E-06	147.36	0.00	4.36E-03	3.97E-03	4.36E-03		
U-236	1.2717E-05	147.36	294.72	0.00E+00	1.87E-03	3.75E-03		
U-238	-3.8857E-08	147.36	0.00	2.71E-03	2.70E-03	2.71E-03		
Y-90	2.6015E+00	147.36	294.72	0.00E+00	3.83E+02	7.67E+02		
Other Radionuclides					5.60E+02	1.12E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.40E+00	1.48E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences ¹
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	20	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	147.36	26.73	Nominal burnup taken directly from SFD (converted to MWd)
Bounding		294.72	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.40	0.18	0.99
Bounding	0.79		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 1220 ROMANIA
 SNF ID #: 1078
 Fuel Units & Descr: 498 - ELEMENT
 Heavy Metal Mass: BOL=124.5kg, EOL=121 462kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2010
 Estimates as of: 2010
 Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd): 6 65
 Template BOL Heavy Metal Mass (MT): 0 000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 4 49

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 5173E-10	2,899 91	5,799 81	0 00E+00	2 47E-06	4 94E-06	Avg MeV	
Am-241	1 8331E-03	2,899 91	5,799 81	0 00E+00	5 32E+00	1 06E+01	0 0150	9 374E+14
Am-242m	1 4129E-06	2,899 91	5,799 81	0 00E+00	4 10E-03	8 19E-03	0 0250	2 063E+14
Am-243	1 4774E-07	2,899 91	5,799 81	0 00E+00	4 28E-04	8 57E-04	0 0375	1 757E+14
C-14	1 2871E-04	2,899 91	5,799 81	0 00E+00	3 73E-01	7 46E-01	0 0575	1 803E+14
Cl-36	2 8120E-06	2,899 91	5,799 81	0 00E+00	8 15E-03	1 63E-02	0 0850	1 117E+14
Cm-243	1 7940E-07	2,899 91	5,799 81	0 00E+00	5 20E-04	1 04E-03	0 1250	8 111E+13
Cm-244	1 6962E-06	2,899 91	5,799 81	0 00E+00	4 92E-03	9 84E-03	0 2250	9 475E+13
Co-60	1 2839E+00	2,899 91	5,799 81	0 00E+00	3 72E+03	7 45E+03	0 3750	4 808E+13
Cs-134	9 0541E-02	2,899 91	5,799 81	0 00E+00	2 63E+02	5 25E+02	0 5750	6 392E+14
Cs-135	3 2195E-05	2,899 91	5,799 81	0 00E+00	9 34E-02	1 87E-01	0 8500	2 744E+13
Cs-137	2 7564E+00	2,899 91	5,799 81	0 00E+00	7 99E+03	1 60E+04	1 2500	5 572E+14
Eu-154	1 5368E-02	2,899 91	5,799 81	0 00E+00	4 46E+01	8 91E+01	1 7500	3 714E+11
Eu-155	2 9293E-02	2,899 91	5,799 81	0 00E+00	8 49E+01	1 70E+02	2 2500	5 986E+11
Fe-55	7 7158E-01	2,899 91	5,799 81	0 00E+00	2 24E+03	4 48E+03	2 7500	4 751E+09
H-3	1 1111E-02	2,899 91	5,799 81	0 00E+00	3 22E+01	6 44E+01	3 5000	5 529E+08
I-129	7 3684E-07	2,899 91	5,799 81	0 00E+00	2 14E-03	4 27E-03	5 0000	3 117E+03
Kr-85	2 5263E-01	2,899 91	5,799 81	0 00E+00	7 33E+02	1 47E+03	7 0000	3 529E+02
Np-237	1 2427E-06	2,899 91	5,799 81	0 00E+00	3 60E-03	7 21E-03	11 0000	4 021E+01
Pa-231	3 8511E-09	2,899 91	5,799 81	0 00E+00	1 12E-05	2 23E-05		
Pb-210	7 3880E-15	2,899 91	5,799 81	0 00E+00	2 14E-11	4 28E-11		
Pm-147	2 1023E+00	2,899 91	5,799 81	0 00E+00	6 10E+03	1 22E+04		
Pu-238	1 0383E-03	2,899 91	5,799 81	0 00E+00	3 01E+00	6 02E+00		
Pu-239	5 5293E-03	2,899 91	5,799 81	0 00E+00	1 60E+01	3 21E+01		
Pu-240	2 1278E-03	2,899 91	5,799 81	0 00E+00	6 17E+00	1 23E+01		
Pu-241	1 0195E-01	2,899 91	5,799 81	0 00E+00	2 96E+02	5 91E+02		
Pu-242	2 3128E-07	2,899 91	5,799 81	0 00E+00	6 71E-04	1 34E-03		
Ra-226	5 2782E-14	2,899 91	5,799 81	0 00E+00	1 53E-10	3 06E-10		
Ra-228	1 9338E-10	2,899 91	5,799 81	0 00E+00	5 61E-07	1 12E-06		
Ru-106	9 1684E-02	2,899 91	5,799 81	0 00E+00	2 66E+02	5 32E+02		
Se-79	1 3018E-05	2,899 91	5,799 81	0 00E+00	3 78E-02	7 55E-02		
Sn-126	1 2167E-05	2,899 91	5,799 81	0 00E+00	3 53E-02	7 06E-02		
Sr-90	2 6045E+00	2,899 91	5,799 81	0 00E+00	7 55E+03	1 51E+04		
Tc-99	4 4241E-04	2,899 91	5,799 81	0 00E+00	1 28E+00	2 57E+00		
Th-229	1 3713E-10	2,899 91	5,799 81	0 00E+00	3 98E-07	7 95E-07		
Th-230	1 8090E-11	2,899 91	5,799 81	0 00E+00	5 25E-08	1 05E-07		
Th-232	2 5278E-10	2,899 91	5,799 81	0 00E+00	7 33E-07	1 47E-06		
Ti-208	1 6947E-08	2,899 91	5,799 81	0 00E+00	4 91E-05	9 83E-05		
U-232	4 8737E-08	2,899 91	5,799 81	0 00E+00	1 41E-04	2 83E-04		
U-233	1 2203E-07	2,899 91	5,799 81	0 00E+00	3 54E-04	7 08E-04		
U-234	1 5925E-07	2,899 91	5,799 81	0 00E+00	4 62E-04	9 24E-04		
U-235	-2 6194E-06	2,899 91	0 00	5 35E-02	4 59E-02	5 35E-02		
U-236	1 2693E-05	2,899 91	5,799 81	0 00E+00	3 68E-02	7 36E-02		
U-238	-3 6331E-08	2,899 91	0 00	3 35E-02	3 34E-02	3 35E-02		
Y-90	2 6060E+00	2,899 91	5,799 81	0 00E+00	7 56E+03	1 51E+04		
Other Radionuclides					1 05E+04	2 09E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	19 9	10 to 20 1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	1 213 38	2 899 91
Bounding		5 799 81

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
 Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 68	2 39
Bounding	1 37	

Estimated EOL HM/Given EOL HM

1 00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 20/20 (IFE) ENGLAND
SNF ID # 1043

Fuel Units & Descr: 2 - ELEMENT
Heavy Metal Mass: BOL=0.376kg, EOL=0.367kg
ROD Storage Site INEEL

¹Fuel decay start date 2010
Estimates as of 2010
Template TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0.02

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	10.63	21.27	0.00E+00	9.06E-09	1.81E-08	Avg. MeV	
Am-241	1.8331E-03	10.63	21.27	0.00E+00	1.95E-02	3.90E-02	0.0150	3.437E+12
Am-242m	1.4129E-06	10.63	21.27	0.00E+00	1.50E-05	3.00E-05	0.0250	7.563E+11
Am-243	1.4774E-07	10.63	21.27	0.00E+00	1.57E-06	3.14E-06	0.0375	6.441E+11
C-14	1.2871E-04	10.63	21.27	0.00E+00	1.37E-03	2.74E-03	0.0575	6.611E+11
Ct-36	2.8120E-06	10.63	21.27	0.00E+00	2.99E-05	5.98E-05	0.0850	4.096E+11
Cm-243	1.7940E-07	10.63	21.27	0.00E+00	1.91E-06	3.82E-06	0.1250	2.974E+11
Cm-244	1.6962E-06	10.63	21.27	0.00E+00	1.80E-05	3.61E-05	0.2250	3.474E+11
Co-60	1.2839E+00	10.63	21.27	0.00E+00	1.37E+01	2.73E+01	0.3750	1.763E+11
Cs-134	9.0541E-02	10.63	21.27	0.00E+00	9.63E-01	1.93E+00	0.5750	2.344E+12
Cs-135	3.2195E-05	10.63	21.27	0.00E+00	3.42E-04	6.85E-04	0.8500	1.006E+11
Cs-137	2.7564E+00	10.63	21.27	0.00E+00	2.93E+01	5.86E+01	1.2500	2.043E+12
Eu-154	1.5368E-02	10.63	21.27	0.00E+00	1.63E-01	3.27E-01	1.7500	1.362E+09
Eu-155	2.9293E-02	10.63	21.27	0.00E+00	3.11E-01	6.23E-01	2.2500	2.195E+09
Fe-55	7.7158E-01	10.63	21.27	0.00E+00	8.20E+00	1.64E+01	2.7500	1.742E+07
H-3	1.1111E-02	10.63	21.27	0.00E+00	1.18E-01	2.36E-01	3.5000	2.027E+06
I-129	7.3684E-07	10.63	21.27	0.00E+00	7.84E-06	1.57E-05	5.0000	1.138E+01
Kr-85	2.5263E-01	10.63	21.27	0.00E+00	2.69E+00	5.37E+00	7.0000	1.288E+00
Np-237	1.2427E-06	10.63	21.27	0.00E+00	1.32E-05	2.64E-05	11.0000	1.468E-01
Pa-231	3.8511E-09	10.63	21.27	0.00E+00	4.10E-08	8.19E-08		
Pb-210	7.3880E-15	10.63	21.27	0.00E+00	7.86E-14	1.57E-13		
Pm-147	2.1023E+00	10.63	21.27	0.00E+00	2.24E+01	4.47E+01		
Pu-238	1.0383E-03	10.63	21.27	0.00E+00	1.10E-02	2.21E-02		
Pu-239	5.5293E-03	10.63	21.27	0.00E+00	5.88E-02	1.18E-01		
Pu-240	2.1278E-03	10.63	21.27	0.00E+00	2.26E-02	4.53E-02		
Pu-241	1.0195E-01	10.63	21.27	0.00E+00	1.08E+00	2.17E+00		
Pu-242	2.3128E-07	10.63	21.27	0.00E+00	2.46E-06	4.92E-06		
Ra-226	5.2782E-14	10.63	21.27	0.00E+00	5.61E-13	1.12E-12		
Ra-228	1.9338E-10	10.63	21.27	0.00E+00	2.06E-09	4.11E-09		
Ru-106	9.1684E-02	10.63	21.27	0.00E+00	9.75E-01	1.95E+00		
Se-79	1.3018E-05	10.63	21.27	0.00E+00	1.38E-04	2.77E-04		
Sn-126	1.2167E-05	10.63	21.27	0.00E+00	1.29E-04	2.59E-04		
Sr-90	2.6045E+00	10.63	21.27	0.00E+00	2.77E+01	5.54E+01		
Tc-99	4.4241E-04	10.63	21.27	0.00E+00	4.70E-03	9.41E-03		
Th-229	1.3713E-10	10.63	21.27	0.00E+00	1.46E-09	2.92E-09		
Th-230	1.8090E-11	10.63	21.27	0.00E+00	1.92E-10	3.85E-10		
Th-232	2.5278E-10	10.63	21.27	0.00E+00	2.69E-09	5.38E-09		
Th-208	1.6947E-08	10.63	21.27	0.00E+00	1.80E-07	3.60E-07		
U-232	4.8737E-08	10.63	21.27	0.00E+00	5.18E-07	1.04E-06	Thermal Power	
U-233	1.2203E-07	10.63	21.27	0.00E+00	1.30E-06	2.60E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.5925E-07	10.63	21.27	0.00E+00	1.69E-06	3.39E-06	6.19E-01	1.24E+00
U-235	-2.6194E-06	10.63	0.00	1.62E-04	1.34E-04	1.62E-04	Total	Total
U-236	1.2693E-05	10.63	21.27	0.00E+00	1.35E-04	2.70E-04		
U-238	-3.6331E-08	10.63	0.00	1.01E-04	1.01E-04	1.01E-04		
Y-90	2.6060E+00	10.63	21.27	0.00E+00	2.77E+01	5.54E+01		
Other Radionuclides					3.83E+01	7.67E+01		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	19.94680851	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	10.63	8.97
Bounding		21.27

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd)
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.83	0.84
Bounding	1.66	

Estimated EOL HM/Given EOL HM
1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 20/20 ARRR
SNF ID #: 780
Fuel Units & Descr: 15 - ELEMENT
Heavy Metal Mass: BOL=10.275kg, EOL=8.179kg
ROD Storage Site: INEEL
Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zr SST, 10 to 20%, U)
Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.14

Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	2,000.38	4,000.76	0.00E+00	1.70E-06	3.41E-06	Avg. MeV	
Am-241	1.8331E-03	2,000.38	4,000.76	0.00E+00	3.67E+00	7.33E+00	0.0150	6.466E+14
Am-242m	1.4129E-06	2,000.38	4,000.76	0.00E+00	2.83E-03	5.65E-03	0.0250	1.423E+14
Am-243	1.4774E-07	2,000.38	4,000.76	0.00E+00	2.96E-04	5.91E-04	0.0375	1.212E+14
C-14	1.2871E-04	2,000.38	4,000.76	0.00E+00	2.57E-01	5.15E-01	0.0575	1.244E+14
Cl-36	2.8120E-06	2,000.38	4,000.76	0.00E+00	5.63E-03	1.13E-02	0.0850	7.705E+13
Cm-243	1.7940E-07	2,000.38	4,000.76	0.00E+00	3.59E-04	7.18E-04	0.1250	5.595E+13
Cm-244	1.6962E-06	2,000.38	4,000.76	0.00E+00	3.39E-03	6.79E-03	0.2250	6.536E+13
Co-60	1.2839E+00	2,000.38	4,000.76	0.00E+00	2.57E+03	5.14E+03	0.3750	3.317E+13
Cs-134	9.0541E-02	2,000.38	4,000.76	0.00E+00	1.81E+02	3.62E+02	0.5750	4.410E+14
Cs-135	3.2195E-05	2,000.38	4,000.76	0.00E+00	6.44E-02	1.29E-01	0.8500	1.893E+13
Cs-137	2.7564E+00	2,000.38	4,000.76	0.00E+00	5.51E+03	1.10E+04	1.2500	3.843E+14
Eu-154	1.5368E-02	2,000.38	4,000.76	0.00E+00	3.07E+01	6.15E+01	1.7500	2.562E+11
Eu-155	2.9293E-02	2,000.38	4,000.76	0.00E+00	5.86E+01	1.17E+02	2.2500	4.129E+11
Fe-55	7.7158E-01	2,000.38	4,000.76	0.00E+00	1.54E+03	3.09E+03	2.7500	3.277E+09
H-3	1.1111E-02	2,000.38	4,000.76	0.00E+00	2.22E+01	4.45E+01	3.5000	3.814E+08
I-129	7.3684E-07	2,000.38	4,000.76	0.00E+00	1.47E-03	2.95E-03	5.0000	2.103E+03
Kr-85	2.5263E-01	2,000.38	4,000.76	0.00E+00	5.05E+02	1.01E+03	7.0000	2.380E+02
Np-237	1.2427E-06	2,000.38	4,000.76	0.00E+00	2.49E-03	4.97E-03	11.0000	2.711E+01
Pa-231	3.8511E-09	2,000.38	4,000.76	0.00E+00	7.70E-06	1.54E-05		
Pb-210	7.3880E-15	2,000.38	4,000.76	0.00E+00	1.48E-11	2.96E-11		
Pm-147	2.1023E+00	2,000.38	4,000.76	0.00E+00	4.21E+03	8.41E+03		
Pu-238	1.0383E-03	2,000.38	4,000.76	0.00E+00	2.08E+00	4.15E+00		
Pu-239	5.5293E-03	2,000.38	4,000.76	0.00E+00	1.11E+01	2.21E+01		
Pu-240	2.1278E-03	2,000.38	4,000.76	0.00E+00	4.26E+00	8.51E+00		
Pu-241	1.0195E-01	2,000.38	4,000.76	0.00E+00	2.04E+02	4.08E+02		
Pu-242	2.3128E-07	2,000.38	4,000.76	0.00E+00	4.63E-04	9.25E-04		
Ra-226	5.2782E-14	2,000.38	4,000.76	0.00E+00	1.06E-10	2.11E-10		
Ra-228	1.9338E-10	2,000.38	4,000.76	0.00E+00	3.87E-07	7.74E-07		
Ru-106	9.1684E-02	2,000.38	4,000.76	0.00E+00	1.83E+02	3.67E+02		
Se-79	1.3018E-05	2,000.38	4,000.76	0.00E+00	2.60E-02	5.21E-02		
Sn-126	1.2167E-05	2,000.38	4,000.76	0.00E+00	2.43E-02	4.87E-02		
Sr-90	2.6045E+00	2,000.38	4,000.76	0.00E+00	5.21E+03	1.04E+04		
Tc-99	4.4241E-04	2,000.38	4,000.76	0.00E+00	8.85E-01	1.77E+00		
Th-229	1.3713E-10	2,000.38	4,000.76	0.00E+00	2.74E-07	5.49E-07		
Th-230	1.8090E-11	2,000.38	4,000.76	0.00E+00	3.62E-08	7.24E-08		
Th-232	2.5278E-10	2,000.38	4,000.76	0.00E+00	5.06E-07	1.01E-06		
Th-208	1.6947E-08	2,000.38	4,000.76	0.00E+00	3.39E-05	6.78E-05		
U-232	4.8737E-08	2,000.38	4,000.76	0.00E+00	9.75E-05	1.95E-04		
U-233	1.2203E-07	2,000.38	4,000.76	0.00E+00	2.44E-04	4.88E-04		
U-234	1.5925E-07	2,000.38	4,000.76	0.00E+00	3.19E-04	6.37E-04		
U-235	-2.6194E-06	2,000.38	0.00	4.36E-03	0.00E+00	4.36E-03		
U-236	1.2693E-05	2,000.38	4,000.76	0.00E+00	2.54E-02	5.08E-02		
U-238	-3.6331E-08	2,000.38	0.00	2.77E-03	2.70E-03	2.77E-03		
Y-90	2.6060E+00	2,000.38	4,000.76	0.00E+00	5.21E+03	1.04E+04		
Other Radionuclides					7.21E+03	1.44E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	19.64963504	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	581.16	2,000.38
Bounding		4,000.76

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	5.71	3.44
Bounding	11.42	

Estimated EOL HM/ Given EOL HM

1.06

¹ Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

² Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 2020 MNRC
SNF ID # 1053
Fuel Units & Descr 8 - ELEMENT
Heavy Metal Mass BOL=3 962kg, EOL=3 962kg
ROD Storage Site: INEEL

¹Fuel decay start date 2035
Estimates as of 2010
Template TRIGA-SS (LW/U-Zrx SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT) 0 000195
Template Decay Time 5 years

Estimated
Canister usage:
18"x10"
0 07

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	8 5173E-10	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 0150	4 193E+07
Am-241	1 8331E-03	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 0250	0 000E+00
Am-242m	1 4129E-06	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 0375	5 713E+04
Am-243	1 4774E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 0575	3 498E+04
C-14	1 2871E-04	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 0850	4 881E+06
Cl-36	2 8120E-06	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 1250	9 636E+06
Cm-243	1 7940E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 2250	3 410E+07
Cm-244	1 6962E-06	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 3750	8 510E+04
Co-60	1 2839E+00	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 5750	4 186E+03
Cs-134	9 0541E-02	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 8500	6 537E+02
Cs-135	3 2195E-05	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	1 2500	3 906E+01
Cs-137	2 7564E+00	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	1 7500	1 911E+01
Eu-154	1 5368E-02	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	2 2500	1 107E+01
Eu-155	2 9293E-02	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	2 7500	6 433E+00
Fe-55	7 7158E-01	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	3 5000	5 751E+00
H-3	1 1111E-02	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	5 0000	2 471E+00
I-129	7 3684E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	7 0000	2 844E-01
Kr-85	2 5263E-01	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	11 0000	3 270E-02
Np-237	1 2427E-06	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pa-231	3 8511E-09	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pb-210	7 3880E-15	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pm-147	2 1023E+00	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pu-238	1 0383E-03	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pu-239	5 5293E-03	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pu-240	2 1278E-03	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pu-241	1 0195E-01	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pu-242	2 3128E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Ra-226	5 2782E-14	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Ra-228	1 9338E-10	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Ru-106	9 1684E-02	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Se-79	1 3018E-05	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Sn-126	1 2167E-05	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Sr-90	2 6045E+00	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Tc-99	4 4241E-04	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Th-229	1 3713E-10	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Th-230	1 8090E-11	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Th-232	2 5278E-10	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Ti-208	1 6947E-08	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
U-232	4 8737E-08	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
U-233	1 2203E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
U-234	1 5925E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
U-235	-2 6194E-06	0 00	0 00	1 69E-03	1 69E-03	1 69E-03		
U-236	1 2693E-05	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
U-238	-3 6331E-08	0 00	0 00	1 07E-03	1 07E-03	1 07E-03		
Y-90	2 6060E+00	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	19 74990819	10 to 20 1	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	0 00		Nominal burnup taken directly from SFD (converted to MWd)
Bounding			Bounding burnup assumed to be twice nominal burnup
Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0 00		
Bounding	0 00		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 2020 MNRC

SNF ID #: 1054

Fuel Units & Descr: 84 - ELEMENT

Heavy Metal Mass: BOL=41 605kg; EOL=40 555kg

ROD Storage Site: INEEL

¹Fuel decay start date:

2035

Estimates as of

2010

Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)

²Template Burnup(MWd):

6.65

Template BOL Heavy Metal Mass (MT):

0.000195

Template Decay Time:

5 years

Estimated

Canister usage:

18"x10"

0.76

II. Estimates

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources
	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci) ¹	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group
Ac-227	8.5173E-10	1.00234	2.00468	0.00E+00	8.54E-07	1.71E-06	Avg MeV
Am-241	1.8331E-03	1.00234	2.00468	0.00E+00	1.84E+00	3.67E+00	0.0150
Am-242m	1.4129E-06	1.00234	2.00468	0.00E+00	1.42E-03	2.83E-03	0.0250
Am-243	1.4774E-07	1.00234	2.00468	0.00E+00	1.48E-04	2.96E-04	0.0375
C-14	1.2871E-04	1.00234	2.00468	0.00E+00	1.29E-01	2.58E-01	0.0575
Cl-36	2.8120E-06	1.00234	2.00468	0.00E+00	2.82E-03	5.64E-03	0.0850
Cm-243	1.7940E-07	1.00234	2.00468	0.00E+00	1.80E-04	3.60E-04	0.1250
Cm-244	1.6962E-06	1.00234	2.00468	0.00E+00	1.70E-03	3.40E-03	0.2250
Co-60	1.2839E+00	1.00234	2.00468	0.00E+00	1.29E+03	2.57E+03	0.3750
Cs-134	9.0541E-02	1.00234	2.00468	0.00E+00	9.08E+01	1.82E+02	0.5750
Cs-135	3.2195E-05	1.00234	2.00468	0.00E+00	3.23E-02	6.45E-02	0.8500
Cs-137	2.7564E+00	1.00234	2.00468	0.00E+00	2.76E+03	5.53E+03	1.2500
Eu-154	1.5368E-02	1.00234	2.00468	0.00E+00	1.54E+01	3.08E+01	1.7500
Eu-155	2.9293E-02	1.00234	2.00468	0.00E+00	2.94E+01	5.87E+01	2.2500
Fe-55	7.7158E-01	1.00234	2.00468	0.00E+00	7.73E+02	1.55E+03	2.7500
H-3	1.1111E-02	1.00234	2.00468	0.00E+00	1.11E+01	2.23E+01	3.5000
I-129	7.3684E-07	1.00234	2.00468	0.00E+00	7.39E-04	1.48E-03	5.0000
Kr-85	2.5263E-01	1.00234	2.00468	0.00E+00	2.53E+02	5.06E+02	7.0000
Np-237	1.2427E-06	1.00234	2.00468	0.00E+00	1.25E-03	2.49E-03	11.0000
Pa-231	3.8511E-09	1.00234	2.00468	0.00E+00	3.86E-06	7.72E-06	
Pb-210	7.3880E-15	1.00234	2.00468	0.00E+00	7.41E-12	1.48E-11	
Pm-147	2.1023E+00	1.00234	2.00468	0.00E+00	2.11E+03	4.21E+03	
Pu-238	1.0383E-03	1.00234	2.00468	0.00E+00	1.04E+00	2.08E+00	
Pu-239	5.5293E-03	1.00234	2.00468	0.00E+00	5.54E+00	1.11E+01	
Pu-240	2.1278E-03	1.00234	2.00468	0.00E+00	2.13E+00	4.27E+00	
Pu-241	1.0195E-01	1.00234	2.00468	0.00E+00	1.02E+02	2.04E+02	
Pu-242	2.3128E-07	1.00234	2.00468	0.00E+00	2.32E-04	4.64E-04	
Ra-226	5.2782E-14	1.00234	2.00468	0.00E+00	5.29E-11	1.06E-10	
Ra-228	1.9338E-10	1.00234	2.00468	0.00E+00	1.94E-07	3.88E-07	
Ru-106	9.1684E-02	1.00234	2.00468	0.00E+00	9.19E+01	1.84E+02	
Se-79	1.3018E-05	1.00234	2.00468	0.00E+00	1.30E-02	2.61E-02	
Sn-126	1.2167E-05	1.00234	2.00468	0.00E+00	1.22E-02	2.44E-02	
Sr-90	2.6045E+00	1.00234	2.00468	0.00E+00	2.61E+03	5.22E+03	
Tc-99	4.4241E-04	1.00234	2.00468	0.00E+00	4.43E-01	8.87E-01	
Th-229	1.3713E-10	1.00234	2.00468	0.00E+00	1.37E-07	2.75E-07	
Th-230	1.8090E-11	1.00234	2.00468	0.00E+00	1.81E-08	3.63E-08	
Th-232	2.5278E-10	1.00234	2.00468	0.00E+00	2.53E-07	5.07E-07	
Ti-208	1.6947E-08	1.00234	2.00468	0.00E+00	1.70E-05	3.40E-05	
U-232	4.8737E-08	1.00234	2.00468	0.00E+00	4.89E-05	9.77E-05	
U-233	1.2203E-07	1.00234	2.00468	0.00E+00	1.22E-04	2.45E-04	
U-234	1.5925E-07	1.00234	2.00468	0.00E+00	1.60E-04	3.19E-04	
U-235	-2.6194E-06	1.00234	0.00	1.78E-02	1.51E-02	1.78E-02	
U-236	1.2693E-05	1.00234	2.00468	0.00E+00	1.27E-02	2.54E-02	
U-238	-3.6331E-08	1.00234	0.00	1.12E-02	1.12E-02	1.12E-02	
Y-90	2.6060E+00	1.00234	2.00468	0.00E+00	2.61E+03	5.22E+03	
Other Radionuclides					3.61E+03	7.23E+03	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %:	19.74990819	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	784.42	1.00234
Bounding		2.00468

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.71	1.28
Bounding:	1.41	

Estimated EOL HM/Given EOL HM

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 20/20 SLOVENIA
SNF ID #: 731
Fuel Units & Descr: 10 - ELEMENT
Heavy Metal Mass: BOL=4 949kg, EOL=4 754kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2010
Estimates as of 2010
Template TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
²Template Burnup(MWd) 6 65
Template BOL Heavy Metal Mass (MT): 0 000195
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0 09

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 5173E-10	186 62	373 23	0 00E+00	1 59E-07	3 18E-07	Avg MeV	
Am-241	1 8331E-03	186 62	373 23	0 00E+00	3 42E-01	6 84E-01	0 0150	6.032E+13
Am-242m	1 4129E-06	186 62	373.23	0 00E+00	2 64E-04	5.27E-04	0 0250	1.327E+13
Am-243	1 4774E-07	186 62	373.23	0 00E+00	2 76E-05	5 51E-05	0 0375	1 130E+13
C-14	1.2871E-04	186 62	373.23	0 00E+00	2 40E-02	4 80E-02	0 0575	1 160E+13
Cl-36	2 8120E-06	186 62	373.23	0 00E+00	5 25E-04	1 05E-03	0 0850	7 188E+12
Cm-243	1 7940E-07	186 62	373.23	0 00E+00	3 35E-05	6 70E-05	0 1250	5.220E+12
Cm-244	1 6962E-06	186 62	373.23	0 00E+00	3 17E-04	6 33E-04	0.2250	6 098E+12
Co-60	1.2839E+00	186 62	373.23	0 00E+00	2 40E+02	4 79E+02	0.3750	3 094E+12
Cs-134	9 0541E-02	186 62	373 23	0 00E+00	1 69E+01	3 38E+01	0 5750	4 114E+13
Cs-135	3.2195E-05	186 62	373 23	0 00E+00	6 01E-03	1 20E-02	0 8500	1 766E+12
Cs-137	2 7564E+00	186 62	373 23	0 00E+00	5.14E+02	1 03E+03	1.2500	3 586E+13
Eu-154	1 5368E-02	186 62	373 23	0 00E+00	2 87E+00	5 74E+00	1 7500	2.390E+10
Eu-155	2 9293E-02	186 62	373 23	0 00E+00	5.47E+00	1 09E+01	2.2500	3.852E+10
Fe-55	7 7158E-01	186 62	373 23	0 00E+00	1 44E+02	2 88E+02	2 7500	3 057E+08
H-3	1 1111E-02	186 62	373 23	0 00E+00	2 07E+00	4 15E+00	3.5000	3 588E+07
I-129	7.3684E-07	186 62	373.23	0 00E+00	1 38E-04	2.75E-04	5 0000	1.987E+02
Kr-85	2.5263E-01	186 62	373.23	0 00E+00	4 71E+01	9 43E+01	7 0000	2.249E+01
Np-237	1.2427E-06	186 62	373.23	0 00E+00	2 32E-04	4 64E-04	11.0000	2.562E+00
Pa-231	3.8511E-09	186 62	373.23	0 00E+00	7.19E-07	1 44E-06		
Pb-210	7.3880E-15	186 62	373.23	0 00E+00	1.38E-12	2 76E-12		
Pm-147	2.1023E+00	186 62	373.23	0 00E+00	3 92E+02	7 85E+02		
Pu-238	1 0383E-03	186 62	373 23	0 00E+00	1.94E-01	3 88E-01		
Pu-239	5 5293E-03	186 62	373 23	0 00E+00	1 03E+00	2 06E+00		
Pu-240	2 1278E-03	186 62	373 23	0 00E+00	3 97E-01	7.94E-01		
Pu-241	1 0195E-01	186 62	373 23	0 00E+00	1.90E+01	3 81E+01		
Pu-242	2 3128E-07	186 62	373 23	0 00E+00	4 32E-05	8 63E-05		
Ra-226	5 2782E-14	186 62	373 23	0 00E+00	9 85E-12	1.97E-11		
Ra-228	1 9338E-10	186 62	373 23	0 00E+00	3 61E-08	7.22E-08		
Ru-106	9 1684E-02	186 62	373.23	0 00E+00	1 71E+01	3 42E+01		
Se-79	1 3018E-05	186 62	373 23	0 00E+00	2 43E-03	4 86E-03		
Sn-126	1 2167E-05	186 62	373.23	0 00E+00	2 27E-03	4 54E-03		
Sr-90	2 6045E+00	186 62	373.23	0 00E+00	4 86E+02	9 72E+02		
Tc-99	4 4241E-04	186 62	373.23	0 00E+00	8 26E-02	1 65E-01		
Th-229	1.3713E-10	186 62	373.23	0.00E+00	2.56E-08	5 12E-08		
Th-230	1.8090E-11	186 62	373.23	0 00E+00	3 38E-09	6 75E-09		
Th-232	2.5278E-10	186 62	373.23	0 00E+00	4.72E-08	9 43E-08		
Ti-208	1.6947E-08	186 62	373.23	0 00E+00	3.16E-06	6 33E-06		
U-232	4 8737E-08	186 62	373 23	0 00E+00	9 10E-06	1.82E-05	Thermal Power	
U-233	1.2203E-07	186 62	373 23	0 00E+00	2.28E-05	4.55E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1 5925E-07	186 62	373 23	0 00E+00	2 97E-05	5 94E-05	1 09E+01	2.17E+01
U-235	-2 6194E-06	186 62	0.00	2 11E-03	1 63E-03	2 11E-03	Total	Total
U-236	1.2693E-05	186.62	373.23	0 00E+00	2 37E-03	4 74E-03		
U-238	-3 6331E-08	186.62	0 00	1.33E-03	1 33E-03	1.33E-03		
Y-90	2 6060E+00	186 62	373.23	0 00E+00	4 86E+02	9 73E+02		
Other Radionuclides					6 73E+02	1 35E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19 76747705	10 to 20 1	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	186 62	186 15	
Bounding		373.23	

Nominal burnup taken directly from SFD (converted to MWd)
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	1 11	1 00	
Bounding	2.21		

Estimated EOL HM/Given EOL HM: 1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 30/20

SNF ID #: 995

Fuel Units & Descr: 19 - ELEMENT

Heavy Metal Mass: BOL=16 625kg; EOL=16 433kg

ROD Storage Site: INEEL

Fuel decay start date: 2035

Estimates as of: 2010

Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20% U)

Template Burnup (MWd): 6 65

Template BOL Heavy Metal Mass (MT): 0 000195

Template Decay Time: 5 years

Estimated

Canister usage:

18"x10"

0 17

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 5173E-10	183 19	366 38	0 00E+00	1 56E-07	3 12E-07	Avg MeV	
Am-241	1 8331E-03	183 19	366 38	0 00E+00	3 36E-01	6 72E-01	0 0150	5 922E+13
Am-242m	1 4129E-06	183 19	366 38	0 00E+00	2 59E-04	5 18E-04	0 0250	1 303E+13
Am-243	1 4774E-07	183 19	366 38	0 00E+00	2 71E-05	5 41E-05	0 0375	1 110E+13
C-14	1 2871E-04	183 19	366 38	0 00E+00	2 36E-02	4 72E-02	0 0575	1 139E+13
Cf-256	2 8120E-06	183 19	366 38	0 00E+00	5 15E-04	1 03E-03	0 0850	7 056E+12
Cm-243	1 7940E-07	183 19	366 38	0 00E+00	3 29E-05	6 57E-05	0 1250	5 124E+12
Cm-244	1 6962E-06	183 19	366 38	0 00E+00	3 11E-04	6 21E-04	0 2250	5 986E+12
Co-60	1 2839E+00	183 19	366 38	0 00E+00	2 35E+02	4 70E+02	0 3750	3 038E+12
Cs-134	9 0541E-02	183 19	366 38	0 00E+00	1 66E+01	3 32E+01	0 5750	4 038E+13
Cs-135	3 2195E-05	183 19	366 38	0 00E+00	5 90E-03	1 18E-02	0 8500	1 733E+12
Cs-137	2 7564E+00	183 19	366 38	0 00E+00	5 05E+02	1 01E+03	1 2500	3 520E+13
Eu-154	1 5368E-02	183 19	366 38	0 00E+00	2 82E+00	5 63E+00	1 7500	2 346E+10
Eu-155	2 9293E-02	183 19	366 38	0 00E+00	5 37E+00	1 07E+01	2 2500	3 782E+10
Fe-55	7 7158E-01	183 19	366 38	0 00E+00	1 41E+02	2 83E+02	2 7500	3 001E+08
H-3	1 1111E-02	183 19	366 38	0 00E+00	2 04E+00	4 07E+00	3 5000	3 493E+07
I-129	7 3684E-07	183 19	366 38	0 00E+00	1 35E-04	2 70E-04	5 0000	2 023E+02
Kr-85	2 5263E-01	183 19	366 38	0 00E+00	4 63E+01	9 26E+01	7 0000	2 292E+01
Np-237	1 2427E-06	183 19	366 38	0 00E+00	2 28E-04	4 55E-04	11 0000	2 612E+00
Pa-231	3 8511E-09	183 19	366 38	0 00E+00	7 05E-07	1 41E-06		
Pb-210	7 3880E-15	183 19	366 38	0 00E+00	1 35E-12	2 71E-12		
Pm-147	2 1023E+00	183 19	366 38	0 00E+00	3 85E+02	7 70E+02		
Pu-238	1 0383E-03	183 19	366 38	0 00E+00	1 90E-01	3 80E-01		
Pu-239	5 5293E-03	183 19	366 38	0 00E+00	1 01E+00	2 03E+00		
Pu-240	2 1278E-03	183 19	366 38	0 00E+00	3 90E-01	7 80E-01		
Pu-241	1 0195E-01	183 19	366 38	0 00E+00	1 87E+01	3 74E+01		
Pu-242	2 3128E-07	183 19	366 38	0 00E+00	4 24E-05	8 47E-05		
Ra-226	5 2782E-14	183 19	366 38	0 00E+00	9 67E-12	1 93E-11		
Ra-228	1 9338E-10	183 19	366 38	0 00E+00	3 54E-08	7 09E-08		
Ru-106	9 1684E-02	183 19	366 38	0 00E+00	1 68E+01	3 36E+01		
Se-79	1 3018E-05	183 19	366 38	0 00E+00	2 38E-03	4 77E-03		
Sn-126	1 2167E-05	183 19	366 38	0 00E+00	2 23E-03	4 46E-03		
Sr-90	2 6045E+00	183 19	366 38	0 00E+00	4 77E+02	9 54E+02		
Tc-99	4 4241E-04	183 19	366 38	0 00E+00	8 10E-02	1 62E-01		
Th-229	1 3713E-10	183 19	366 38	0 00E+00	2 51E-08	5 02E-08		
Th-230	1 8090E-11	183 19	366 38	0 00E+00	3 31E-09	6 63E-09		
Th-232	2 5278E-10	183 19	366 38	0 00E+00	4 63E-08	9 26E-08		
Tl-208	1 6947E-08	183 19	366 38	0 00E+00	3 10E-06	6 21E-06		
U-232	4 8737E-08	183 19	366 38	0 00E+00	8 93E-06	1 79E-05		
U-233	1 2203E-07	183 19	366 38	0 00E+00	2 24E-05	4 47E-05		
U-234	1 5925E-07	183 19	366 38	0 00E+00	2 92E-05	5 83E-05		
U-235	2 6194E-06	183 19	0 00	7 19E-03	6 71E-03	7 19E-03		
U-236	1 2693E-05	183 19	366 38	0 00E+00	2 33E-03	4 65E-03		
U-238	3 6331E-08	183 19	0 00	4 47E-03	4 46E-03	4 47E-03		
Y-90	2 6060E+00	183 19	366 38	0 00E+00	4 77E+02	9 55E+02		
Other Radionuclides					6 60E+02	1 32E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
Fuel Cladding	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
BOL HM Constituents	SST	SST	
BOL Enrichment %	U	U	
	20	10 to 20 1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		183 19	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		366 38	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0 32		1 00
Bounding	0 65		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 30/20 MNRG
SNF ID # 704

Fuel Units & Descr 6 - ELEMENT

Heavy Metal Mass BOL=4.974kg EOL=4.974kg

ROD Storage Site INEEL

¹Fuel decay start date 2035

Estimates as of 2010

Template TRIGA-SS (LW/U-Zr, SST, 10 to 20% U)

²Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.000195

Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0.05

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	Avg MeV	
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0150	5.280E+07
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0250	0.000E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0375	7.199E+04
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0575	4.394E+04
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0850	6.150E+06
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.1250	1.214E+07
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.2250	4.297E+07
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.3750	1.072E+05
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.5750	5.275E+03
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.8500	8.232E+02
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.2500	4.899E+01
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.7500	2.397E+01
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.2500	1.389E+01
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.7500	8.068E+00
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	3.5000	7.213E+00
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	5.0000	3.099E+00
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	7.0000	3.567E-01
Np-237	1.2427E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	11.0000	4.101E-02
Pa-231	3.8511E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pb-210	7.3880E-15	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pm-147	2.1023E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-238	1.0383E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-239	5.5293E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-240	2.1278E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-241	1.0195E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-242	2.3128E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-226	5.2782E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-228	1.9338E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ru-106	9.1684E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Se-79	1.3018E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sn-126	1.2167E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sr-90	2.6045E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Tc-99	4.4241E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-229	1.3713E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-230	1.8090E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-232	2.5278E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-208	1.6947E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-232	4.8737E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-233	1.2203E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-234	1.5925E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-235	-2.6194E-06	0.00	0.00	2.13E-03	2.13E-03	2.13E-03		
U-236	1.2693E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-238	-3.6331E-08	0.00	0.00	1.34E-03	1.34E-03	1.34E-03		
Y-90	2.6060E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Other Radionuclides					0.00E+00	0.00E+00		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences*
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	19.82495894	10 to 20.1	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate*
Nominal	0.00		
Bounding			

Nominal burnup taken directly from SFD (converted to MWd)
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.00		
Bounding	0.00		

Estimated EOL HM/Given EOL HM
1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20
 SNF ID #: 252
 Fuel Units & Descr: 50 - ELEMENT
 Heavy Metal Mass: BOL=9.37kg; EOL=9.07kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 Estimates as of: 2010
 Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
 Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage
 18"x10"
 0.45

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CV/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	286.38	572.76	0.00E+00	2.44E-07	4.88E-07	Avg MeV	
Am-241	1.8331E-03	286.38	572.76	0.00E+00	5.25E-01	1.05E+00	0.0150	9.257E+13
Am-242m	1.4129E-06	286.38	572.76	0.00E+00	4.05E-04	8.09E-04	0.0250	2.037E+13
Am-243	1.4774E-07	286.38	572.76	0.00E+00	4.23E-05	8.46E-05	0.0375	1.735E+13
C-14	1.2871E-04	286.38	572.76	0.00E+00	3.69E-02	7.37E-02	0.0575	1.781E+13
Cl-36	2.8120E-06	286.38	572.76	0.00E+00	8.05E-04	1.61E-03	0.0850	1.103E+13
Cm-243	1.7940E-07	286.38	572.76	0.00E+00	5.14E-05	1.03E-04	0.1250	8.010E+12
Cm-244	1.6962E-06	286.38	572.76	0.00E+00	4.86E-04	9.72E-04	0.2250	9.357E+12
Co-60	1.2839E+00	286.38	572.76	0.00E+00	3.68E+02	7.35E+02	0.3750	4.749E+12
Cs-134	9.0541E-02	286.38	572.76	0.00E+00	2.59E+01	5.19E+01	0.5750	6.313E+13
Cs-135	3.2195E-05	286.38	572.76	0.00E+00	9.22E-03	1.84E-02	0.8500	2.709E+12
Cs-137	2.7564E+00	286.38	572.76	0.00E+00	7.89E+02	1.58E+03	1.2500	5.502E+13
Eu-154	1.5368E-02	286.38	572.76	0.00E+00	4.40E+00	8.80E+00	1.7500	3.668E+10
Eu-155	2.9293E-02	286.38	572.76	0.00E+00	8.39E+00	1.68E+01	2.2500	5.912E+10
Fe-55	7.7158E-01	286.38	572.76	0.00E+00	2.21E+02	4.42E+02	2.7500	4.691E+08
H-3	1.1111E-02	286.38	572.76	0.00E+00	3.18E+00	6.36E+00	3.5000	5.460E+07
I-129	7.3684E-07	286.38	572.76	0.00E+00	2.11E-04	4.22E-04	5.0000	3.060E+02
Kr-85	2.5263E-01	286.38	572.76	0.00E+00	7.23E+01	1.45E+02	7.0000	3.465E+01
Np-237	1.2427E-06	286.38	572.76	0.00E+00	3.56E-04	7.12E-04	11.0000	3.947E+00
Pa-231	3.8511E-09	286.38	572.76	0.00E+00	1.10E-06	2.21E-06		
Pb-210	7.3880E-15	286.38	572.76	0.00E+00	2.12E-12	4.23E-12		
Pm-147	2.1023E+00	286.38	572.76	0.00E+00	6.02E+02	1.20E+03		
Pu-238	1.0383E-03	286.38	572.76	0.00E+00	2.97E-01	5.95E-01		
Pu-239	5.5293E-03	286.38	572.76	0.00E+00	1.58E+00	3.17E+00		
Pu-240	2.1278E-03	286.38	572.76	0.00E+00	6.09E-01	1.22E+00		
Pu-241	1.0195E-01	286.38	572.76	0.00E+00	2.92E+01	5.84E+01		
Pu-242	2.3128E-07	286.38	572.76	0.00E+00	6.62E-05	1.32E-04		
Ra-226	5.2782E-14	286.38	572.76	0.00E+00	1.51E-11	3.02E-11		
Ra-228	1.9338E-10	286.38	572.76	0.00E+00	5.54E-08	1.11E-07		
Ru-106	9.1684E-02	286.38	572.76	0.00E+00	2.63E+01	5.25E+01		
Se-79	1.3018E-05	286.38	572.76	0.00E+00	3.73E-03	7.46E-03		
Sn-126	1.2167E-05	286.38	572.76	0.00E+00	3.48E-03	6.97E-03		
Sr-90	2.6045E+00	286.38	572.76	0.00E+00	7.46E+02	1.49E+03		
Tc-99	4.4241E-04	286.38	572.76	0.00E+00	1.27E-01	2.53E-01		
Th-229	1.3713E-10	286.38	572.76	0.00E+00	3.93E-08	7.85E-08		
Th-230	1.8090E-11	286.38	572.76	0.00E+00	5.18E-09	1.04E-08		
Th-232	2.5278E-10	286.38	572.76	0.00E+00	7.24E-08	1.45E-07		
Ti-208	1.6947E-08	286.38	572.76	0.00E+00	4.85E-06	9.71E-06		
U-232	4.8737E-08	286.38	572.76	0.00E+00	1.40E-05	2.79E-05		
U-233	1.2203E-07	286.38	572.76	0.00E+00	3.49E-05	6.99E-05		
U-234	1.5925E-07	286.38	572.76	0.00E+00	4.56E-05	9.12E-05		
U-235	-2.6194E-06	286.38	0.00	3.95E-03	3.20E-03	3.95E-03		
U-236	1.2693E-05	286.38	572.76	0.00E+00	3.64E-03	7.27E-03		
U-238	-3.6331E-08	286.38	0.00	2.54E-03	2.53E-03	2.54E-03		
Y-90	2.6060E+00	286.38	572.76	0.00E+00	7.46E+02	1.49E+03		
Other Radionuclides					1.03E+03	2.06E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
Fuel Cladding	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
BOL HM Constituents	SST	SST	
BOL Enrichment %	U	U	
	19.49184744	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	273.96	286.38	
Bounding		572.76	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.90	1.05	
Bounding:	1.79		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 5/20 (IFE) ITALY
SNF ID #: 929
Fuel Units & Descr: 2 - ELEMENT
Heavy Metal Mass: BOL=0.383kg EOL=0.372kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1999
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 10 years

Estimated
Canister usage
18"x10"
0.02

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3731E-09	13.06	26.13	0.00E+00	1.79E-08	3.59E-08	Avg MeV	
Am-241	2.3865E-03	13.06	26.13	0.00E+00	3.12E-02	6.24E-02	0.0150	3.376E+12
Am-242m	1.3812E-06	13.06	26.13	0.00E+00	1.80E-05	3.61E-05	0.0250	7.151E+11
Am-243	1.4767E-07	13.06	26.13	0.00E+00	1.93E-06	3.86E-06	0.0375	6.108E+11
C-14	1.2863E-04	13.06	26.13	0.00E+00	1.68E-03	3.36E-03	0.0575	6.510E+11
Cl-36	2.8120E-06	13.06	26.13	0.00E+00	3.67E-05	7.35E-05	0.0850	3.950E+11
Cm-243	1.5895E-07	13.06	26.13	0.00E+00	2.08E-06	4.15E-06	0.1250	2.596E+11
Cm-244	1.4008E-06	13.06	26.13	0.00E+00	1.83E-05	3.66E-05	0.2250	3.369E+11
Co-60	6.6541E-01	13.06	26.13	0.00E+00	8.69E+00	1.74E+01	0.3750	1.547E+11
Cs-134	1.6887E-02	13.06	26.13	0.00E+00	2.21E-01	4.41E-01	0.5750	2.424E+12
Cs-135	3.2195E-05	13.06	26.13	0.00E+00	4.21E-04	8.41E-04	0.8500	4.328E+10
Cs-137	2.4556E+00	13.06	26.13	0.00E+00	3.21E+01	6.42E+01	1.2500	1.301E+12
Eu-154	1.0268E-02	13.06	26.13	0.00E+00	1.34E-01	2.68E-01	1.7500	7.830E+08
Eu-155	1.4570E-02	13.06	26.13	0.00E+00	1.90E-01	3.81E-01	2.2500	4.090E+07
Fe-55	2.0361E-01	13.06	26.13	0.00E+00	2.66E+00	5.32E+00	2.7500	6.770E+05
H-3	8.3940E-03	13.06	26.13	0.00E+00	1.10E-01	2.19E-01	3.5000	8.022E+04
I-129	7.3684E-07	13.06	26.13	0.00E+00	9.63E-06	1.93E-05	5.0000	1.387E+01
Kr-85	1.8286E-01	13.06	26.13	0.00E+00	2.39E+00	4.78E+00	7.0000	1.569E+00
Np-237	1.2462E-06	13.06	26.13	0.00E+00	1.63E-05	3.26E-05	11.0000	1.787E-01
Pa-231	4.9143E-09	13.06	26.13	0.00E+00	6.42E-08	1.28E-07		
Pb-210	1.7173E-14	13.06	26.13	0.00E+00	2.24E-13	4.49E-13		
Pm-147	5.6165E-01	13.06	26.13	0.00E+00	7.34E+00	1.47E+01		
Pu-238	9.9820E-04	13.06	26.13	0.00E+00	1.30E-02	2.61E-02		
Pu-239	5.5293E-03	13.06	26.13	0.00E+00	7.22E-02	1.44E-01		
Pu-240	2.1263E-03	13.06	26.13	0.00E+00	2.78E-02	5.56E-02		
Pu-241	8.0165E-02	13.06	26.13	0.00E+00	1.05E+00	2.09E+00		
Pu-242	2.3128E-07	13.06	26.13	0.00E+00	3.02E-06	6.04E-06		
Ra-226	9.9774E-14	13.06	26.13	0.00E+00	1.30E-12	2.61E-12		
Ra-228	2.1729E-10	13.06	26.13	0.00E+00	2.84E-09	5.68E-09		
Ru-106	2.9519E-03	13.06	26.13	0.00E+00	3.86E-02	7.71E-02		
Se-79	1.3017E-05	13.06	26.13	0.00E+00	1.70E-04	3.40E-04		
Sn-126	1.2167E-05	13.06	26.13	0.00E+00	1.59E-04	3.18E-04		
Sr-90	2.3128E+00	13.06	26.13	0.00E+00	3.02E+01	6.04E+01		
Tc-99	4.4241E-04	13.06	26.13	0.00E+00	5.78E-03	1.16E-02		
Th-229	1.9459E-10	13.06	26.13	0.00E+00	2.54E-09	5.08E-09		
Th-230	2.5564E-11	13.06	26.13	0.00E+00	3.34E-10	6.68E-10		
Th-232	2.5278E-10	13.06	26.13	0.00E+00	3.30E-09	6.60E-09		
Ti-208	1.6947E-08	13.06	26.13	0.00E+00	2.21E-07	4.43E-07		
U-232	4.6812E-08	13.06	26.13	0.00E+00	6.12E-07	1.22E-06		
U-233	1.2206E-07	13.06	26.13	0.00E+00	1.59E-06	3.19E-06		
U-234	1.7323E-07	13.06	26.13	0.00E+00	2.26E-06	4.53E-06		
U-235	-2.6194E-06	13.06	0.00	1.66E-04	1.32E-04	1.66E-04		
U-236	1.2693E-05	13.06	26.13	0.00E+00	1.66E-04	3.32E-04		
U-238	-3.6331E-08	13.06	0.00	1.03E-04	1.02E-04	1.03E-04		
Y-90	2.3128E+00	13.06	26.13	0.00E+00	3.02E+01	6.04E+01		
Other Radionuclides					3.20E+01	6.41E+01		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences*
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	This Template was used for the following reasons
Fuel Cladding	SST	SST	This fuel matches on all parameters except enrichment (very close to 20%)
BOL HM Constituents	U	U	
BOL Enrichment %	20.10443864	10 to 20.1	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	13.06	10.50	Nominal burnup taken directly from SFD (converted to MWd)
Bounding		26.13	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	1.00	0.80	0.99
Bounding	2.00		

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 (IFE) OSU
SNF ID #: 1040
Fuel Units & Descr: 2 - ELEMENT
Heavy Metal Mass: BOL=0.39kg; EOL=0.38kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2025
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.02

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	9.55	19.09	0.00E+00	8.13E-09	1.63E-08	Avg. MeV	
Am-241	1.8331E-03	9.55	19.09	0.00E+00	1.75E-02	3.50E-02	0.0150	3.086E+12
Am-242m	1.4129E-06	9.55	19.09	0.00E+00	1.35E-05	2.70E-05	0.0250	6.790E+11
Am-243	1.4774E-07	9.55	19.09	0.00E+00	1.41E-06	2.82E-06	0.0375	5.782E+11
C-14	1.2871E-04	9.55	19.09	0.00E+00	1.23E-03	2.46E-03	0.0575	5.935E+11
Cf-254	2.8120E-06	9.55	19.09	0.00E+00	2.68E-05	5.37E-05	0.0850	3.677E+11
Cm-243	1.7940E-07	9.55	19.09	0.00E+00	1.71E-06	3.43E-06	0.1250	2.670E+11
Cm-244	1.6962E-06	9.55	19.09	0.00E+00	1.62E-05	3.24E-05	0.2250	3.119E+11
Co-60	1.2839E+00	9.55	19.09	0.00E+00	1.23E+01	2.45E+01	0.3750	1.583E+11
Cs-134	9.0541E-02	9.55	19.09	0.00E+00	8.64E-01	1.73E+00	0.5750	2.104E+12
Cs-135	3.2195E-05	9.55	19.09	0.00E+00	3.07E-04	6.15E-04	0.8500	9.031E+10
Cs-137	2.7564E+00	9.55	19.09	0.00E+00	2.63E+01	5.26E+01	1.2500	1.834E+12
Eu-154	1.5368E-02	9.55	19.09	0.00E+00	1.47E-01	2.93E-01	1.7500	1.223E+09
Eu-155	2.9293E-02	9.55	19.09	0.00E+00	2.80E-01	5.59E-01	2.2500	1.971E+09
Fe-55	7.7158E-01	9.55	19.09	0.00E+00	7.37E+00	1.47E+01	2.7500	1.564E+07
H-3	1.1111E-02	9.55	19.09	0.00E+00	1.06E-01	2.12E-01	3.5000	1.820E+06
I-129	7.3684E-07	9.55	19.09	0.00E+00	7.03E-06	1.41E-05	5.0000	1.025E+01
Kr-85	2.5263E-01	9.55	19.09	0.00E+00	2.41E+00	4.82E+00	7.0000	1.160E+00
Np-237	1.2427E-06	9.55	19.09	0.00E+00	1.19E-05	2.37E-05	11.0000	1.322E-01
Pa-231	3.8511E-09	9.55	19.09	0.00E+00	3.68E-08	7.35E-08		
Pb-210	7.3880E-15	9.55	19.09	0.00E+00	7.05E-14	1.41E-13		
Pm-147	2.1023E+00	9.55	19.09	0.00E+00	2.01E+01	4.01E+01		
Pu-238	1.0383E-03	9.55	19.09	0.00E+00	9.91E-03	1.98E-02		
Pu-239	5.5293E-03	9.55	19.09	0.00E+00	5.28E-02	1.06E-01		
Pu-240	2.1278E-03	9.55	19.09	0.00E+00	2.03E-02	4.06E-02		
Pu-241	1.0195E-01	9.55	19.09	0.00E+00	9.73E-01	1.95E+00		
Pu-242	2.3128E-07	9.55	19.09	0.00E+00	2.21E-06	4.42E-06		
Ra-226	5.2782E-14	9.55	19.09	0.00E+00	5.04E-13	1.01E-12		
Ra-228	1.9338E-10	9.55	19.09	0.00E+00	1.85E-09	3.69E-09		
Ru-106	9.1684E-02	9.55	19.09	0.00E+00	8.75E-01	1.75E+00		
Se-79	1.3018E-05	9.55	19.09	0.00E+00	1.24E-04	2.49E-04		
Sn-126	1.2167E-05	9.55	19.09	0.00E+00	1.16E-04	2.32E-04		
Sr-90	2.6045E+00	9.55	19.09	0.00E+00	2.49E+01	4.97E+01		
Tc-99	4.4241E-04	9.55	19.09	0.00E+00	4.22E-03	8.45E-03		
Th-229	1.3713E-10	9.55	19.09	0.00E+00	1.31E-09	2.62E-09		
Th-230	1.8090E-11	9.55	19.09	0.00E+00	1.73E-10	3.45E-10		
Th-232	2.5278E-10	9.55	19.09	0.00E+00	2.41E-09	4.83E-09		
Th-208	1.6947E-08	9.55	19.09	0.00E+00	1.62E-07	3.24E-07		
U-232	4.8737E-08	9.55	19.09	0.00E+00	4.65E-07	9.30E-07		
U-233	1.2203E-07	9.55	19.09	0.00E+00	1.16E-06	2.33E-06		
U-234	1.5925E-07	9.55	19.09	0.00E+00	1.52E-06	3.04E-06		
U-235	2.6194E-06	9.55	0.00	1.68E-04	1.43E-04	1.68E-04		
U-236	1.2693E-05	9.55	19.09	0.00E+00	1.21E-04	2.42E-04		
U-238	3.6331E-08	9.55	0.00	1.05E-04	1.05E-04	1.05E-04		
Y-90	2.6060E+00	9.55	19.09	0.00E+00	2.49E+01	4.98E+01		
Other Radionuclides					3.44E+01	6.88E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.56E-01	1.11E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	19.9	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	3.80	9.55
Bounding		19.09

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.72	2.51
Bounding	1.44	

Estimated EOL HM/Given EOL HM

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 8 5/20 (IFE) U OF AZ
SNF ID #: 972
Fuel Units & Descr: 1 - ELEMENT
Heavy Metal Mass BOL=0 195kg, EOL=0 188kg
ROD Storage Site INEEL

¹Fuel decay start date 1998
Estimates as of 2010
Template TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd) 6 65
Template BOL Heavy Metal Mass (MT) 0 000195
Template Decay Time 10 years

Estimated
Canister usage
18"x10"
0 01

II. Estimates	m	x _m	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3731E-09	6 68	13 36	0 00E+00	9 18E-09	1 84E-08	Avg MeV	
Am-241	2.3865E-03	6 68	13 36	0 00E+00	1 59E-02	3 19E-02	0 0150	1 727E+12
Am-242m	1.3812E-06	6 68	13 36	0 00E+00	9 23E-06	1 85E-05	0 0250	3 658E+11
Am-243	1 4767E-07	6 68	13 36	0 00E+00	9 87E-07	1 97E-06	0 0375	3 124E+11
C-14	1 2863E-04	6 68	13 36	0 00E+00	8 60E-04	1 72E-03	0 0575	3 330E+11
Cl-36	2 8120E-06	6 68	13 36	0 00E+00	1 88E-05	3 76E-05	0 0850	2 020E+11
Cm-243	1.5895E-07	6 68	13 36	0 00E+00	1 06E-06	2 12E-06	0 1250	1 328E+11
Cm-244	1.4008E-06	6 68	13 36	0 00E+00	9 36E-06	1 87E-05	0 2250	1 723E+11
Co-60	6 6541E-01	6 68	13 36	0 00E+00	4 45E+00	8 89E+00	0 3750	7 914E+10
Cs-134	1 6887E-02	6 68	13 36	0 00E+00	1 13E-01	2 26E-01	0 5750	1 240E+12
Cs-135	3 2195E-05	6 68	13 36	0 00E+00	2 15E-04	4 30E-04	0 8500	2 213E+10
Cs-137	2 4556E+00	6 68	13 36	0 00E+00	1 64E+01	3 28E+01	1 2500	6 655E+11
Eu-154	1 0268E-02	6 68	13 36	0 00E+00	6 86E-02	1 37E-01	1 7500	4 005E+08
Eu-155	1 4570E-02	6 68	13 36	0 00E+00	8 86E-02	1 95E-01	2 2500	2 092E+07
Fe-55	2 0361E-01	6 68	13 36	0 00E+00	9 74E-02	1 95E-01	2 7500	3 463E+05
H-3	8 3940E-03	6 68	13 36	0 00E+00	5 61E-02	1 12E-01	3 5000	4 103E+04
I-129	7 3684E-07	6 68	13 36	0 00E+00	4 92E-06	9 85E-06	5 0000	7 095E+00
Kr-85	1 8286E-01	6 68	13 36	0 00E+00	1 22E+00	2 44E+00	7 0000	8 025E-01
Np-237	1 2462E-06	6 68	13 36	0 00E+00	8 33E-06	1 67E-05	11 0000	9 137E-02
Pa-231	4 9143E-09	6 68	13 36	0 00E+00	3 28E-08	6 57E-08		
Pb-210	1 7173E-14	6 68	13 36	0 00E+00	1 15E-13	2 30E-13		
Pm-147	5 6165E-01	6 68	13 36	0 00E+00	3 75E+00	7 51E+00		
Pu-238	9 9820E-04	6 68	13 36	0 00E+00	6 67E-03	1 33E-02		
Pu-239	5 5293E-03	6 68	13 36	0 00E+00	3 69E-02	7 39E-02		
Pu-240	2 1263E-03	6 68	13 36	0 00E+00	1 42E-02	2 84E-02		
Pu-241	8 0165E-02	6 68	13 36	0 00E+00	5 36E-01	1 07E+00		
Pu-242	2 3128E-07	6 68	13 36	0 00E+00	1 55E-06	3 09E-06		
Ra-226	9 9774E-14	6 68	13 36	0 00E+00	6 67E-13	1 33E-12		
Ra-228	2 1729E-10	6 68	13 36	0 00E+00	1 45E-09	2 90E-09		
Ru-106	2 9519E-03	6 68	13 36	0 00E+00	1 97E-02	3 95E-02		
Se-79	1 3017E-05	6 68	13 36	0 00E+00	8 70E-05	1 74E-04		
Sn-126	1 2167E-05	6 68	13 36	0 00E+00	8 13E-05	1 63E-04		
Sr-90	2 3128E+00	6 68	13 36	0 00E+00	1 55E+01	3 09E+01		
Tc-99	4 4241E-04	6 68	13 36	0 00E+00	2 96E-03	5 91E-03		
Th-229	1 9459E-10	6 68	13 36	0 00E+00	1 30E-09	2 60E-09		
Th-230	2 5564E-11	6 68	13 36	0 00E+00	1 71E-10	3 42E-10		
Th-232	2 5278E-10	6 68	13 36	0 00E+00	1 69E-09	3 38E-09		
Ti-208	1 6947E-08	6 68	13 36	0 00E+00	1 13E-07	2 26E-07		
U-232	4 6812E-08	6 68	13 36	0 00E+00	3 13E-07	6 26E-07		
U-233	1 2206E-07	6 68	13 36	0 00E+00	8 16E-07	1 63E-06		
U-234	1 7323E-07	6 68	13 36	0 00E+00	1 16E-06	2 32E-06		
U-235	-2 6194E-06	6 68	0 00	8 43E-05	6 68E-05	8 43E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1 2693E-05	6 68	13 36	0 00E+00	8 48E-05	1 70E-04	2 62E-01	5 23E-01
U-238	-3 6331E-08	6 68	0 00	5 24E-05	5 22E-05	5 24E-05	Total	Total
Y-90	2 3128E+00	6 68	13 36	0 00E+00	1 55E+01	3 09E+01		
Other Radionuclides					1 64E+01	3 28E+01		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20	10 to 20 1	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	1.90	6.68	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		13.36	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal	1.00	3.52	1.00
Bounding	2.01		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 (IFE) U OF AZ
 SNF ID #: 973
 Fuel Units & Descr: 2 - ELEMENT
 Heavy Metal Mass: BOL=0.39kg; EOL=0.378kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 Estimates as of: 2010
 Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
 Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage
 18"x10"
 0.02

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	11.46	22.91	0.00E+00	9.76E-09	1.95E-08	Avg MeV	
Am-241	1.8331E-03	11.46	22.91	0.00E+00	2.10E-02	4.20E-02	0.0150	3.703E+12
Am-242m	1.4129E-06	11.46	22.91	0.00E+00	1.62E-05	3.24E-05	0.0250	8.148E+11
Am-243	1.4774E-07	11.46	22.91	0.00E+00	1.69E-06	3.38E-06	0.0375	6.939E+11
C-14	1.2871E-04	11.46	22.91	0.00E+00	1.47E-03	2.95E-03	0.0575	7.122E+11
Cl-36	2.8120E-06	11.46	22.91	0.00E+00	3.22E-05	6.44E-05	0.0850	4.412E+11
Cm-243	1.7940E-07	11.46	22.91	0.00E+00	2.06E-06	4.11E-06	0.1250	3.204E+11
Cm-244	1.6962E-06	11.46	22.91	0.00E+00	1.94E-05	3.89E-05	0.2250	3.743E+11
Co-60	1.2839E+00	11.46	22.91	0.00E+00	1.47E+01	2.94E+01	0.3750	1.899E+11
Cs-134	9.0541E-02	11.46	22.91	0.00E+00	1.04E+00	2.07E+00	0.5750	2.525E+12
Cs-135	3.2195E-05	11.46	22.91	0.00E+00	3.69E-04	7.38E-04	0.8500	1.084E+11
Cs-137	2.7564E+00	11.46	22.91	0.00E+00	3.16E+01	6.32E+01	1.2500	2.201E+12
Eu-154	1.5368E-02	11.46	22.91	0.00E+00	1.76E-01	3.52E-01	1.7500	1.467E+09
Eu-155	2.9293E-02	11.46	22.91	0.00E+00	3.36E-01	6.71E-01	2.2500	2.365E+09
Fe-55	7.7158E-01	11.46	22.91	0.00E+00	8.84E+00	1.77E+01	2.7500	1.877E+07
H-3	1.1111E-02	11.46	22.91	0.00E+00	1.27E-01	2.55E-01	3.5000	2.184E+06
I-129	7.3684E-07	11.46	22.91	0.00E+00	8.44E-06	1.69E-05	5.0000	1.225E+01
Kr-85	2.5263E-01	11.46	22.91	0.00E+00	2.89E+00	5.79E+00	7.0000	1.387E+00
Np-237	1.2427E-06	11.46	22.91	0.00E+00	1.42E-05	2.85E-05	11.0000	1.580E-01
Pa-231	3.8511E-09	11.46	22.91	0.00E+00	4.41E-08	8.82E-08		
Pb-210	7.3880E-15	11.46	22.91	0.00E+00	8.46E-14	1.69E-13		
Pm-147	2.1023E+00	11.46	22.91	0.00E+00	2.41E+01	4.82E+01		
Pu-238	1.0383E-03	11.46	22.91	0.00E+00	1.19E-02	2.38E-02		
Pu-239	5.5293E-03	11.46	22.91	0.00E+00	6.33E-02	1.27E-01		
Pu-240	2.1278E-03	11.46	22.91	0.00E+00	2.44E-02	4.87E-02		
Pu-241	1.0195E-01	11.46	22.91	0.00E+00	1.17E+00	2.34E+00		
Pu-242	2.3128E-07	11.46	22.91	0.00E+00	2.65E-06	5.30E-06		
Ra-226	5.2782E-14	11.46	22.91	0.00E+00	6.05E-13	1.21E-12		
Ra-228	1.9338E-10	11.46	22.91	0.00E+00	2.22E-09	4.43E-09		
Ru-106	9.1684E-02	11.46	22.91	0.00E+00	1.05E+00	2.10E+00		
Se-79	1.3018E-05	11.46	22.91	0.00E+00	1.49E-04	2.98E-04		
Sn-126	1.2167E-05	11.46	22.91	0.00E+00	1.39E-04	2.79E-04		
Sr-90	2.6045E+00	11.46	22.91	0.00E+00	2.98E+01	5.97E+01		
Tc-99	4.4241E-04	11.46	22.91	0.00E+00	5.07E-03	1.01E-02		
Th-229	1.3713E-10	11.46	22.91	0.00E+00	1.57E-09	3.14E-09		
Th-230	1.8090E-11	11.46	22.91	0.00E+00	2.07E-10	4.14E-10		
Th-232	2.5278E-10	11.46	22.91	0.00E+00	2.90E-09	5.79E-09		
Ti-208	1.6947E-08	11.46	22.91	0.00E+00	1.94E-07	3.88E-07		
U-232	4.8737E-08	11.46	22.91	0.00E+00	5.58E-07	1.12E-06		
U-233	1.2203E-07	11.46	22.91	0.00E+00	1.40E-06	2.80E-06		
U-234	1.5925E-07	11.46	22.91	0.00E+00	1.82E-06	3.65E-06		
U-235	-2.6194E-06	11.46	0.00	1.69E-04	1.39E-04	1.69E-04		
U-236	1.2693E-05	11.46	22.91	0.00E+00	1.45E-04	2.91E-04		
U-238	-3.6331E-08	11.46	0.00	1.05E-04	1.04E-04	1.05E-04		
Y-90	2.6060E+00	11.46	22.91	0.00E+00	2.99E+01	5.97E+01		
Other Radionuclides					4.13E+01	8.26E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	20	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	1.90	11.46
Bounding		22.91

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
 Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.85	6.03
Bounding	1.72	

Estimated EOL HM/Given EOL HM

1.00

¹Reactor shutdown, core removal storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 (IFE) U OF IL
SNF ID #: 1048
Fuel Units & Descr: 8 - ELEMENT
Heavy Metal Mass BOL=1.56kg, EOL=1.52kg
ROD Storage Site INEEL

Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0.07

II. Estimates		m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)	
Ac-227	8.5173E-10	38.18	76.37	0.00E+00	3.25E-08	6.50E-08	Avg MeV		
Am-241	1.8331E-03	38.18	76.37	0.00E+00	7.00E-02	1.40E-01	0.0150	1.234E+13	
Am-242m	1.4129E-06	38.18	76.37	0.00E+00	5.40E-05	1.08E-04	0.0250	2.716E+12	
Am-243	1.4774E-07	38.18	76.37	0.00E+00	5.64E-06	1.13E-05	0.0375	2.313E+12	
C-14	1.2871E-04	38.18	76.37	0.00E+00	4.91E-03	9.83E-03	0.0575	2.374E+12	
Cl-36	2.8120E-06	38.18	76.37	0.00E+00	1.07E-04	2.15E-04	0.0850	1.471E+12	
Cm-243	1.7940E-07	38.18	76.37	0.00E+00	6.85E-06	1.37E-05	0.1250	1.068E+12	
Cm-244	1.6962E-06	38.18	76.37	0.00E+00	6.48E-05	1.30E-04	0.2250	1.248E+12	
Co-60	1.2839E+00	38.18	76.37	0.00E+00	4.90E+01	9.81E+01	0.3750	6.331E+11	
Cs-134	9.0541E-02	38.18	76.37	0.00E+00	3.46E+00	6.91E+00	0.5750	8.417E+12	
Cs-135	3.2195E-05	38.18	76.37	0.00E+00	1.23E-03	2.46E-03	0.8500	3.613E+11	
Cs-137	2.7564E+00	38.18	76.37	0.00E+00	1.05E+02	2.11E+02	1.2500	7.336E+12	
Eu-154	1.5368E-02	38.18	76.37	0.00E+00	5.87E-01	1.17E+00	1.7500	4.890E+09	
Eu-155	2.9293E-02	38.18	76.37	0.00E+00	1.12E+00	2.24E+00	2.2500	7.883E+09	
Fe-55	7.7158E-01	38.18	76.37	0.00E+00	2.95E+01	5.89E+01	2.7500	6.255E+07	
H-3	1.1111E-02	38.18	76.37	0.00E+00	4.24E-01	8.49E-01	3.5000	7.280E+06	
I-129	7.3684E-07	38.18	76.37	0.00E+00	2.81E-05	5.63E-05	5.0000	4.099E+01	
Kr-85	2.5263E-01	38.18	76.37	0.00E+00	9.65E+00	1.93E+01	7.0000	4.641E+00	
Np-237	1.2427E-06	38.18	76.37	0.00E+00	4.75E-05	9.49E-05	11.0000	5.288E-01	
Pa-231	3.8511E-09	38.18	76.37	0.00E+00	1.47E-07	2.94E-07			
Pb-210	7.3880E-15	38.18	76.37	0.00E+00	2.82E-13	5.64E-13			
Pm-147	2.1023E+00	38.18	76.37	0.00E+00	8.03E+01	1.61E+02			
Pu-238	1.0383E-03	38.18	76.37	0.00E+00	3.96E-02	7.93E-02			
Pu-239	5.5293E-03	38.18	76.37	0.00E+00	2.11E-01	4.22E-01			
Pu-240	2.1278E-03	38.18	76.37	0.00E+00	8.12E-02	1.62E-01			
Pu-241	1.0195E-01	38.18	76.37	0.00E+00	3.89E+00	7.79E+00			
Pu-242	2.3128E-07	38.18	76.37	0.00E+00	8.83E-06	1.77E-05			
Ra-226	5.2782E-14	38.18	76.37	0.00E+00	2.02E-12	4.03E-12			
Ra-228	1.9338E-10	38.18	76.37	0.00E+00	7.38E-09	1.48E-08			
Ru-106	9.1684E-02	38.18	76.37	0.00E+00	3.50E+00	7.00E+00			
Se-79	1.3018E-05	38.18	76.37	0.00E+00	4.97E-04	9.94E-04			
Sn-126	1.2167E-05	38.18	76.37	0.00E+00	4.65E-04	9.29E-04			
Sr-90	2.6045E+00	38.18	76.37	0.00E+00	9.95E+01	1.99E+02			
Tc-99	4.4241E-04	38.18	76.37	0.00E+00	1.69E-02	3.38E-02			
Th-229	1.3713E-10	38.18	76.37	0.00E+00	5.24E-09	1.05E-08			
Th-230	1.8090E-11	38.18	76.37	0.00E+00	6.91E-10	1.38E-09			
Th-232	2.5278E-10	38.18	76.37	0.00E+00	9.65E-09	1.93E-08			
Ti-208	1.6947E-08	38.18	76.37	0.00E+00	6.47E-07	1.29E-06			
U-232	4.8737E-08	38.18	76.37	0.00E+00	1.86E-06	3.72E-06			
U-233	1.2203E-07	38.18	76.37	0.00E+00	4.66E-06	9.32E-06			
U-234	1.5925E-07	38.18	76.37	0.00E+00	6.08E-06	1.22E-05			
U-235	-2.6194E-06	38.18	0.00	6.74E-04	5.74E-04	6.74E-04			
U-236	1.2693E-05	38.18	76.37	0.00E+00	4.85E-04	9.69E-04			
U-238	-3.6331E-08	38.18	0.00	4.19E-04	4.18E-04	4.19E-04			
Y-90	2.6060E+00	38.18	76.37	0.00E+00	9.95E+01	1.99E+02			
Other Radionuclides					1.38E+02	2.75E+02			

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	20	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	30.41	38.18
Bounding		76.37

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.72	1.26
Bounding	1.44	

Estimated EOL HM/Given EOL HM

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 (IFE) UNIV OF CAL-IRVINE
 SNF ID #: 824
 Fuel Units & Descr: 5 - ELEMENT
 Heavy Metal Mass: BOL=0.916kg; EOL=0.916kg
 ROD Storage Site: INEEL

Fuel decay start date: 2035
 Estimates as of: 2010
 Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Template Burnup(MWd): 6.65
 Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.05

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
							Avg. MeV	
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0150	9.804E+06
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0250	0.000E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0375	1.338E+04
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0575	8.107E+03
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0850	1.143E+06
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.1250	2.257E+06
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.2250	7.988E+06
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.3750	1.993E+04
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.5750	9.805E+02
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.8500	1.528E+02
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.2500	9.009E+00
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.7500	4.408E+00
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.2500	2.553E+00
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.7500	1.484E+00
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	3.5000	1.326E+00
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	5.0000	5.698E-01
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	7.0000	6.559E-02
Np-237	1.2427E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	11.0000	7.541E-03
Pa-231	3.8511E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pb-210	7.3880E-15	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pm-147	2.1023E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-238	1.0383E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-239	5.5293E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-240	2.1278E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-241	1.0195E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-242	2.3128E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-226	5.2782E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-228	1.9338E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ru-106	9.1684E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Se-79	1.3018E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sn-126	1.2167E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sr-90	2.6045E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Tc-99	4.4241E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-229	1.3713E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-230	1.8090E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-232	2.5278E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ti-208	1.6947E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-232	4.8737E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-233	1.2203E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-234	1.5925E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-235	-2.6194E-06	0.00	0.00	3.96E-04	3.96E-04	3.96E-04		
U-236	1.2693E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-238	-3.6331E-08	0.00	0.00	2.46E-04	2.46E-04	2.46E-04		
Y-90	2.6060E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Other Radionuclides					0.00E+00	0.00E+00		
					0.00E+00	0.00E+00		
					0.00E+00	0.00E+00		
					0.00E+00	0.00E+00		
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					0.00E+00	0.00E+00		
					0.00E+00	0.00E+00		
					0.00E+00	0.00E+00		
					0.00E+00	0.00E+00		
					0.00E+00	0.00E+00		
</								

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.66E-05	1.66E-05
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	19.99996708	10 to 20.1	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate.
Nominal	0.00		Nominal burnup taken directly from SFD (converted to MWd)
Bounding			Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.00		1.00
Bounding	0.00		

¹ Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

² Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 8 5/20 (IFE) UNIV OF CAL-IRVINE
SNF ID #: 1051
Fuel Units & Descr: 1 - ELEMENT
Heavy Metal Mass BOL=0 192kg EOL=0 19kg
ROD Storage Site INEEL

¹Fuel decay start date: 2035
Estimates as of 2010
Template TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd) 6 65
Template BOL Heavy Metal Mass (MT) 0 000195
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0 01

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 5173E-10	1 87	3 73	0 00E+00	1 59E-09	3 18E-09	Avg MeV	
Am-241	1 8331E-03	1 87	3 73	0 00E+00	3 42E-03	6 85E-03	0 0150	6 036E+11
Am-242m	1 4129E-06	1 87	3 73	0 00E+00	2 64E-06	5 28E-06	0 0250	1 328E+11
Am-243	1 4774E-07	1 87	3 73	0 00E+00	2 76E-07	5 52E-07	0 0375	1 131E+11
C-14	1 2871E-04	1 87	3 73	0 00E+00	2 40E-04	4 81E-04	0 0575	1 161E+11
Cl-36	2 8120E-06	1 87	3 73	0 00E+00	5 25E-06	1 05E-05	0 0850	7 192E+10
Cm-243	1 7940E-07	1 87	3 73	0 00E+00	3 35E-07	6 70E-07	0 1250	5 223E+10
Cm-244	1 6962E-06	1 87	3 73	0 00E+00	3 17E-06	6 33E-06	0 2250	6 101E+10
Co-60	1 2839E+00	1 87	3 73	0 00E+00	2 40E+00	4 79E+00	0 3750	3 096E+10
Cs-134	9 0541E-02	1 87	3 73	0 00E+00	1 69E-01	3 38E-01	0 5750	4 116E+11
Cs-135	3 2195E-05	1 87	3 73	0 00E+00	6 01E-05	1 20E-04	0 8500	1 767E+10
Cs-137	2 7564E+00	1 87	3 73	0 00E+00	5 15E+00	1 03E+01	1 2500	3 588E+11
Eu-154	1 5368E-02	1 87	3 73	0 00E+00	2 87E-02	5 74E-02	1 7500	2 392E+08
Eu-155	2 9293E-02	1 87	3 73	0 00E+00	5 47E-02	1 09E-01	2 2500	3 855E+08
Fe-55	7 7158E-01	1 87	3 73	0 00E+00	1 44E+00	2 88E+00	2 7500	3 059E+06
H-3	1 1111E-02	1 87	3 73	0 00E+00	2 07E-02	4 15E-02	3 5000	3 560E+05
I-129	7 3684E-07	1 87	3 73	0 00E+00	1 38E-06	2 75E-06	5 0000	2 076E+00
Kr-85	2 5263E-01	1 87	3 73	0 00E+00	4 72E-01	9 43E-01	7 0000	2 352E-01
Np-237	1 2427E-06	1 87	3 73	0 00E+00	2 32E-06	4 64E-06	11 0000	2 681E-02
Pa-231	3 8511E-09	1 87	3 73	0 00E+00	7 19E-09	1 44E-08		
Pb-210	7 3880E-15	1 87	3 73	0 00E+00	1 38E-14	2 76E-14		
Pm-147	2 1023E+00	1 87	3 73	0 00E+00	3 93E+00	7 85E+00		
Pu-238	1 0383E-03	1 87	3 73	0 00E+00	1 94E-03	3 88E-03		
Pu-239	5 5293E-03	1 87	3 73	0 00E+00	1 03E-02	2 07E-02		
Pu-240	2 1278E-03	1 87	3 73	0 00E+00	3 97E-03	7 95E-03		
Pu-241	1 0195E-01	1 87	3 73	0 00E+00	1 90E-01	3 81E-01		
Pu-242	2 3128E-07	1 87	3 73	0 00E+00	4 32E-07	8 64E-07		
Ra-226	5 2782E-14	1 87	3 73	0 00E+00	9 86E-14	1 97E-13		
Ra-228	1 9338E-10	1 87	3 73	0 00E+00	3 61E-10	7 22E-10		
Ru-106	9 1684E-02	1 87	3 73	0 00E+00	1 71E-01	3 42E-01		
Se-79	1 3018E-05	1 87	3 73	0 00E+00	2 43E-05	4 86E-05		
Sn-126	1 2167E-05	1 87	3 73	0 00E+00	2 27E-05	4 54E-05		
Sr-90	2 6045E+00	1 87	3 73	0 00E+00	4 86E+00	9 73E+00		
Tc-99	4 4241E-04	1 87	3 73	0 00E+00	8 26E-04	1 65E-03		
Th-229	1 3713E-10	1 87	3 73	0 00E+00	2 56E-10	5 12E-10		
Th-230	1 8090E-11	1 87	3 73	0 00E+00	3 38E-11	6 76E-11		
Th-232	2 5278E-10	1 87	3 73	0 00E+00	4 72E-10	9 44E-10		
Ti-208	1 6947E-08	1 87	3 73	0 00E+00	3 16E-08	6 33E-08		
U-232	4 8737E-08	1 87	3 73	0 00E+00	9 10E-08	1 82E-07		
U-233	1 2203E-07	1 87	3 73	0 00E+00	2 28E-07	4 56E-07		
U-234	1 5925E-07	1 87	3 73	0 00E+00	2 97E-07	5 95E-07		
U-235	2 6194E-06	1 87	0 00	8 28E-05	7 79E-05	8 28E-05		
U-236	1 2693E-05	1 87	3 73	0 00E+00	2 37E-05	4 74E-05		
U-238	3 6331E-08	1 87	0 00	5 15E-05	5 14E-05	5 15E-05		
Y-90	2 6060E+00	1 87	3 73	0 00E+00	4 87E+00	9 73E+00		
Other Radionuclides					6 73E+00	1 35E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1 09E-01	2 17E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	20 00002088	10 to 20 1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	1 87	1 43
Bounding		3 73

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd)
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 29	0 77
Bounding	0 57	

Estimated EOL HM/Given EOL HM
1 00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 5/20 AFRR1
SNF ID #: 250

Fuel Units & Descr: 95 - ELEMENT

Heavy Metal Mass: BOL=18.525kg, EOL=18.012kg

ROD Storage Site: INEEL

¹Fuel decay start date: 2019

Estimates as of: 2010

Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)

²Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.000195

Template Decay Time: 5 years

Estimated
Canister usage,
18"x10"
0.86

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	8.5173E-10	489.71	979.43	0.00E+00	4.17E-07	8.34E-07	Avg MeV	
Am-241	1.8331E-03	489.71	979.43	0.00E+00	8.98E-01	1.80E+00	0.0150	1.583E+14
Am-242m	1.4129E-06	489.71	979.43	0.00E+00	6.92E-04	1.38E-03	0.0250	3.483E+13
Am-243	1.4774E-07	489.71	979.43	0.00E+00	7.24E-05	1.45E-04	0.0375	2.966E+13
C-14	1.2871E-04	489.71	979.43	0.00E+00	6.30E-02	1.26E-01	0.0575	3.045E+13
Cl-36	2.8120E-06	489.71	979.43	0.00E+00	1.38E-03	2.75E-03	0.0850	1.886E+13
Cm-243	1.7940E-07	489.71	979.43	0.00E+00	8.79E-05	1.76E-04	0.1250	1.370E+13
Cm-244	1.6962E-06	489.71	979.43	0.00E+00	8.31E-04	1.66E-03	0.2250	1.600E+13
Co-60	1.2839E+00	489.71	979.43	0.00E+00	6.29E+02	1.26E+03	0.3750	8.120E+12
Cs-134	9.0541E-02	489.71	979.43	0.00E+00	4.43E+01	8.87E+01	0.5750	1.080E+14
Cs-135	3.2195E-05	489.71	979.43	0.00E+00	1.58E-02	3.15E-02	0.8500	4.633E+12
Cs-137	2.7564E+00	489.71	979.43	0.00E+00	1.35E+03	2.70E+03	1.2500	9.409E+13
Eu-154	1.5368E-02	489.71	979.43	0.00E+00	7.53E+00	1.51E+01	1.7500	6.272E+10
Eu-155	2.9293E-02	489.71	979.43	0.00E+00	1.43E+01	2.87E+01	2.2500	1.011E+11
Fe-55	7.7158E-01	489.71	979.43	0.00E+00	3.78E+02	7.56E+02	2.7500	8.022E+08
H-3	1.1111E-02	489.71	979.43	0.00E+00	5.44E+00	1.09E+01	3.5000	9.336E+07
I-129	7.3684E-07	489.71	979.43	0.00E+00	3.61E-04	7.22E-04	5.0000	5.248E+02
Kr-85	2.5263E-01	489.71	979.43	0.00E+00	1.24E+02	2.47E+02	7.0000	5.942E+01
Np-237	1.2427E-06	489.71	979.43	0.00E+00	6.09E-04	1.22E-03	11.0000	6.769E+00
Pa-231	3.8511E-09	489.71	979.43	0.00E+00	1.89E-06	3.77E-06		
Pb-210	7.3880E-15	489.71	979.43	0.00E+00	3.62E-12	7.24E-12		
Pm-147	2.1023E+00	489.71	979.43	0.00E+00	1.03E+03	2.06E+03		
Pu-238	1.0383E-03	489.71	979.43	0.00E+00	5.08E-01	1.02E+00		
Pu-239	5.5293E-03	489.71	979.43	0.00E+00	2.71E+00	5.42E+00		
Pu-240	2.1278E-03	489.71	979.43	0.00E+00	1.04E+00	2.08E+00		
Pu-241	1.0195E-01	489.71	979.43	0.00E+00	4.99E+01	9.99E+01		
Pu-242	2.3128E-07	489.71	979.43	0.00E+00	1.13E-04	2.27E-04		
Ra-226	5.2782E-14	489.71	979.43	0.00E+00	2.58E-11	5.17E-11		
Ra-228	1.9338E-10	489.71	979.43	0.00E+00	9.47E-08	1.89E-07		
Ru-106	9.1684E-02	489.71	979.43	0.00E+00	4.49E+01	8.98E+01		
Se-79	1.3018E-05	489.71	979.43	0.00E+00	6.38E-03	1.28E-02		
Sn-126	1.2167E-05	489.71	979.43	0.00E+00	5.96E-03	1.19E-02		
Sr-90	2.6045E+00	489.71	979.43	0.00E+00	1.28E+03	2.55E+03		
Tc-99	4.4241E-04	489.71	979.43	0.00E+00	2.17E-01	4.33E-01		
Th-229	1.3713E-10	489.71	979.43	0.00E+00	6.72E-08	1.34E-07		
Th-230	1.8090E-11	489.71	979.43	0.00E+00	8.86E-09	1.77E-08		
Th-232	2.5278E-10	489.71	979.43	0.00E+00	1.24E-07	2.48E-07		
Ti-208	1.6947E-08	489.71	979.43	0.00E+00	8.30E-06	1.66E-05		
U-232	4.8737E-08	489.71	979.43	0.00E+00	2.39E-05	4.77E-05		
U-233	1.2203E-07	489.71	979.43	0.00E+00	5.98E-05	1.20E-04		
U-234	1.5925E-07	489.71	979.43	0.00E+00	7.80E-05	1.56E-04		
U-235	-2.6194E-06	489.71	0.00	8.01E-03	6.72E-03	8.01E-03		
U-236	1.2693E-05	489.71	979.43	0.00E+00	6.22E-03	1.24E-02		
U-238	-3.6331E-08	489.71	0.00	4.98E-03	4.96E-03	4.98E-03		
Y-90	2.6060E+00	489.71	979.43	0.00E+00	1.28E+03	2.55E+03		
Other Radionuclides					1.77E+03	3.53E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	20	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	90.27	489.71
Bounding		979.43

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.78	5.42
Bounding	1.55	

Estimated EOL HM/Given EOL HM

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 8 S/20 ANL-W
SNF ID #: 353
Fuel Units & Descr: 2 - ELEMENT
Heavy Metal Mass BOL=0.39kg EOL=0.17kg
ROD Storage Site INEEL

¹Fuel decay start date 1994
Estimates as of 2010
Template TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWD): 6.65
Template BOL Heavy Metal Mass (MT) 0.000195
Template Decay Time 15 years

Estimated
Canister usage
18"x10"
0.02

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.9744E-09	209.82	372.30	0.00E+00	4.14E-07	7.35E-07	Avg MeV	
Am-241	2.8150E-03	209.82	372.30	0.00E+00	5.91E-01	1.05E+00	0.0150	4.223E+13
Am-242m	1.3501E-06	209.82	372.30	0.00E+00	2.83E-04	5.03E-04	0.0250	8.827E+12
Am-243	1.4761E-07	209.82	372.30	0.00E+00	3.10E-05	5.50E-05	0.0375	7.620E+12
C-14	1.2854E-04	209.82	372.30	0.00E+00	2.70E-02	4.79E-02	0.0575	8.176E+12
Cl-36	2.8120E-06	209.82	372.30	0.00E+00	5.90E-04	1.05E-03	0.0850	4.945E+12
Cm-243	1.4075E-07	209.82	372.30	0.00E+00	2.95E-05	5.24E-05	0.1250	3.239E+12
Cm-244	1.1570E-06	209.82	372.30	0.00E+00	2.43E-04	4.31E-04	0.2250	4.234E+12
Co-60	3.4481E-01	209.82	372.30	0.00E+00	7.23E+01	1.28E+02	0.3750	1.877E+12
Cs-134	3.1474E-03	209.82	372.30	0.00E+00	6.60E-01	1.17E+00	0.5750	3.046E+13
Cs-135	3.2195E-05	209.82	372.30	0.00E+00	6.76E-03	1.20E-02	0.8500	3.853E+11
Cs-137	2.1880E+00	209.82	372.30	0.00E+00	4.59E+02	8.15E+02	1.2500	9.656E+12
Eu-154	6.8647E-03	209.82	372.30	0.00E+00	1.44E+00	2.56E+00	1.7500	9.200E+09
Eu-155	7.2481E-03	209.82	372.30	0.00E+00	1.52E+00	2.70E+00	2.2500	5.808E+07
Fe-55	5.3744E-02	209.82	372.30	0.00E+00	1.13E+01	2.00E+01	2.7500	6.581E+05
H-3	6.3414E-03	209.82	372.30	0.00E+00	1.33E+00	2.36E+00	3.5000	3.725E+04
I-129	7.3684E-07	209.82	372.30	0.00E+00	1.55E-04	2.74E-04	5.0000	1.940E+02
Kr-85	1.3236E-01	209.82	372.30	0.00E+00	2.78E+01	4.93E+01	7.0000	2.192E+01
Np-237	1.2504E-06	209.82	372.30	0.00E+00	2.62E-04	4.66E-04	11.0000	2.495E+00
Pa-231	5.9774E-09	209.82	372.30	0.00E+00	7.04E-12	1.25E-11		
Pb-210	3.3534E-14	209.82	372.30	0.00E+00	3.15E+01	5.59E+01		
Pm-147	1.5002E-01	209.82	372.30	0.00E+00	2.01E-01	3.57E-01		
Pu-238	9.5970E-04	209.82	372.30	0.00E+00	1.16E+00	2.06E+00		
Pu-239	5.5278E-03	209.82	372.30	0.00E+00	4.46E-01	7.91E-01		
Pu-240	2.1248E-03	209.82	372.30	0.00E+00	1.32E+01	2.35E+01		
Pu-241	6.3023E-02	209.82	372.30	0.00E+00	4.85E-05	8.61E-05		
Pu-242	2.3128E-07	209.82	372.30	0.00E+00	3.43E-11	6.09E-11		
Ra-226	1.6346E-13	209.82	372.30	0.00E+00	4.86E-08	8.63E-08		
Ra-228	2.3173E-10	209.82	372.30	0.00E+00	1.99E-02	3.54E-02		
Ru-106	9.5038E-05	209.82	372.30	0.00E+00	2.73E-03	4.85E-03		
Se-79	1.3017E-05	209.82	372.30	0.00E+00	2.55E-03	4.53E-03		
Sn-126	1.2165E-05	209.82	372.30	0.00E+00	4.31E+02	7.65E+02		
Sr-90	2.0541E+00	209.82	372.30	0.00E+00	9.28E-02	1.65E-01		
Tc-99	4.4241E-04	209.82	372.30	0.00E+00	5.29E-08	9.39E-08		
Th-229	2.5218E-10	209.82	372.30	0.00E+00	7.06E-09	1.25E-08		
Th-230	3.3654E-11	209.82	372.30	0.00E+00	5.30E-08	9.41E-08		
Th-232	2.5278E-10	209.82	372.30	0.00E+00	3.46E-06	6.15E-06		
Ti-208	1.6511E-08	209.82	372.30	0.00E+00	9.38E-06	1.66E-05		
U-232	4.4722E-08	209.82	372.30	0.00E+00	2.56E-05	4.55E-05		
U-233	1.2209E-07	209.82	372.30	0.00E+00	3.92E-05	6.95E-05		
U-234	1.8662E-07	209.82	0.00	1.69E-04	0.00E+00	1.69E-04		
U-235	-2.6194E-06	209.82	0.00	0.00E-04	2.66E-03	4.73E-03		
U-236	1.2693E-05	209.82	0.00	1.05E-04	9.72E-05	1.05E-04		
U-238	-3.6331E-08	209.82	0.00	0.00E+00	4.31E+02	7.65E+02		
Y-90	2.0541E+00	209.82	372.30	0.00E+00	4.54E+02	8.05E+02		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	20	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	13.30	209.82
Bounding	15.99	372.30

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup calculated assuming all BOL heavy metal burned

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	15.78	15.77
Bounding	27.99	23.28

Estimated EOL HM/Given EOL HM
2.07

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 5/20 ANL-W
SNF ID #: 370
Fuel Units & Descr.: 40 - ELEMENT
Heavy Metal Mass: BOL=7.12kg; EOL=6.86kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1994
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 15 years

Estimated
Canister usage:
18"x10"
0.36

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.9744E-09	248.20	496.40	0.00E+00	4.90E-07	9.80E-07	Avg MeV	
Am-241	2.8150E-03	248.20	496.40	0.00E+00	6.99E-01	1.40E+00	0.0150	5.630E+13
Am-242m	1.3501E-06	248.20	496.40	0.00E+00	3.35E-04	6.70E-04	0.0250	1.177E+13
Am-243	1.4761E-07	248.20	496.40	0.00E+00	3.66E-05	7.33E-05	0.0375	1.016E+13
C-14	1.2854E-04	248.20	496.40	0.00E+00	3.19E-02	6.38E-02	0.0575	1.090E+13
Cl-36	2.8120E-06	248.20	496.40	0.00E+00	6.98E-04	1.40E-03	0.0850	6.594E+12
Cm-243	1.4075E-07	248.20	496.40	0.00E+00	3.49E-05	6.99E-05	0.1250	4.318E+12
Cm-244	1.1570E-06	248.20	496.40	0.00E+00	2.87E-04	5.74E-04	0.2250	5.646E+12
Co-60	3.4481E-01	248.20	496.40	0.00E+00	8.56E+01	1.71E+02	0.3750	2.503E+12
Cs-134	3.1474E-03	248.20	496.40	0.00E+00	7.81E-01	1.56E+00	0.5750	4.061E+13
Cs-135	3.2195E-05	248.20	496.40	0.00E+00	7.99E-03	1.60E-02	0.8500	5.138E+11
Cs-137	2.1880E+00	248.20	496.40	0.00E+00	5.43E+02	1.09E+03	1.2500	1.287E+13
Eu-154	6.8647E-03	248.20	496.40	0.00E+00	1.70E+00	3.41E+00	1.7500	1.227E+10
Eu-155	7.2481E-03	248.20	496.40	0.00E+00	1.80E+00	3.60E+00	2.2500	7.744E+07
Fe-55	5.3744E-02	248.20	496.40	0.00E+00	1.33E+01	2.67E+01	2.7500	8.774E+05
H-3	6.3414E-03	248.20	496.40	0.00E+00	1.57E+00	3.15E+00	3.5000	4.967E+04
I-129	7.3684E-07	248.20	496.40	0.00E+00	1.83E-04	3.66E-04	5.0000	2.628E+02
Kr-85	1.3236E-01	248.20	496.40	0.00E+00	3.29E+01	6.57E+01	7.0000	2.970E+01
Np-237	1.2504E-06	248.20	496.40	0.00E+00	3.10E-04	6.21E-04	11.0000	3.381E+00
Pa-231	5.9774E-09	248.20	496.40	0.00E+00	1.48E-06	2.97E-06		
Pb-210	3.3534E-14	248.20	496.40	0.00E+00	8.32E-12	1.66E-11		
Pm-147	1.5002E-01	248.20	496.40	0.00E+00	3.72E+01	7.45E+01		
Pu-238	9.5970E-04	248.20	496.40	0.00E+00	2.38E-01	4.76E-01		
Pu-239	5.5278E-03	248.20	496.40	0.00E+00	1.37E+00	2.74E+00		
Pu-240	2.1248E-03	248.20	496.40	0.00E+00	5.27E-01	1.05E+00		
Pu-241	6.3023E-02	248.20	496.40	0.00E+00	1.56E+01	3.13E+01		
Pu-242	2.3128E-07	248.20	496.40	0.00E+00	5.74E-05	1.15E-04		
Ra-226	1.6346E-13	248.20	496.40	0.00E+00	4.06E-11	8.11E-11		
Ra-228	2.3173E-10	248.20	496.40	0.00E+00	5.75E-08	1.15E-07		
Ru-106	9.5038E-05	248.20	496.40	0.00E+00	2.36E-02	4.72E-02		
Se-79	1.3017E-05	248.20	496.40	0.00E+00	3.23E-03	6.46E-03		
Sn-126	1.2165E-05	248.20	496.40	0.00E+00	3.02E-03	6.04E-03		
Sr-90	2.0541E+00	248.20	496.40	0.00E+00	5.10E+02	1.02E+03		
Tc-99	4.4241E-04	248.20	496.40	0.00E+00	1.10E-01	2.20E-01		
Th-229	2.5218E-10	248.20	496.40	0.00E+00	6.26E-08	1.25E-07		
Th-230	3.3654E-11	248.20	496.40	0.00E+00	8.35E-09	1.67E-08		
Th-232	2.5278E-10	248.20	496.40	0.00E+00	6.27E-08	1.25E-07		
Ti-208	1.6511E-08	248.20	496.40	0.00E+00	4.10E-06	8.20E-06		
U-232	4.4722E-08	248.20	496.40	0.00E+00	1.11E-05	2.22E-05		
U-233	1.2209E-07	248.20	496.40	0.00E+00	3.03E-05	6.06E-05		
U-234	1.8662E-07	248.20	496.40	0.00E+00	4.63E-05	9.26E-05		
U-235	-2.6194E-06	248.20	0.00	3.03E-03	2.38E-03	3.03E-03		
U-236	1.2693E-05	248.20	496.40	0.00E+00	3.15E-03	6.30E-03		
U-238	-3.6331E-08	248.20	0.00	1.92E-03	1.91E-03	1.92E-03		
Y-90	2.0541E+00	248.20	496.40	0.00E+00	5.10E+02	1.02E+03		
Other Radionuclides					5.37E+02	1.07E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	19.66292135	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	173.48	248.20	
Bounding	291.92	496.40	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	1.02	1.43	
Bounding	2.04	1.70	1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 5/20 AUSTRIA
SNF ID #: 469
Fuel Units & Descr: 30 - ELEMENT
Heavy Metal Mass BOL=5.85kg EOL=5.643kg
ROD Storage Site INEEL

Fuel decay start date 2010
Estimates as of 2010
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
Template Burnup(MWd) 6.65
Template BOL Heavy Metal Mass (MT) 0.000195
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0.27

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group Avg MeV Total Photons/sec (bounding)
Ac-227	8.5173E-10	197.60	395.21	0.00E+00	1.68E-07	3.37E-07	0.0150 6.388E+13
Am-241	1.8331E-03	197.60	395.21	0.00E+00	3.62E-01	7.24E-01	0.0250 1.406E+13
Am-242m	1.4129E-06	197.60	395.21	0.00E+00	2.79E-04	5.58E-04	0.0375 1.197E+13
Am-243	1.4774E-07	197.60	395.21	0.00E+00	2.92E-05	5.84E-05	0.0575 1.229E+13
C-14	1.2871E-04	197.60	395.21	0.00E+00	2.54E-02	5.09E-02	0.0850 7.611E+12
Cl-36	2.8120E-06	197.60	395.21	0.00E+00	5.56E-04	1.11E-03	0.1250 5.527E+12
Cm-243	1.7940E-07	197.60	395.21	0.00E+00	3.54E-05	7.09E-05	0.2250 6.457E+12
Cm-244	1.6962E-06	197.60	395.21	0.00E+00	3.35E-04	6.70E-04	0.3750 3.277E+12
Co-60	1.2839E+00	197.60	395.21	0.00E+00	2.54E+02	5.07E+02	0.5750 4.356E+13
Cs-134	9.0541E-02	197.60	395.21	0.00E+00	1.79E+01	3.58E+01	0.8500 1.869E+12
Cs-135	3.2195E-05	197.60	395.21	0.00E+00	6.36E-03	1.27E-02	1.2500 3.797E+13
Cs-137	2.7564E+00	197.60	395.21	0.00E+00	5.45E+02	1.09E+03	1.7500 2.531E+10
Eu-154	1.5368E-02	197.60	395.21	0.00E+00	3.04E+00	6.07E+00	2.2500 4.079E+10
Eu-155	2.9293E-02	197.60	395.21	0.00E+00	5.79E+00	1.16E+01	2.7500 3.237E+08
Fe-55	7.7158E-01	197.60	395.21	0.00E+00	1.52E+02	3.05E+02	3.5000 3.767E+07
H-3	1.1111E-02	197.60	395.21	0.00E+00	2.20E+00	4.39E+00	5.0000 2.108E+02
I-129	7.3684E-07	197.60	395.21	0.00E+00	1.46E-04	2.91E-04	7.0000 2.386E+01
Kr-85	2.5263E-01	197.60	395.21	0.00E+00	4.99E+01	9.98E+01	11.0000 2.718E+00
Np-237	1.2427E-06	197.60	395.21	0.00E+00	2.46E-04	4.91E-04	
Pa-231	3.8511E-09	197.60	395.21	0.00E+00	7.61E-07	1.52E-06	
Pb-210	7.3880E-15	197.60	395.21	0.00E+00	1.46E-12	2.92E-12	
Pm-147	2.1023E+00	197.60	395.21	0.00E+00	4.15E+02	8.31E+02	
Pu-238	1.0383E-03	197.60	395.21	0.00E+00	2.05E-01	4.10E-01	
Pu-239	5.5293E-03	197.60	395.21	0.00E+00	1.09E+00	2.19E+00	
Pu-240	2.1278E-03	197.60	395.21	0.00E+00	4.20E-01	8.41E-01	
Pu-241	1.0195E-01	197.60	395.21	0.00E+00	2.01E+01	4.03E+01	
Pu-242	2.3128E-07	197.60	395.21	0.00E+00	4.57E-05	9.14E-05	
Ra-226	5.2782E-14	197.60	395.21	0.00E+00	1.04E-11	2.09E-11	
Ra-228	1.9338E-10	197.60	395.21	0.00E+00	3.82E-08	7.64E-08	
Ru-106	9.1684E-02	197.60	395.21	0.00E+00	1.81E+01	3.62E+01	
Se-79	1.3018E-05	197.60	395.21	0.00E+00	2.57E-03	5.14E-03	
Sn-126	1.2167E-05	197.60	395.21	0.00E+00	2.40E-03	4.81E-03	
Sr-90	2.6045E+00	197.60	395.21	0.00E+00	5.15E+02	1.03E+03	
Tc-99	4.4241E-04	197.60	395.21	0.00E+00	8.74E-02	1.75E-01	
Th-229	1.3713E-10	197.60	395.21	0.00E+00	2.71E-08	5.42E-08	
Th-230	1.8090E-11	197.60	395.21	0.00E+00	3.57E-09	7.15E-09	
Th-232	2.5278E-10	197.60	395.21	0.00E+00	5.00E-08	9.99E-08	
Ti-208	1.6947E-08	197.60	395.21	0.00E+00	3.35E-06	6.70E-06	
U-232	4.8737E-08	197.60	395.21	0.00E+00	9.63E-06	1.93E-05	
U-233	1.2203E-07	197.60	395.21	0.00E+00	2.41E-05	4.82E-05	
U-234	1.5925E-07	197.60	395.21	0.00E+00	3.15E-05	6.29E-05	
U-235	-2.6194E-06	197.60	0.00	2.53E-03	2.01E-03	2.53E-03	
U-236	1.2693E-05	197.60	395.21	0.00E+00	2.51E-03	5.02E-03	
U-238	-3.6331E-08	197.60	0.00	1.57E-03	1.57E-03	1.57E-03	
Y-90	2.6060E+00	197.60	395.21	0.00E+00	5.15E+02	1.03E+03	
Other Radionuclides					7.12E+02	1.42E+03	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20.00000041	10 to 20.1	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	57.01	197.60	Nominal burnup calculated from the heavy metal mass destroyed
Bounding		395.21	Bounding burnup assumed to be twice nominal burnup
Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.99	3.47	1.00
Bounding	1.98		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 5/20 BRAZIL
SNF ID #: 1063
Fuel Units & Descr: 9 - ELEMENT
Heavy Metal Mass: BOL=1755kg, EOL=1741kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2006
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0.08

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	17.10	34.21	0.00E+00	1.46E-08	2.91E-08	Avg. MeV	
Am-241	1.8331E-03	17.10	34.21	0.00E+00	3.14E-02	6.27E-02	0.0150	5.529E+12
Am-242m	1.4129E-06	17.10	34.21	0.00E+00	2.42E-05	4.83E-05	0.0250	1.217E+12
Am-243	1.4774E-07	17.10	34.21	0.00E+00	2.53E-06	5.05E-06	0.0375	1.036E+12
C-14	1.2871E-04	17.10	34.21	0.00E+00	2.20E-03	4.40E-03	0.0575	1.063E+12
Cl-36	2.8120E-06	17.10	34.21	0.00E+00	4.81E-05	9.62E-05	0.0850	6.588E+11
Cm-243	1.7940E-07	17.10	34.21	0.00E+00	3.07E-06	6.14E-06	0.1250	4.784E+11
Cm-244	1.6962E-06	17.10	34.21	0.00E+00	2.90E-05	5.80E-05	0.2250	5.589E+11
Co-60	1.2839E+00	17.10	34.21	0.00E+00	2.20E+01	4.39E+01	0.3750	2.836E+11
Cs-134	9.0541E-02	17.10	34.21	0.00E+00	1.55E+00	3.10E+00	0.5750	3.770E+12
Cs-135	3.2195E-05	17.10	34.21	0.00E+00	5.51E-04	1.10E-03	0.8500	1.618E+11
Cs-137	2.7564E+00	17.10	34.21	0.00E+00	4.71E+01	9.43E+01	1.2500	3.286E+12
Eu-154	1.5368E-02	17.10	34.21	0.00E+00	2.63E-01	5.26E-01	1.7500	2.191E+09
Eu-155	2.9293E-02	17.10	34.21	0.00E+00	5.01E-01	1.00E+00	2.2500	3.531E+09
Fe-55	7.7158E-01	17.10	34.21	0.00E+00	1.32E+01	2.64E+01	2.7500	2.802E+07
H-3	1.1111E-02	17.10	34.21	0.00E+00	1.90E-01	3.80E-01	3.5000	3.261E+06
I-129	7.3684E-07	17.10	34.21	0.00E+00	1.26E-05	2.52E-05	5.0000	1.902E+01
Kr-85	2.5263E-01	17.10	34.21	0.00E+00	4.32E+00	8.64E+00	7.0000	2.155E+00
Np-237	1.2427E-06	17.10	34.21	0.00E+00	2.13E-05	4.25E-05	11.0000	2.455E-01
Pa-231	3.8511E-09	17.10	34.21	0.00E+00	6.59E-08	1.32E-07		
Pb-210	7.3880E-15	17.10	34.21	0.00E+00	1.26E-13	2.53E-13		
Pm-147	2.1023E+00	17.10	34.21	0.00E+00	3.60E+01	7.19E+01		
Pu-238	1.0383E-03	17.10	34.21	0.00E+00	1.78E-02	3.55E-02		
Pu-239	5.5293E-03	17.10	34.21	0.00E+00	9.46E-02	1.89E-01		
Pu-240	2.1278E-03	17.10	34.21	0.00E+00	3.64E-02	7.28E-02		
Pu-241	1.0195E-01	17.10	34.21	0.00E+00	1.74E+00	3.49E+00		
Pu-242	2.3128E-07	17.10	34.21	0.00E+00	3.96E-06	7.91E-06		
Ra-226	5.2782E-14	17.10	34.21	0.00E+00	9.03E-13	1.81E-12		
Ra-228	1.9338E-10	17.10	34.21	0.00E+00	3.31E-09	6.62E-09		
Ru-106	9.1684E-02	17.10	34.21	0.00E+00	1.57E+00	3.14E+00		
Sa-79	1.3018E-05	17.10	34.21	0.00E+00	2.23E-04	4.45E-04		
Sn-126	1.2167E-05	17.10	34.21	0.00E+00	2.08E-04	4.16E-04		
Sr-90	2.6045E+00	17.10	34.21	0.00E+00	4.45E+01	8.91E+01		
Tc-99	4.4241E-04	17.10	34.21	0.00E+00	7.57E-03	1.51E-02		
Th-229	1.3713E-10	17.10	34.21	0.00E+00	2.35E-09	4.69E-09		
Th-230	1.8090E-11	17.10	34.21	0.00E+00	3.09E-10	6.19E-10		
Th-232	2.5278E-10	17.10	34.21	0.00E+00	4.32E-09	8.65E-09		
Ti-208	1.6947E-08	17.10	34.21	0.00E+00	2.90E-07	5.80E-07		
U-232	4.8737E-08	17.10	34.21	0.00E+00	8.34E-07	1.67E-06		
U-233	1.2203E-07	17.10	34.21	0.00E+00	2.09E-06	4.17E-06		
U-234	1.5925E-07	17.10	34.21	0.00E+00	2.72E-06	5.45E-06		
U-235	-2.6194E-06	17.10	0.00	7.59E-04	7.14E-04	7.59E-04		
U-236	1.2693E-05	17.10	34.21	0.00E+00	2.17E-04	4.34E-04		
U-238	-3.6331E-08	17.10	0.00	4.72E-04	4.71E-04	4.72E-04		
Y-90	2.6060E+00	17.10	34.21	0.00E+00	4.46E+01	8.91E+01		
Other Radionuclides					6.17E+01	1.23E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20	10 to 20.1	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	17.10	13.75	
Bounding		34.21	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.29	0.80	
Bounding	0.57		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 8.5/20 CORNELL

SNF ID # 246

Fuel Units & Descr: 115 - ELEMENT

Heavy Metal Mass: BOL=21.896kg, EOL=21.586kg

ROD Storage Site: INEEL

Fuel decay start date 2035

Estimates as of 2010

Template TRIGA-SS (LW/U-Zrx SST, 10 to 20%, U)

Template Burnup(MWd) 6.65

Template BOL Heavy Metal Mass (MT) 0.000195

Template Decay Time 5 years

Estimated
Canister usage

18"x10"

1.04

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	320.10	640.20	0.00E+00	2.73E-07	5.45E-07	Avg MeV	
Am-241	1.8331E-03	320.10	640.20	0.00E+00	5.87E-01	1.17E+00	0.0150	1.035E+14
Am-242m	1.4129E-06	320.10	640.20	0.00E+00	4.52E-04	9.05E-04	0.0250	2.277E+13
Am-243	1.4774E-07	320.10	640.20	0.00E+00	4.73E-05	9.46E-05	0.0375	1.939E+13
C-14	1.2871E-04	320.10	640.20	0.00E+00	4.12E-02	8.24E-02	0.0575	1.990E+13
Ct-36	2.8120E-06	320.10	640.20	0.00E+00	9.00E-04	1.80E-03	0.0850	1.233E+13
Cm-243	1.7940E-07	320.10	640.20	0.00E+00	5.74E-05	1.15E-04	0.1250	8.953E+12
Cm-244	1.6962E-06	320.10	640.20	0.00E+00	5.43E-04	1.09E-03	0.2250	1.046E+13
Co-60	1.2839E+00	320.10	640.20	0.00E+00	4.11E+02	8.22E+02	0.3750	5.308E+12
Cs-134	9.0541E-02	320.10	640.20	0.00E+00	2.90E+01	5.80E+01	0.5750	7.056E+13
Cs-135	3.2195E-05	320.10	640.20	0.00E+00	1.03E-02	2.06E-02	0.8500	3.028E+12
Cs-137	2.7564E+00	320.10	640.20	0.00E+00	8.82E+02	1.76E+03	1.2500	6.150E+13
Eu-154	1.5368E-02	320.10	640.20	0.00E+00	4.92E+00	9.84E+00	1.7500	4.100E+10
Eu-155	2.9293E-02	320.10	640.20	0.00E+00	9.38E+00	1.88E+01	2.2500	6.608E+10
Fe-55	7.7158E-01	320.10	640.20	0.00E+00	2.47E+02	4.94E+02	2.7500	5.244E+08
H-3	1.1111E-02	320.10	640.20	0.00E+00	3.56E+00	7.11E+00	3.5000	6.103E+07
I-129	7.3684E-07	320.10	640.20	0.00E+00	2.36E-04	4.72E-04	5.0000	3.491E+02
Kr-85	2.5263E-01	320.10	640.20	0.00E+00	8.09E+01	1.62E+02	7.0000	3.954E+01
Np-237	1.2427E-06	320.10	640.20	0.00E+00	3.98E-04	7.96E-04	11.0000	4.505E+00
Pa-231	3.8511E-09	320.10	640.20	0.00E+00	1.23E-06	2.47E-06		
Pb-210	7.3880E-15	320.10	640.20	0.00E+00	2.36E-12	4.73E-12		
Pm-147	2.1023E+00	320.10	640.20	0.00E+00	6.73E+02	1.35E+03		
Pu-238	1.0383E-03	320.10	640.20	0.00E+00	3.32E-01	6.65E-01		
Pu-239	5.5293E-03	320.10	640.20	0.00E+00	1.77E+00	3.54E+00		
Pu-240	2.1278E-03	320.10	640.20	0.00E+00	6.81E-01	1.36E+00		
Pu-241	1.0195E-01	320.10	640.20	0.00E+00	3.26E+01	6.53E+01		
Pu-242	2.3128E-07	320.10	640.20	0.00E+00	7.40E-05	1.48E-04		
Ra-226	5.2782E-14	320.10	640.20	0.00E+00	1.69E-11	3.38E-11		
Ra-228	1.9338E-10	320.10	640.20	0.00E+00	6.19E-08	1.24E-07		
Ru-106	9.1684E-02	320.10	640.20	0.00E+00	2.93E+01	5.87E+01		
Se-79	1.3018E-05	320.10	640.20	0.00E+00	4.17E-03	8.33E-03		
Sn-126	1.2167E-05	320.10	640.20	0.00E+00	3.89E-03	7.79E-03		
Sr-90	2.6045E+00	320.10	640.20	0.00E+00	8.34E+02	1.67E+03		
Tc-99	4.4241E-04	320.10	640.20	0.00E+00	1.42E-01	2.83E-01		
Th-229	1.3713E-10	320.10	640.20	0.00E+00	4.39E-08	8.78E-08		
Th-230	1.8090E-11	320.10	640.20	0.00E+00	5.79E-09	1.16E-08		
Th-232	2.5278E-10	320.10	640.20	0.00E+00	8.09E-08	1.62E-07		
Th-208	1.6947E-08	320.10	640.20	0.00E+00	5.42E-06	1.08E-05		
U-232	4.8737E-08	320.10	640.20	0.00E+00	1.56E-05	3.12E-05	Thermal Power	
U-233	1.2203E-07	320.10	640.20	0.00E+00	3.91E-05	7.81E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.5925E-07	320.10	640.20	0.00E+00	5.10E-05	1.02E-04	1.86E+01	3.73E+01
U-235	-2.6194E-06	320.10	0.00	9.45E-03	8.61E-03	9.45E-03	Total	Total
U-236	1.2693E-05	320.10	640.20	0.00E+00	4.06E-03	8.13E-03		
U-238	-3.6331E-08	320.10	0.00	5.89E-03	5.88E-03	5.89E-03		
Y-90	2.6060E+00	320.10	640.20	0.00E+00	8.34E+02	1.67E+03		
Other Radionuclides					1.15E+03	2.31E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences
Reactor Moderator:	From SFD	Used	
Fuel Cladding	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
BOL HM Constituents:	SST	SST	
BOL Enrichment %:	U	U	
	19.97350572	10 to 20.1	
Burnup Summary (MWd) ²			Basis for burnup used in estimate
	From SFD	Estimated	
Nominal	320.10	296.41	
Bounding		640.20	
			Nominal burnup taken directly from SFD (converted to MWd)
			Bounding burnup assumed to be twice nominal burnup
Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.43	0.93	
Bounding	0.86		
			1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 DOW

SNF ID #: 251

Fuel Units & Descr: 77 - ELEMENT

Heavy Metal Mass: BOL=15 015kg EOL=14 63kg

ROD Storage Site: INEEL

¹Fuel decay start date.

2035

Estimates as of:

2010

Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)

²Template Burnup(MWd).

6 65

Template BOL Heavy Metal Mass (MT):

0 000195

Template Decay Time:

5 years

Estimated

Canister usage

18"x10"

0 69

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 5173E-10	367 52	735 05	0 00E+00	3 13E-07	6 26E-07	Avg MeV	
Am-241	1 8331E-03	367 52	735 05	0 00E+00	6 74E-01	1 35E+00	0 0150	1 188E+14
Am-242m	1 4129E-06	367 52	735 05	0 00E+00	5 19E-04	1 04E-03	0 0250	2 614E+13
Am-243	1 4774E-07	367 52	735 05	0 00E+00	5 43E-05	1 09E-04	0 0375	2 226E+13
C-14	1 2871E-04	367 52	735 05	0 00E+00	4 73E-02	9 46E-02	0 0575	2 285E+13
Ct-36	2 8120E-06	367 52	735 05	0 00E+00	1 03E-03	2 07E-03	0 0850	1 416E+13
Cm-243	1 7940E-07	367 52	735 05	0 00E+00	6 59E-05	1 32E-04	0 1250	1 028E+13
Cm-244	1 6962E-06	367 52	735 05	0 00E+00	6 23E-04	1 25E-03	0 2250	1 201E+13
Co-60	1 2839E+00	367 52	735 05	0 00E+00	4 72E+02	9 44E+02	0 3750	6 094E+12
Cs-134	9 0541E-02	367 52	735 05	0 00E+00	3 33E+01	6 66E+01	0 5750	8 102E+13
Cs-135	3 2195E-05	367 52	735 05	0 00E+00	1 18E-02	2 37E-02	0 8500	3 477E+12
Cs-137	2 7564E+00	367 52	735 05	0 00E+00	1 01E+03	2 03E+03	1 2500	7 061E+13
Eu-154	1 5368E-02	367 52	735 05	0 00E+00	5 65E+00	1 13E+01	1 7500	4 707E+10
Eu-155	2 9293E-02	367 52	735 05	0 00E+00	1 08E+01	2 15E+01	2 2500	7 587E+10
Fe-55	7 7158E-01	367 52	735 05	0 00E+00	2 84E+02	5 67E+02	2 7500	6 021E+08
H-3	1 1111E-02	367 52	735 05	0 00E+00	4 08E+00	8 17E+00	3 5000	7 007E+07
I-129	7 3684E-07	367 52	735 05	0 00E+00	2 71E-04	5 42E-04	5 0000	3 946E+02
Kr-85	2 5263E-01	367 52	735 05	0 00E+00	9 28E+01	1 86E+02	7 0000	4 467E+01
Np-237	1 2427E-06	367 52	735 05	0 00E+00	4 57E-04	9 13E-04	11 0000	5 089E+00
Pa-231	3 8511E-09	367 52	735 05	0 00E+00	1 42E-06	2 83E-06		
Pb-210	7 3880E-15	367 52	735 05	0 00E+00	2 72E-12	5 43E-12		
Pm-147	2 1023E+00	367 52	735 05	0 00E+00	7 73E+02	1 55E+03		
Pu-238	1 0383E-03	367 52	735 05	0 00E+00	3 82E-01	7 63E-01		
Pu-239	5 5293E-03	367 52	735 05	0 00E+00	2 03E+00	4 06E+00		
Pu-240	2 1278E-03	367 52	735 05	0 00E+00	7 82E-01	1 56E+00		
Pu-241	1 0195E-01	367 52	735 05	0 00E+00	3 75E+01	7 49E+01		
Pu-242	2 3128E-07	367 52	735 05	0 00E+00	8 50E-05	1 70E-04		
Ra-226	5 2782E-14	367 52	735 05	0 00E+00	1 94E-11	3 88E-11		
Ra-228	1 9338E-10	367 52	735 05	0 00E+00	7 11E-08	1 42E-07		
Ru-106	9 1684E-02	367 52	735 05	0 00E+00	3 37E+01	6 74E+01		
Se-79	1 3018E-05	367 52	735 05	0 00E+00	4 78E-03	9 57E-03		
Sn-126	1 2167E-05	367 52	735 05	0 00E+00	4 47E-03	8 94E-03		
Sr-90	2 6045E+00	367 52	735 05	0 00E+00	9 57E+02	1 91E+03		
Tc-99	4 4241E-04	367 52	735 05	0 00E+00	1 63E-01	3 25E-01		
Th-229	1 3713E-10	367 52	735 05	0 00E+00	5 04E-08	1 01E-07		
Th-230	1 8090E-11	367 52	735 05	0 00E+00	6 65E-09	1 33E-08		
Th-232	2 5278E-10	367 52	735 05	0 00E+00	9 29E-08	1 86E-07		
Ti-208	1 6947E-08	367 52	735 05	0 00E+00	6 23E-06	1 25E-05		
U-232	4 8737E-08	367 52	735 05	0 00E+00	1 79E-05	3 58E-05		
U-233	1 2203E-07	367 52	735 05	0 00E+00	4 48E-05	8 97E-05		
U-234	1 5925E-07	367 52	735 05	0 00E+00	5 85E-05	1 17E-04		
U-235	-2 6194E-06	367 52	0 00	6 49E-03	5 53E-03	6 49E-03		
U-236	1 2693E-05	367 52	735 05	0 00E+00	4 67E-03	9 33E-03		
U-238	-3 6331E-08	367 52	0 00	4 04E-03	4 02E-03	4 04E-03		
Y-90	2 6060E+00	367 52	735 05	0 00E+00	9 58E+02	1 92E+03		
Other Radionuclides					1 33E+03	2 65E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	20	10 to 20 1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	219.50	367 52
Bounding		735 05

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 72	1 67
Bounding	1 44	

Estimated EOL HM/Given EOL HM

1 00

²Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 5/20 ENGLAND
SNF ID #: 485
Fuel Units & Descr: 84 - ELEMENT
Heavy Metal Mass: BOL=16 187kg EOL=15 826kg
ROD Storage Site: INEEL

Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-SS (LWA/J-Zrx SST, 10 to 20% U)
Template Burnup(MWd): 6 65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0.76

II. Estimates		m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	394.39	788.78	0.00E+00	3.36E-07	6.72E-07	0.0150	1.275E+14	
Am-241	1.8331E-03	394.39	788.78	0.00E+00	7.23E-01	1.45E+00	0.0250	2.805E+13	
Am-242m	1.4129E-06	394.39	788.78	0.00E+00	5.57E-04	1.11E-03	0.0375	2.389E+13	
Am-243	1.4774E-07	394.39	788.78	0.00E+00	5.83E-05	1.17E-04	0.0575	2.452E+13	
C-14	1.2871E-04	394.39	788.78	0.00E+00	5.08E-02	1.02E-01	0.0850	1.519E+13	
Cl-36	2.8120E-06	394.39	788.78	0.00E+00	1.11E-03	2.22E-03	0.1250	1.103E+13	
Cm-243	1.7940E-07	394.39	788.78	0.00E+00	7.08E-05	1.42E-04	0.2250	1.289E+13	
Cm-244	1.6962E-06	394.39	788.78	0.00E+00	6.69E-04	1.34E-03	0.3750	6.540E+12	
Co-60	1.2839E+00	394.39	788.78	0.00E+00	5.06E+02	1.01E+03	0.5750	8.694E+13	
Cs-134	9.0541E-02	394.39	788.78	0.00E+00	3.57E+01	7.14E+01	0.8500	3.731E+12	
Cs-135	3.2195E-05	394.39	788.78	0.00E+00	1.27E-02	2.54E-02	1.2500	7.578E+13	
Cs-137	2.7564E+00	394.39	788.78	0.00E+00	1.09E+03	2.17E+03	1.7500	5.051E+10	
Eu-154	1.5368E-02	394.39	788.78	0.00E+00	6.06E+00	1.21E+01	2.2500	8.142E+10	
Eu-155	2.9293E-02	394.39	788.78	0.00E+00	1.16E+01	2.31E+01	2.7500	6.461E+08	
Fe-55	7.7158E-01	394.39	788.78	0.00E+00	3.04E+02	6.09E+02	3.5000	7.519E+07	
H-3	1.1111E-02	394.39	788.78	0.00E+00	4.38E+00	8.76E+00	5.0000	4.235E+02	
I-129	7.3684E-07	394.39	788.78	0.00E+00	2.91E-04	5.81E-04	7.0000	4.794E+01	
Kr-85	2.5263E-01	394.39	788.78	0.00E+00	9.96E+01	1.99E+02	11.0000	5.462E+00	
Np-237	1.2427E-06	394.39	788.78	0.00E+00	4.90E-04	9.80E-04			
Pa-231	3.8511E-09	394.39	788.78	0.00E+00	1.52E-06	3.04E-06			
Pb-210	7.3880E-15	394.39	788.78	0.00E+00	2.91E-12	5.83E-12			
Pm-147	2.1023E+00	394.39	788.78	0.00E+00	8.29E+02	1.66E+03			
Pu-238	1.0383E-03	394.39	788.78	0.00E+00	4.10E-01	8.19E-01			
Pu-239	5.5293E-03	394.39	788.78	0.00E+00	2.18E+00	4.36E+00			
Pu-240	2.1278E-03	394.39	788.78	0.00E+00	8.39E-01	1.68E+00			
Pu-241	1.0195E-01	394.39	788.78	0.00E+00	4.02E+01	8.04E+01			
Pu-242	2.3128E-07	394.39	788.78	0.00E+00	9.12E-05	1.82E-04			
Ra-226	5.2782E-14	394.39	788.78	0.00E+00	2.08E-11	4.16E-11			
Ra-228	1.9338E-10	394.39	788.78	0.00E+00	7.63E-08	1.53E-07			
Ru-106	9.1684E-02	394.39	788.78	0.00E+00	3.62E+01	7.23E+01			
Se-79	1.3018E-05	394.39	788.78	0.00E+00	5.13E-03	1.03E-02			
Sn-126	1.2167E-05	394.39	788.78	0.00E+00	4.80E-03	9.60E-03			
Sr-90	2.6045E+00	394.39	788.78	0.00E+00	1.03E+03	2.05E+03			
Tc-99	4.4241E-04	394.39	788.78	0.00E+00	1.74E-01	3.49E-01			
Th-229	1.3713E-10	394.39	788.78	0.00E+00	5.41E-08	1.08E-07			
Th-230	1.8090E-11	394.39	788.78	0.00E+00	7.13E-09	1.43E-08			
Th-232	2.5278E-10	394.39	788.78	0.00E+00	9.97E-08	1.99E-07			
Ti-208	1.6947E-08	394.39	788.78	0.00E+00	6.68E-06	1.34E-05			
U-232	4.8737E-08	394.39	788.78	0.00E+00	1.92E-05	3.84E-05			
U-233	1.2203E-07	394.39	788.78	0.00E+00	4.81E-05	9.63E-05			
U-234	1.5925E-07	394.39	788.78	0.00E+00	6.28E-05	1.26E-04			
U-235	2.6194E-06	394.39	0.00	6.93E-03	5.90E-03	6.93E-03			
U-236	1.2693E-05	394.39	788.78	0.00E+00	5.01E-03	1.00E-02			
U-238	3.6331E-08	394.39	0.00	4.36E-03	4.35E-03	4.36E-03			
Y-90	2.6060E+00	394.39	788.78	0.00E+00	1.03E+03	2.06E+03			
Other Radionuclides					1.42E+03	2.84E+03			

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	19 80853811	10 to 20.1	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate.
Nominal	394.39	344.80	
Bounding		788.78	

Nominal burnup taken directly from SFD (converted to MWd)
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.71	0.87	
Bounding	1.43		

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 FINLAND
SNF ID #: 472
Fuel Units & Descr: 102 - ELEMENT
Heavy Metal Mass: BOL=19 89kg EOL=19 686kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd), 6 65
Template BOL Heavy Metal Mass (MT), 0 000195
Template Decay Time 5 years

Estimated
Canister usage:
18"x10"
0 92

II. Estimates	m	X _n	X _s	b	Y _n	Y _s	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 5173E-10	194 74	389 48	0 00E+00	1 66E-07	3 32E-07	Avg MeV	
Am-241	1 8331E-03	194 74	389 48	0 00E+00	3 57E-01	7 14E-01	0 0150	6 295E+13
Am-242m	1 4129E-06	194 74	389 48	0 00E+00	2 75E-04	5 50E-04	0 0250	1 385E+13
Am-243	1 4774E-07	194 74	389 48	0 00E+00	2 88E-05	5 75E-05	0 0375	1 180E+13
C-14	1 2871E-04	194 74	389 48	0 00E+00	2 51E-02	5 01E-02	0 0575	1 211E+13
Cl-36	2 8120E-06	194 74	389 48	0 00E+00	5 48E-04	1 10E-03	0 0850	7 501E+12
Cm-243	1 7940E-07	194 74	389 48	0 00E+00	3 49E-05	6 99E-05	0 1250	5 447E+12
Cm-244	1 6962E-06	194 74	389 48	0 00E+00	3 30E-04	6 61E-04	0 2250	6 363E+12
Co-60	1 2839E+00	194 74	389 48	0 00E+00	2 50E+02	5 00E+02	0 3750	3 229E+12
Cs-134	9 0541E-02	194 74	389 48	0 00E+00	1 76E+01	3 53E+01	0 5750	4 293E+13
Cs-135	3 2195E-05	194 74	389 48	0 00E+00	6 27E-03	1 25E-02	0 8500	1 842E+12
Cs-137	2 7564E+00	194 74	389 48	0 00E+00	5 37E+02	1 07E+03	1 2500	3 742E+13
Eu-154	1 5368E-02	194 74	389 48	0 00E+00	2 99E+00	5 99E+00	1 7500	2 494E+10
Eu-155	2 9293E-02	194 74	389 48	0 00E+00	5 70E+00	1 14E+01	2 2500	4 020E+10
Fe-55	7 7158E-01	194 74	389 48	0 00E+00	1 50E+02	3 01E+02	2 7500	3 190E+08
H-3	1 1111E-02	194 74	389 48	0 00E+00	2 16E+00	4 33E+00	3 5000	3 713E+07
I-129	7 3684E-07	194 74	389 48	0 00E+00	1 43E-04	2 87E-04	5 0000	2 165E+02
Kr-85	2 5263E-01	194 74	389 48	0 00E+00	4 92E+01	9 84E+01	7 0000	2 452E+01
Np-237	1 2427E-06	194 74	389 48	0 00E+00	2 42E-04	4 84E-04	11 0000	2 795E+00
Pa-231	3 8511E-09	194 74	389 48	0 00E+00	7 50E-07	1 50E-06		
Pb-210	7 3880E-15	194 74	389 48	0 00E+00	1 44E-12	2 88E-12		
Pm-147	2 1023E+00	194 74	389 48	0 00E+00	4 09E+02	8 19E+02		
Pu-238	1 0383E-03	194 74	389 48	0 00E+00	2 02E-01	4 04E-01		
Pu-239	5 5293E-03	194 74	389 48	0 00E+00	1 08E+00	2 15E+00		
Pu-240	2 1278E-03	194 74	389 48	0 00E+00	4 14E-01	8 29E-01		
Pu-241	1 0195E-01	194 74	389 48	0 00E+00	1 99E+01	3 97E+01		
Pu-242	2 3128E-07	194 74	389 48	0 00E+00	4 50E-05	9 01E-05		
Ra-226	5 2782E-14	194 74	389 48	0 00E+00	1 03E-11	2 06E-11		
Ra-228	1 9338E-10	194 74	389 48	0 00E+00	3 77E-08	7 53E-08		
Ru-106	9 1684E-02	194 74	389 48	0 00E+00	1 79E+01	3 57E+01		
Se-79	1 3018E-05	194 74	389 48	0 00E+00	2 54E-03	5 07E-03		
Sn-126	1 2167E-05	194 74	389 48	0 00E+00	2 37E-03	4 74E-03		
Sr-90	2 6045E+00	194 74	389 48	0 00E+00	5 07E+02	1 01E+03		
Tc-99	4 4241E-04	194 74	389 48	0 00E+00	8 62E-02	1 72E-01		
Th-229	1 3713E-10	194 74	389 48	0 00E+00	2 67E-08	5 34E-08		
Th-230	1 8090E-11	194 74	389 48	0 00E+00	3 52E-09	7 05E-09		
Th-232	2 5278E-10	194 74	389 48	0 00E+00	4 92E-08	9 85E-08		
Ti-208	1 6947E-08	194 74	389 48	0 00E+00	3 30E-06	6 60E-06		
U-232	4 8737E-08	194 74	389 48	0 00E+00	9 49E-06	1 90E-05		
U-233	1 2203E-07	194 74	389 48	0 00E+00	2 38E-05	4 75E-05		
U-234	1 5925E-07	194 74	389 48	0 00E+00	3 10E-05	6 20E-05		
U-235	-2 6194E-06	194 74	0 00	8 60E-03	8 09E-03	8 60E-03		
U-236	1 2693E-05	194 74	389 48	0 00E+00	2 47E-03	4 94E-03		
U-238	-3 6331E-08	194 74	0 00	5 35E-03	5 34E-03	5 35E-03		
Y-90	2 6060E+00	194 74	389 48	0 00E+00	5 07E+02	1 01E+03		
Other Radionuclides					7 02E+02	1 40E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
Fuel Cladding	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
BOL HM Constituents	SST	SST	
BOL Enrichment %	20 00000041	10 to 20 1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	193.85	194 74	
Bounding		389 48	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 29	1 00	
Bounding	0 57		1 00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 8 5/20 GA
SNF ID #: 244
Fuel Units & Descr: 114 - ELEMENT
Heavy Metal Mass BOL=22.23kg EOL=19 688kg
ROD Storage Site INEEL

¹Fuel decay start date 1982
Estimates as of 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd) 6 65
Template BOL Heavy Metal Mass (MT)³ 0 000195
Template Decay Time 25 years

Estimated
Canister usage
18"x10"
1 03

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	4 1459E-09	2,426 80	4,853 61	0 00E+00	1 01E-05	2 01E-05	0 0150	4.308E+14
Am-241	3 5850E-03	2,426 80	4,853 61	0 00E+00	8 70E+00	1 74E+01	0 0250	8.956E+13
Am-242m	1.2899E-06	2,426 80	4,853 61	0 00E+00	3 13E-03	6.26E-03	0 0375	7 771E+13
Am-243	1 4747E-07	2,426 80	4,853 61	0 00E+00	3 58E-04	7.16E-04	0 0575	8.368E+13
C-14	1 2839E-04	2,426 80	4,853 61	0 00E+00	3.12E-01	6.23E-01	0 0850	5 044E+13
Cl-36	2 8120E-06	2,426 80	4,853 61	0 00E+00	6 82E-03	1.36E-02	0 1250	3.291E+13
Cm-243	1 1038E-07	2,426 80	4,853 61	0 00E+00	2 68E-04	5.36E-04	0 2250	4 338E+13
Cm-244	7 8917E-07	2,426 80	4,853 61	0 00E+00	1 92E-03	3 83E-03	0 3750	1 895E+13
Co-60	9 2647E-02	2,426 80	4,853 61	0 00E+00	2.25E+02	4 50E+02	0 5750	3 141E+14
Cs-134	1 0940E-04	2,426 80	4,853 61	0 00E+00	2 65E-01	5 31E-01	0 8500	3 372E+12
Cs-135	3.2195E-05	2,426 80	4,853 61	0 00E+00	7 81E-02	1 56E-01	1.2500	3 462E+13
Cs-137	1.7368E+00	2,426 80	4,853 61	0 00E+00	4 21E+03	8 43E+03	1 7500	8 776E+10
Eu-154	3 0677E-03	2,426 80	4,853 61	0 00E+00	7 44E+00	1 49E+01	2.2500	1.851E+08
Eu-155	1 7925E-03	2,426 80	4,853 61	0 00E+00	4 35E+00	8 70E+00	2 7500	3 129E+06
Fe-55	3 7444E-03	2,426 80	4,853 61	0 00E+00	9 09E+00	1.82E+01	3.5000	6.507E+03
H-3	3 6180E-03	2,426 80	4,853 61	0 00E+00	8 78E+00	1.76E+01	5 0000	2.531E+03
I-129	7 3684E-07	2,426 80	4,853 61	0 00E+00	1.79E-03	3 58E-03	7 0000	2.857E+02
Kr-85	6 9368E-02	2,426 80	4,853 61	0 00E+00	1 68E+02	3.37E+02	11 0000	3 249E+01
Np-237	1 2662E-06	2,426 80	4,853 61	0 00E+00	3 07E-03	6 15E-03		
Pa-231	9 1654E-09	2,426 80	4,853 61	0 00E+00	2 22E-05	4 45E-05		
Pb-210	1.3728E-13	2,426 80	4,853 61	0 00E+00	3 33E-10	6 66E-10		
Pm-147	1.0702E-02	2,426 80	4,853 61	0 00E+00	2 60E+01	5 19E+01		
Pu-238	8 8692E-04	2,426 80	4,853 61	0 00E+00	2 15E+00	4 30E+00		
Pu-239	5.5263E-03	2,426 80	4,853 61	0 00E+00	1 34E+01	2 68E+01		
Pu-240	2 1233E-03	2,426 80	4,853 61	0 00E+00	5 15E+00	1 03E+01		
Pu-241	3 8962E-02	2,426 80	4,853 61	0 00E+00	9 46E+01	1.89E+02		
Pu-242	2.3128E-07	2,426 80	4,853 61	0 00E+00	5 61E-04	1 12E-03		
Ra-226	4 6752E-13	2,426 80	4,853 61	0 00E+00	1 13E-09	2.27E-09		
Ra-228	2 4827E-10	2,426 80	4,853 61	0 00E+00	6 03E-07	1.21E-06		
Ru-106	9 8526E-08	2,426 80	4,853 61	0 00E+00	2.39E-04	4 78E-04		
Se-79	1.3015E-05	2,426 80	4,853 61	0 00E+00	3 16E-02	6 32E-02		
Sn-126	1.2165E-05	2,426 80	4,853 61	0 00E+00	2 95E-02	5 90E-02		
Sr-90	1 6195E+00	2,426 80	4,853 61	0 00E+00	3 93E+03	7 86E+03		
Tc-99	4.4241E-04	2,426 80	4,853 61	0 00E+00	1 07E+00	2 15E+00		
Th-229	4.2451E-10	2,426 80	4,853 61	0 00E+00	1 03E-06	2.06E-06		
Th-230	6 1398E-11	2,426 80	4,853 61	0 00E+00	1.49E-07	2.98E-07		
Th-232	2 5278E-10	2,426 80	4,853 61	0 00E+00	6 13E-07	1.23E-06		
Th-208	1.5098E-08	2,426 80	4,853 61	0 00E+00	3 66E-05	7.33E-05		
U-232	4 0662E-08	2,426 80	4,853 61	0 00E+00	9 87E-05	1 97E-04		
U-233	1.2217E-07	2,426 80	4,853 61	0 00E+00	2 96E-04	5 93E-04		
U-234	2 2391E-07	2,426 80	4,853 61	0 00E+00	5 43E-04	1 09E-03		
U-235	-2.6194E-06	2,426 80	0.00	9 61E-03	3 25E-03	9 61E-03		
U-236	1.2695E-05	2,426 80	4,853 61	0 00E+00	3 08E-02	6 16E-02		
U-238	-3 6331E-08	2,426 80	0.00	5 98E-03	5 89E-03	5 98E-03		
Y-90	1.6195E+00	2,426 80	4,853 61	0 00E+00	3 93E+03	7 86E+03		
Other Radionuclides					4 18E+03	8.35E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	20	10 to 20 1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	758.29	2 426 80
Bounding		4 853 61

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	3.20	3.20
Bounding	6.40	

Estimated EOL HM/Given EOL HM
1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 5/20 GERMANY
SNF ID #: 305
Fuel Units & Descr: 15 - ELEMENT
Heavy Metal Mass: BOL=2.925kg, EOL=2.883kg
ROD Storage Site: INEEL

Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.14

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	40.09	80.19	0.00E+00	3.41E-08	6.83E-08	Avg MeV	
Am-241	1.8331E-03	40.09	80.19	0.00E+00	7.35E-02	1.47E-01	0.0150	1.296E+13
Am-242m	1.4129E-06	40.09	80.19	0.00E+00	5.66E-05	1.13E-04	0.0250	2.852E+12
Am-243	1.4774E-07	40.09	80.19	0.00E+00	5.92E-06	1.18E-05	0.0375	2.429E+12
C-14	1.2871E-04	40.09	80.19	0.00E+00	5.16E-03	1.03E-02	0.0575	2.493E+12
Cl-36	2.8120E-06	40.09	80.19	0.00E+00	1.13E-04	2.25E-04	0.0850	1.544E+12
Cm-243	1.7940E-07	40.09	80.19	0.00E+00	7.19E-06	1.44E-05	0.1250	1.121E+12
Cm-244	1.6962E-06	40.09	80.19	0.00E+00	6.80E-05	1.36E-04	0.2250	1.310E+12
Co-60	1.2839E+00	40.09	80.19	0.00E+00	5.15E+01	1.03E+02	0.3750	6.648E+11
Cs-134	9.0541E-02	40.09	80.19	0.00E+00	3.63E+00	7.26E+00	0.5750	8.838E+12
Cs-135	3.2195E-05	40.09	80.19	0.00E+00	1.29E-03	2.58E-03	0.8500	3.793E+11
Cs-137	2.7564E+00	40.09	80.19	0.00E+00	1.11E+02	2.21E+02	1.2500	7.703E+12
Eu-154	1.5368E-02	40.09	80.19	0.00E+00	6.16E-01	1.23E+00	1.7500	5.135E+09
Eu-155	2.9293E-02	40.09	80.19	0.00E+00	1.17E+00	2.35E+00	2.2500	8.277E+09
Fe-55	7.7158E-01	40.09	80.19	0.00E+00	3.09E+01	6.19E+01	2.7500	6.568E+07
H-3	1.1111E-02	40.09	80.19	0.00E+00	4.45E-01	8.91E-01	3.5000	7.644E+06
I-129	7.3684E-07	40.09	80.19	0.00E+00	2.95E-05	5.91E-05	5.0000	4.384E+01
Kr-85	2.5263E-01	40.09	80.19	0.00E+00	1.01E+01	2.03E+01	7.0000	4.965E+00
Np-237	1.2427E-06	40.09	80.19	0.00E+00	4.98E-05	9.96E-05	11.0000	5.658E-01
Pa-231	3.8511E-09	40.09	80.19	0.00E+00	1.54E-07	3.09E-07		
Pb-210	7.3880E-15	40.09	80.19	0.00E+00	2.96E-13	5.92E-13		
Pm-147	2.1023E+00	40.09	80.19	0.00E+00	8.43E+01	1.69E+02		
Pu-238	1.0383E-03	40.09	80.19	0.00E+00	4.16E-02	8.33E-02		
Pu-239	5.5293E-03	40.09	80.19	0.00E+00	2.22E-01	4.43E-01		
Pu-240	2.1278E-03	40.09	80.19	0.00E+00	8.53E-02	1.71E-01		
Pu-241	1.0195E-01	40.09	80.19	0.00E+00	4.09E+00	8.18E+00		
Pu-242	2.3128E-07	40.09	80.19	0.00E+00	9.27E-06	1.85E-05		
Ra-226	5.2782E-14	40.09	80.19	0.00E+00	2.12E-12	4.23E-12		
Ra-228	1.9338E-10	40.09	80.19	0.00E+00	7.75E-09	1.55E-08		
Ru-106	9.1684E-02	40.09	80.19	0.00E+00	3.68E+00	7.35E+00		
Se-79	1.3018E-05	40.09	80.19	0.00E+00	5.22E-04	1.04E-03		
Sn-126	1.2167E-05	40.09	80.19	0.00E+00	4.88E-04	9.76E-04		
Sr-90	2.6045E+00	40.09	80.19	0.00E+00	1.04E+02	2.09E+02		
Tc-99	4.4241E-04	40.09	80.19	0.00E+00	1.77E-02	3.55E-02		
Th-229	1.3713E-10	40.09	80.19	0.00E+00	5.50E-09	1.10E-08		
Th-230	1.8090E-11	40.09	80.19	0.00E+00	7.25E-10	1.45E-09		
Th-232	2.5278E-10	40.09	80.19	0.00E+00	1.01E-08	2.03E-08		
Th-208	1.6947E-08	40.09	80.19	0.00E+00	6.79E-07	1.36E-06		
U-232	4.8737E-08	40.09	80.19	0.00E+00	1.95E-06	3.91E-06		
U-233	1.2203E-07	40.09	80.19	0.00E+00	4.89E-06	9.79E-06		
U-234	1.5925E-07	40.09	80.19	0.00E+00	6.38E-06	1.28E-05		
U-235	-2.6194E-06	40.09	0.00	1.26E-03	1.16E-03	1.26E-03		
U-236	1.2693E-05	40.09	80.19	0.00E+00	5.09E-04	1.02E-03		
U-238	-3.6331E-08	40.09	0.00	7.86E-04	7.85E-04	7.86E-04		
Y-90	2.6060E+00	40.09	80.19	0.00E+00	1.04E+02	2.09E+02		
Other Radionuclides					1.45E+02	2.89E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20.00000041	10 to 20.1	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	28.51	40.09	
Bounding		80.19	

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.40	1.41	
Bounding	0.80		

1.00

¹ Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

² Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 8 5/20 GERMANY
SNF ID # 474
Fuel Units & Descr: 70 - ELEMENT
Heavy Metal Mass: BOL=13.65kg EOL=13.377kg
ROD Storage Site: INEEL

¹Fuel decay start date 2010
Estimates as of 2010

Template TRIGA-SS (LW/U-Zr, SST, 10 to 20% U)
²Template Burnup(MWd) 6.65
Template BOL Heavy Metal Mass (MT) 0.000195
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0.63

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	260.61	521.22	0.00E+00	2.22E-07	4.44E-07	Avg MeV	
Am-241	1.8331E-03	260.61	521.22	0.00E+00	4.78E-01	9.55E-01	0.0150	8.424E+13
Am-242m	1.4129E-06	260.61	521.22	0.00E+00	3.68E-04	7.36E-04	0.0250	1.854E+13
Am-243	1.4774E-07	260.61	521.22	0.00E+00	3.85E-05	7.70E-05	0.0375	1.579E+13
C-14	1.2871E-04	260.61	521.22	0.00E+00	3.35E-02	6.71E-02	0.0575	1.620E+13
Cl-36	2.8120E-06	260.61	521.22	0.00E+00	7.33E-04	1.47E-03	0.0850	1.004E+13
Cm-243	1.7940E-07	260.61	521.22	0.00E+00	4.68E-05	9.35E-05	0.1250	7.289E+12
Cm-244	1.6962E-06	260.61	521.22	0.00E+00	4.42E-04	8.84E-04	0.2250	8.515E+12
Co-60	1.2839E+00	260.61	521.22	0.00E+00	3.35E+02	6.69E+02	0.3750	4.321E+12
Cs-134	9.0541E-02	260.61	521.22	0.00E+00	2.36E+01	4.72E+01	0.5750	5.745E+13
Cs-135	3.2195E-05	260.61	521.22	0.00E+00	8.39E-03	1.68E-02	0.8500	2.466E+12
Cs-137	2.7564E+00	260.61	521.22	0.00E+00	7.18E+02	1.44E+03	1.2500	5.007E+13
Eu-154	1.5368E-02	260.61	521.22	0.00E+00	4.01E+00	8.01E+00	1.7500	3.338E+10
Eu-155	2.9293E-02	260.61	521.22	0.00E+00	7.63E+00	1.53E+01	2.2500	5.380E+10
Fe-55	7.7158E-01	260.61	521.22	0.00E+00	2.01E+02	4.02E+02	2.7500	4.269E+08
H-3	1.1111E-02	260.61	521.22	0.00E+00	2.90E+00	5.79E+00	3.5000	4.969E+07
I-129	7.3684E-07	260.61	521.22	0.00E+00	1.92E-04	3.84E-04	5.0000	2.816E+02
Kr-85	2.5263E-01	260.61	521.22	0.00E+00	6.58E+01	1.32E+02	7.0000	3.189E+01
Np-237	1.2427E-06	260.61	521.22	0.00E+00	3.24E-04	6.48E-04	11.0000	3.633E+00
Pa-231	3.8511E-09	260.61	521.22	0.00E+00	1.00E-06	2.01E-06		
Pb-210	7.3880E-15	260.61	521.22	0.00E+00	1.93E-12	3.85E-12		
Pm-147	2.1023E+00	260.61	521.22	0.00E+00	5.48E+02	1.10E+03		
Pu-238	1.0383E-03	260.61	521.22	0.00E+00	2.71E-01	5.41E-01		
Pu-239	5.5293E-03	260.61	521.22	0.00E+00	1.44E+00	2.88E+00		
Pu-240	2.1278E-03	260.61	521.22	0.00E+00	5.55E-01	1.11E+00		
Pu-241	1.0195E-01	260.61	521.22	0.00E+00	2.66E+01	5.31E+01		
Pu-242	2.3128E-07	260.61	521.22	0.00E+00	6.03E-05	1.21E-04		
Ra-226	5.2782E-14	260.61	521.22	0.00E+00	1.38E-11	2.75E-11		
Ra-228	1.9338E-10	260.61	521.22	0.00E+00	5.04E-08	1.01E-07		
Ru-106	9.1684E-02	260.61	521.22	0.00E+00	2.39E+01	4.78E+01		
Se-79	1.3018E-05	260.61	521.22	0.00E+00	3.39E-03	6.79E-03		
Sn-126	1.2167E-05	260.61	521.22	0.00E+00	3.17E-03	6.34E-03		
Sr-90	2.6045E+00	260.61	521.22	0.00E+00	6.79E+02	1.36E+03		
Tc-99	4.4241E-04	260.61	521.22	0.00E+00	1.15E-01	2.31E-01		
Th-229	1.3713E-10	260.61	521.22	0.00E+00	3.57E-08	7.15E-08		
Th-230	1.8090E-11	260.61	521.22	0.00E+00	4.71E-09	9.43E-09		
Th-232	2.5278E-10	260.61	521.22	0.00E+00	6.59E-08	1.32E-07		
Ti-208	1.6947E-08	260.61	521.22	0.00E+00	4.42E-06	8.83E-06		
U-232	4.8737E-08	260.61	521.22	0.00E+00	1.27E-05	2.54E-05		
U-233	1.2203E-07	260.61	521.22	0.00E+00	3.18E-05	6.36E-05		
U-234	1.5925E-07	260.61	521.22	0.00E+00	4.15E-05	8.30E-05		
U-235	-2.6194E-06	260.61	0.00	5.90E-03	5.22E-03	5.90E-03		
U-236	1.2693E-05	260.61	521.22	0.00E+00	3.31E-03	6.62E-03		
U-238	-3.6331E-08	260.61	0.00	3.67E-03	3.66E-03	3.67E-03		
Y-90	2.6060E+00	260.61	521.22	0.00E+00	6.79E+02	1.36E+03		
Other Radionuclides					9.40E+02	1.88E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.52E+01	3.03E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20.00000041	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	133.03	260.61	
Bounding		521.22	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.56	1.96	
Bounding	1.12		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 HANNOVER

SNF ID #: 473

Fuel Units & Descr: 5 - ELEMENT

Heavy Metal Mass: BOL=0.972kg; EOL=0.95kg

ROD Storage Site: INEEL

Fuel decay start date: 1999

Estimates as of: 2010

Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)

Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.000195

Template Decay Time: 10 years

Estimated

Canister usage:

18"x10"

0.05

II. Estimates

	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3731E-09	21.48	42.96	0.00E+00	2.95E-08	5.90E-08	Avg MeV	
Am-241	2.3865E-03	21.48	42.96	0.00E+00	5.13E-02	1.03E-01	0.0150	5.550E+12
Am-242m	1.3812E-06	21.48	42.96	0.00E+00	2.97E-05	5.93E-05	0.0250	1.176E+12
Am-243	1.4767E-07	21.48	42.96	0.00E+00	3.17E-06	6.34E-06	0.0375	1.004E+12
C-14	1.2863E-04	21.48	42.96	0.00E+00	2.76E-03	5.53E-03	0.0575	1.070E+12
Cl-36	2.8120E-06	21.48	42.96	0.00E+00	6.04E-05	1.21E-04	0.0850	6.493E+11
Cm-243	1.5895E-07	21.48	42.96	0.00E+00	3.41E-06	6.83E-06	0.1250	4.268E+11
Cm-244	1.4008E-06	21.48	42.96	0.00E+00	3.01E-05	6.02E-05	0.2250	5.538E+11
Co-60	6.6541E-01	21.48	42.96	0.00E+00	1.43E+01	2.86E+01	0.3750	2.544E+11
Cs-134	1.6887E-02	21.48	42.96	0.00E+00	3.63E-01	7.25E-01	0.5750	3.985E+12
Cs-135	3.2195E-05	21.48	42.96	0.00E+00	6.92E-04	1.38E-03	0.8500	7.115E+10
Cs-137	2.4556E+00	21.48	42.96	0.00E+00	5.27E+01	1.05E+02	1.2500	2.139E+12
Eu-154	1.0268E-02	21.48	42.96	0.00E+00	2.21E-01	4.41E-01	1.7500	1.287E+09
Eu-155	1.4570E-02	21.48	42.96	0.00E+00	3.13E-01	6.26E-01	2.2500	6.724E+07
Fe-55	2.0361E-01	21.48	42.96	0.00E+00	4.37E+00	8.75E+00	2.7500	1.113E+06
H-3	8.3940E-03	21.48	42.96	0.00E+00	1.80E-01	3.61E-01	3.5000	1.319E+05
I-129	7.3684E-07	21.48	42.96	0.00E+00	1.58E-05	3.17E-05	5.0000	2.302E+01
Kr-85	1.8286E-01	21.48	42.96	0.00E+00	3.93E+00	7.86E+00	7.0000	2.604E+00
Np-237	1.2462E-06	21.48	42.96	0.00E+00	2.68E-05	5.35E-05	11.0000	2.966E-01
Pa-231	4.9143E-09	21.48	42.96	0.00E+00	1.06E-07	2.11E-07		
Pb-210	1.7173E-14	21.48	42.96	0.00E+00	3.69E-13	7.38E-13		
Pm-147	5.6165E-01	21.48	42.96	0.00E+00	1.21E+01	2.41E+01		
Pu-238	9.9820E-04	21.48	42.96	0.00E+00	2.14E-02	4.29E-02		
Pu-239	5.5293E-03	21.48	42.96	0.00E+00	1.19E-01	2.38E-01		
Pu-240	2.1263E-03	21.48	42.96	0.00E+00	4.57E-02	9.13E-02		
Pu-241	8.0165E-02	21.48	42.96	0.00E+00	1.72E+00	3.44E+00		
Pu-242	2.3128E-07	21.48	42.96	0.00E+00	4.97E-06	9.94E-06		
Ra-226	9.9774E-14	21.48	42.96	0.00E+00	2.14E-12	4.29E-12		
Ra-228	2.1729E-10	21.48	42.96	0.00E+00	4.67E-09	9.33E-09		
Ru-106	2.9519E-03	21.48	42.96	0.00E+00	6.34E-02	1.27E-01		
Se-79	1.3017E-05	21.48	42.96	0.00E+00	2.80E-04	5.59E-04		
Sn-126	1.2167E-05	21.48	42.96	0.00E+00	2.61E-04	5.23E-04		
Sr-90	2.3128E+00	21.48	42.96	0.00E+00	4.97E+01	9.94E+01		
Tc-99	4.4241E-04	21.48	42.96	0.00E+00	9.50E-03	1.90E-02		
Th-229	1.9459E-10	21.48	42.96	0.00E+00	4.18E-09	8.36E-09		
Th-230	2.5564E-11	21.48	42.96	0.00E+00	5.49E-10	1.10E-09		
Th-232	2.5278E-10	21.48	42.96	0.00E+00	5.43E-09	1.09E-08		
Ti-208	1.6947E-08	21.48	42.96	0.00E+00	3.64E-07	7.28E-07		
U-232	4.6812E-08	21.48	42.96	0.00E+00	1.01E-06	2.01E-06		
U-233	1.2206E-07	21.48	42.96	0.00E+00	2.62E-06	5.24E-06		
U-234	1.7323E-07	21.48	42.96	0.00E+00	3.72E-06	7.44E-06		
U-235	-2.6194E-06	21.48	0.00	4.16E-04	3.60E-04	4.16E-04		
U-236	1.2693E-05	21.48	42.96	0.00E+00	2.73E-04	5.45E-04		
U-238	-3.6331E-08	21.48	0.00	2.62E-04	2.61E-04	2.62E-04		
Y-90	2.3128E+00	21.48	42.96	0.00E+00	4.97E+01	9.94E+01		
Other Radionuclides					5.27E+01	1.05E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	19.81481481	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	2.37	21.48
Bounding		42.96

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.65	9.07
Bounding	1.30	

Estimated EOL HM/Given EOL HM

1.00

¹ Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

² Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 8.520 HEIDELBERG
SNF ID # 1044
Fuel Units & Descr. 56 - ELEMENT
Heavy Metal Mass BOL=10 713kg EOL=10.556kg
ROD Storage Site INEEL

¹Fuel decay start date 2006
Estimates as of 2010
Template TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT) 0 000195
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0 50

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	8 5173E-10	208 81	417 63	0 00E+00	1 78E-07	3 56E-07	Avg MeV	
Am-241	1 8331E-03	208 81	417 63	0 00E+00	3 83E-01	7 66E-01	0 0150	6 750E+13
Am-242m	1 4129E-06	208 81	417 63	0 00E+00	2 95E-04	5 90E-04	0 0250	1 485E+13
Am-243	1 4774E-07	208 81	417 63	0 00E+00	3 09E-05	6 17E-05	0 0375	1 265E+13
C-14	1 2871E-04	208 81	417 63	0 00E+00	2 69E-02	5 38E-02	0 0575	1 298E+13
Cl-36	2 8120E-06	208 81	417 63	0 00E+00	5 87E-04	1 17E-03	0 0850	8 043E+12
Cm-243	1 7940E-07	208 81	417 63	0 00E+00	3 75E-05	7 49E-05	0 1250	5 841E+12
Cm-244	1 6962E-06	208 81	417 63	0 00E+00	3 54E-04	7 08E-04	0 2250	6 823E+12
Co-60	1 2839E+00	208 81	417 63	0 00E+00	2 68E+02	5 36E+02	0 3750	3 462E+12
Cs-134	9 0541E-02	208 81	417 63	0 00E+00	1 89E+01	3 78E+01	0 5750	4 603E+13
Cs-135	3 2195E-05	208 81	417 63	0 00E+00	6 72E-03	1 34E-02	0 8500	1 976E+12
Cs-137	2 7564E+00	208 81	417 63	0 00E+00	5 76E+02	1 15E+03	1 2500	4 012E+13
Eu-154	1 5368E-02	208 81	417 63	0 00E+00	3 21E+00	6 42E+00	1 7500	2 674E+10
Eu-155	2 9293E-02	208 81	417 63	0 00E+00	6 12E+00	1 22E+01	2 2500	4 311E+10
Fe-55	7 7158E-01	208 81	417 63	0 00E+00	1 61E+02	3 22E+02	2 7500	3 421E+08
H-3	1 1111E-02	208 81	417 63	0 00E+00	2 32E+00	4 64E+00	3 5000	3 981E+07
I-129	7 3684E-07	208 81	417 63	0 00E+00	1 54E-04	3 08E-04	5 0000	2 255E+02
Kr-85	2 5263E-01	208 81	417 63	0 00E+00	5 28E+01	1 06E+02	7 0000	2 554E+01
Np-237	1 2427E-06	208 81	417 63	0 00E+00	2 59E-04	5 19E-04	11 0000	2 910E+00
Pa-231	3 8511E-09	208 81	417 63	0 00E+00	8 04E-07	1 61E-06		
Pb-210	7 3880E-15	208 81	417 63	0 00E+00	1 54E-12	3 09E-12		
Pm-147	2 1023E+00	208 81	417 63	0 00E+00	4 39E+02	8 78E+02		
Pu-238	1 0383E-03	208 81	417 63	0 00E+00	2 17E-01	4 34E-01		
Pu-239	5 5293E-03	208 81	417 63	0 00E+00	1 15E+00	2 31E+00		
Pu-240	2 1278E-03	208 81	417 63	0 00E+00	4 44E-01	8 89E-01		
Pu-241	1 0195E-01	208 81	417 63	0 00E+00	2 13E+01	4 26E+01		
Pu-242	2 3128E-07	208 81	417 63	0 00E+00	4 83E-05	9 66E-05		
Ra-226	5 2782E-14	208 81	417 63	0 00E+00	1 10E-11	2 20E-11		
Ra-228	1 9338E-10	208 81	417 63	0 00E+00	4 04E-08	8 08E-08		
Ru-106	9 1684E-02	208 81	417 63	0 00E+00	1 91E+01	3 83E+01		
Se-79	1 3018E-05	208 81	417 63	0 00E+00	2 72E-03	5 44E-03		
Sn-126	1 2167E-05	208 81	417 63	0 00E+00	2 54E-03	5 08E-03		
Sr-90	2 6045E+00	208 81	417 63	0 00E+00	5 44E+02	1 09E+03		
Tc-99	4 4241E-04	208 81	417 63	0 00E+00	9 24E-02	1 85E-01		
Th-229	1 3713E-10	208 81	417 63	0 00E+00	2 86E-08	5 73E-08		
Th-230	1 8090E-11	208 81	417 63	0 00E+00	3 78E-09	7 55E-09		
Th-232	2 5278E-10	208 81	417 63	0 00E+00	5 28E-08	1 06E-07		
Tl-208	1 6947E-08	208 81	417 63	0 00E+00	3 54E-06	7 08E-06		
U-232	4 8737E-08	208 81	417 63	0 00E+00	1 02E-05	2 04E-05	Thermal Power	
U-233	1 2203E-07	208 81	417 63	0 00E+00	2 55E-05	5 10E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1 5925E-07	208 81	417 63	0 00E+00	3 33E-05	6 65E-05	1 22E+01	2 43E+01
U-235	-2 6194E-06	208 81	0 00	4 57E-03	4 02E-03	4 57E-03	Total	Total
U-236	1 2693E-05	208 81	417 63	0 00E+00	2 65E-03	5 30E-03		
U-238	-3 6331E-08	208 81	0 00	2 89E-03	2 88E-03	2 89E-03		
Y-90	2 6060E+00	208 81	417 63	0 00E+00	5 44E+02	1 09E+03		
Other Radionuclides					7 53E+02	1 51E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	19 72849245	10 to 20 1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	208 81	149 68
Bounding		417 63

Basis for burnup used in estimate

Nominal burnup taken directly from SFD (converted to MWd)
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 57	0 72
Bounding	1 14	

Estimated EOL HM/Given EOL HM

0 99

¹Reactor shutdown, core removal storage shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 INDONESIA
SNF ID # 475
Fuel Units & Descr: 174 - ELEMENT
Heavy Metal Mass, BOL=33 93kg, EOL=33.251kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2010
Estimates as of, 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd): 6 65
Template BOL Heavy Metal Mass (MT): 0 000195
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
1 57

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 5173E-10	647 80	1 295 59	0 00E+00	5 52E-07	1 10E-06	Avg MeV	
Am-241	1 8331E-03	647 80	1 295 59	0 00E+00	1 19E+00	2 37E+00	0 0150	2 094E+14
Am-242m	1 4129E-06	647 80	1 295 59	0 00E+00	9 15E-04	1 83E-03	0 0250	4 608E+13
Am-243	1 4774E-07	647 80	1 295 59	0 00E+00	9 57E-05	1 91E-04	0 0375	3 924E+13
C-14	1 2871E-04	647 80	1 295 59	0 00E+00	8 34E-02	1 67E-01	0 0575	4 027E+13
Cf-256	2 8120E-06	647 80	1 295 59	0 00E+00	1 82E-03	3 64E-03	0 0850	2 495E+13
Cm-243	1 7940E-07	647 80	1 295 59	0 00E+00	1 16E-04	2 32E-04	0 1250	1 812E+13
Cm-244	1 6962E-06	647 80	1 295 59	0 00E+00	1 10E-03	2 20E-03	0 2250	2 117E+13
Co-60	1 2839E+00	647 80	1 295 59	0 00E+00	8 32E+02	1 66E+03	0 3750	1 074E+13
Cs-134	9 0541E-02	647 80	1 295 59	0 00E+00	5 87E+01	1 17E+02	0 5750	1 428E+14
Cs-135	3 2195E-05	647 80	1 295 59	0 00E+00	2 09E-02	4 17E-02	0 8500	6 129E+12
Cs-137	2 7564E+00	647 80	1 295 59	0 00E+00	1 79E+03	3 57E+03	1 2500	1 245E+14
Eu-154	1 5368E-02	647 80	1 295 59	0 00E+00	9 96E+00	1 99E+01	1 7500	8 296E+10
Eu-155	2 9293E-02	647 80	1 295 59	0 00E+00	1 90E+01	3 80E+01	2 2500	1 337E+11
Fe-55	7 7158E-01	647 80	1 295 59	0 00E+00	5 00E+02	1 00E+03	2 7500	1 061E+09
H-3	1 1111E-02	647 80	1 295 59	0 00E+00	7 20E+00	1 44E+01	3 5000	1 235E+08
I-129	7 3684E-07	647 80	1 295 59	0 00E+00	4 77E-04	9 55E-04	5 0000	7 001E+02
Kr-85	2 5263E-01	647 80	1 295 59	0 00E+00	1 64E+02	3 27E+02	7 0000	7 927E+01
Np-237	1 2427E-06	647 80	1 295 59	0 00E+00	8 05E-04	1 61E-03	11 0000	9 032E+00
Pa-231	3 8511E-09	647 80	1 295 59	0 00E+00	2 49E-06	4 99E-06		
Pb-210	7 3880E-15	647 80	1 295 59	0 00E+00	4 79E-12	9 57E-12		
Pm-147	2 1023E+00	647 80	1 295 59	0 00E+00	1 36E+03	2 72E+03		
Pu-238	1 0383E-03	647 80	1 295 59	0 00E+00	6 73E-01	1 35E+00		
Pu-239	5 5293E-03	647 80	1 295 59	0 00E+00	3 58E+00	7 16E+00		
Pu-240	2 1278E-03	647 80	1 295 59	0 00E+00	1 38E+00	2 76E+00		
Pu-241	1 0195E-01	647 80	1 295 59	0 00E+00	6 60E+01	1 32E+02		
Pu-242	2 3128E-07	647 80	1 295 59	0 00E+00	1 50E-04	3 00E-04		
Ra-226	5 2782E-14	647 80	1 295 59	0 00E+00	3 42E-11	6 84E-11		
Ra-228	1 9338E-10	647 80	1 295 59	0 00E+00	1 25E-07	2 51E-07		
Ru-106	9 1684E-02	647 80	1 295 59	0 00E+00	5 94E+01	1 19E+02		
Se-79	1 3018E-05	647 80	1 295 59	0 00E+00	8 43E-03	1 69E-02		
Sn-126	1 2167E-05	647 80	1 295 59	0 00E+00	7 88E-03	1 58E-02		
Sr-90	2 6045E+00	647 80	1 295 59	0 00E+00	1 69E+03	3 37E+03		
Tc-99	4 4241E-04	647 80	1 295 59	0 00E+00	2 87E-01	5 73E-01		
Th-229	1 3713E-10	647 80	1 295 59	0 00E+00	8 88E-08	1 78E-07		
Th-230	1 8090E-11	647 80	1 295 59	0 00E+00	1 17E-08	2 34E-08		
Th-232	2 5278E-10	647 80	1 295 59	0 00E+00	1 64E-07	3 28E-07		
Ti-208	1 6947E-08	647 80	1 295 59	0 00E+00	1 10E-05	2 20E-05		
U-232	4 8737E-08	647 80	1 295 59	0 00E+00	3 16E-05	6 31E-05		
U-233	1 2203E-07	647 80	1 295 59	0 00E+00	7 91E-05	1 58E-04		
U-234	1 5925E-07	647 80	1 295 59	0 00E+00	1 03E-04	2 06E-04		
U-235	-2 6194E-06	647 80	0 00	1 47E-02	1 30E-02	1 47E-02		
U-236	1 2693E-05	647 80	1 295 59	0 00E+00	8 22E-03	1 64E-02		
U-238	-3 6331E-08	647 80	0 00	9 12E-03	9 10E-03	9 12E-03		
Y-90	2 6060E+00	647 80	1 295 59	0 00E+00	1 69E+03	3 38E+03		
Other Radionuclides					2 34E+03	4 67E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3 77E+01	7 54E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %:	20 0000041	10 to 20 1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	330 68	647 80
Bounding		1 295 59

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 56	1 96
Bounding	1 12	

Estimated EOL HM/Given EOL HM

1 00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 8 5/20 INDONESIA
SNF ID # 476
Fuel Units & Descr. 71 - ELEMENT
Heavy Metal Mass BOL=13.845kg EOL=13.568kg
ROD Storage Site INEEL

¹Fuel decay start date 2010
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20% U)
²Template Burnup(MWd) 6.65
Template BOL Heavy Metal Mass (MT) 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.64

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	264.33	528.66	0.00E+00	2.25E-07	4.50E-07	Avg MeV	
Am-241	1.8331E-03	264.33	528.66	0.00E+00	4.85E-01	9.69E-01	0.0150	8.544E+13
Am-242m	1.4129E-06	264.33	528.66	0.00E+00	3.73E-04	7.47E-04	0.0250	1.880E+13
Am-243	1.4774E-07	264.33	528.66	0.00E+00	3.91E-05	7.81E-05	0.0375	1.601E+13
C-14	1.2871E-04	264.33	528.66	0.00E+00	3.40E-02	6.80E-02	0.0575	1.643E+13
Cl-36	2.8120E-06	264.33	528.66	0.00E+00	7.43E-04	1.49E-03	0.0850	1.018E+13
Cm-243	1.7940E-07	264.33	528.66	0.00E+00	4.74E-05	9.48E-05	0.1250	7.393E+12
Cm-244	1.6962E-06	264.33	528.66	0.00E+00	4.48E-04	8.97E-04	0.2250	8.637E+12
Co-60	1.2839E+00	264.33	528.66	0.00E+00	3.39E+02	6.79E+02	0.3750	4.383E+12
Cs-134	9.0541E-02	264.33	528.66	0.00E+00	2.39E+01	4.79E+01	0.5750	5.827E+13
Cs-135	3.2195E-05	264.33	528.66	0.00E+00	8.51E-03	1.70E-02	0.8500	2.501E+12
Cs-137	2.7564E+00	264.33	528.66	0.00E+00	7.29E+02	1.46E+03	1.2500	5.079E+13
Eu-154	1.5368E-02	264.33	528.66	0.00E+00	4.06E+00	8.12E+00	1.7500	3.385E+10
Eu-155	2.9293E-02	264.33	528.66	0.00E+00	7.74E+00	1.55E+01	2.2500	5.457E+10
Fe-55	7.7158E-01	264.33	528.66	0.00E+00	2.04E+02	4.08E+02	2.7500	4.330E+08
H-3	1.1111E-02	264.33	528.66	0.00E+00	2.94E+00	5.87E+00	3.5000	5.039E+07
I-129	7.3684E-07	264.33	528.66	0.00E+00	1.95E-04	3.90E-04	5.0000	2.857E+02
Kr-85	2.5263E-01	264.33	528.66	0.00E+00	6.68E+01	1.34E+02	7.0000	3.235E+01
Np-237	1.2427E-06	264.33	528.66	0.00E+00	3.28E-04	6.57E-04	11.0000	3.685E+00
Pa-231	3.8511E-09	264.33	528.66	0.00E+00	1.02E-06	2.04E-06		
Pb-210	7.3880E-15	264.33	528.66	0.00E+00	1.95E-12	3.91E-12		
Pm-147	2.1023E+00	264.33	528.66	0.00E+00	5.56E+02	1.11E+03		
Pu-238	1.0383E-03	264.33	528.66	0.00E+00	2.74E-01	5.49E-01		
Pu-239	5.5293E-03	264.33	528.66	0.00E+00	1.46E+00	2.92E+00		
Pu-240	2.1278E-03	264.33	528.66	0.00E+00	5.62E-01	1.12E+00		
Pu-241	1.0195E-01	264.33	528.66	0.00E+00	2.69E+01	5.39E+01		
Pu-242	2.3128E-07	264.33	528.66	0.00E+00	6.11E-05	1.22E-04		
Ra-226	5.2782E-14	264.33	528.66	0.00E+00	1.40E-11	2.79E-11		
Ra-228	1.9338E-10	264.33	528.66	0.00E+00	5.11E-08	1.02E-07		
Ru-106	9.1684E-02	264.33	528.66	0.00E+00	2.42E+01	4.85E+01		
Se-79	1.3018E-05	264.33	528.66	0.00E+00	3.44E-03	6.88E-03		
Sn-126	1.2167E-05	264.33	528.66	0.00E+00	3.22E-03	6.43E-03		
Sr-90	2.6045E+00	264.33	528.66	0.00E+00	6.88E+02	1.38E+03		
Tc-99	4.4241E-04	264.33	528.66	0.00E+00	1.17E-01	2.34E-01		
Th-229	1.3713E-10	264.33	528.66	0.00E+00	3.62E-08	7.25E-08		
Th-230	1.8090E-11	264.33	528.66	0.00E+00	4.78E-09	9.56E-09		
Th-232	2.5278E-10	264.33	528.66	0.00E+00	6.68E-08	1.34E-07		
Ti-208	1.6947E-08	264.33	528.66	0.00E+00	4.48E-06	8.96E-06		
U-232	4.8737E-08	264.33	528.66	0.00E+00	1.29E-05	2.58E-05	Thermal Power	
U-233	1.2203E-07	264.33	528.66	0.00E+00	3.23E-05	6.45E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.5925E-07	264.33	528.66	0.00E+00	4.21E-05	8.42E-05	1.54E+01	3.08E+01
U-235	-2.6194E-06	264.33	0.00	5.98E-03	5.29E-03	5.98E-03	Total	Total
U-236	1.2693E-05	264.33	528.66	0.00E+00	3.36E-03	6.71E-03		
U-238	-3.6331E-08	264.33	0.00	3.72E-03	3.71E-03	3.72E-03		
Y-90	2.6060E+00	264.33	528.66	0.00E+00	6.89E+02	1.38E+03		
Other Radionuclides					9.53E+02	1.91E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	20.00000041	10 to 20.1

Basis for Parameter Differences

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	134.93	264.33
Bounding		528.66

Basis for burnup used in estimate

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.56	1.96
Bounding	1.12	

Estimated EOL HM/Given EOL HM

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 520 ITALY

SNF ID #: 477

Fuel Units & Descr: 48 - ELEMENT

Heavy Metal Mass: BOL=9 36kg; EOL=9 173kg

ROD Storage Site: INEEL

¹Fuel decay start date: 2010

Estimates as of: 2010

Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)

²Template Burnup(MWd): 6 65

Template BOL Heavy Metal Mass (MT): 0 000195

Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0 43

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CvMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 5173E-10	178 70	357 41	0 00E+00	1 52E-07	3 04E-07	Avg MeV	
Am-241	1 8331E-03	178 70	357 41	0 00E+00	3 28E-01	6 55E-01	0 0150	5 777E+13
Am-242m	1 4129E-06	178 70	357 41	0 00E+00	2 52E-04	5 05E-04	0 0250	1 271E+13
Am-243	1 4774E-07	178 70	357 41	0 00E+00	2 64E-05	5 28E-05	0 0375	1 082E+13
C-14	1 2871E-04	178 70	357 41	0 00E+00	2 30E-02	4 60E-02	0 0575	1 111E+13
Cl-36	2 8120E-06	178 70	357 41	0 00E+00	5 03E-04	1 01E-03	0 0850	6 883E+12
Cm-243	1 7940E-07	178 70	357 41	0 00E+00	3 21E-05	6 41E-05	0 1250	4 998E+12
Cm-244	1 6962E-06	178 70	357 41	0 00E+00	3 03E-04	6 06E-04	0 2250	5 839E+12
Co-60	1 2839E+00	178 70	357 41	0 00E+00	2 29E+02	4 59E+02	0 3750	2 963E+12
Cs-134	9 0541E-02	178 70	357 41	0 00E+00	1 62E+01	3 24E+01	0 5750	3 939E+13
Cs-135	3 2195E-05	178 70	357 41	0 00E+00	5 75E-03	1 15E-02	0 8500	1 691E+12
Cs-137	2 7564E+00	178 70	357 41	0 00E+00	4 93E+02	9 85E+02	1 2500	3 433E+13
Eu-154	1 5368E-02	178 70	357 41	0 00E+00	2 75E+00	5 49E+00	1 7500	2 289E+10
Eu-155	2 9293E-02	178 70	357 41	0 00E+00	5 23E+00	1 05E+01	2 2500	3 689E+10
Fe-55	7 7158E-01	178 70	357 41	0 00E+00	1 38E+02	2 76E+02	2 7500	2 927E+08
H-3	1 1111E-02	178 70	357 41	0 00E+00	1 99E+00	3 97E+00	3 5000	3 407E+07
I-129	7 3684E-07	178 70	357 41	0 00E+00	1 32E-04	2 63E-04	5 0000	1 931E+02
Kr-85	2 5263E-01	178 70	357 41	0 00E+00	4 51E+01	9 03E+01	7 0000	2 187E+01
Np-237	1 2427E-06	178 70	357 41	0 00E+00	2 22E-04	4 44E-04	11 0000	2 492E+00
Pa-231	3 8511E-09	178 70	357 41	0 00E+00	6 88E-07	1 38E-06		
Pb-210	7 3880E-15	178 70	357 41	0 00E+00	1 32E-12	2 64E-12		
Pm-147	2 1023E+00	178 70	357 41	0 00E+00	3 76E+02	7 51E+02		
Pu-238	1 0383E-03	178 70	357 41	0 00E+00	1 86E-01	3 71E-01		
Pu-239	5 5293E-03	178 70	357 41	0 00E+00	9 88E-01	1 98E+00		
Pu-240	2 1278E-03	178 70	357 41	0 00E+00	3 80E-01	7 60E-01		
Pu-241	1 0195E-01	178 70	357 41	0 00E+00	1 82E+01	3 64E+01		
Pu-242	2 3128E-07	178 70	357 41	0 00E+00	4 13E-05	8 27E-05		
Ra-226	5 2782E-14	178 70	357 41	0 00E+00	9 43E-12	1 89E-11		
Ra-228	1 9338E-10	178 70	357 41	0 00E+00	3 46E-08	6 91E-08		
Ru-106	9 1684E-02	178 70	357 41	0 00E+00	1 64E+01	3 28E+01		
Se-79	1 3018E-05	178 70	357 41	0 00E+00	2 33E-03	4 65E-03		
Sn-126	1 2167E-05	178 70	357 41	0 00E+00	2 17E-03	4 35E-03		
Sr-90	2 6045E+00	178 70	357 41	0 00E+00	4 65E+02	9 31E+02		
Tc-99	4 4241E-04	178 70	357 41	0 00E+00	7 91E-02	1 58E-01		
Th-229	1 3713E-10	178 70	357 41	0 00E+00	2 45E-08	4 90E-08		
Th-230	1 8090E-11	178 70	357 41	0 00E+00	3 23E-09	6 47E-09		
Th-232	2 5278E-10	178 70	357 41	0 00E+00	4 52E-08	9 03E-08		
Th-208	1 6947E-08	178 70	357 41	0 00E+00	3 03E-06	6 06E-06		
U-232	4 8737E-08	178 70	357 41	0 00E+00	8 71E-06	1 74E-05		
U-233	1 2203E-07	178 70	357 41	0 00E+00	2 18E-05	4 36E-05		
U-234	1 5925E-07	178 70	357 41	0 00E+00	2 85E-05	5 69E-05		
U-235	-2 6194E-06	178 70	0 00	4 05E-03	3 58E-03	4 05E-03		
U-236	1 2693E-05	178 70	357 41	0 00E+00	2 27E-03	4 54E-03		
U-238	-3 6331E-08	178 70	0 00	2 52E-03	2 51E-03	2 52E-03		
Y-90	2 6060E+00	178 70	357 41	0 00E+00	4 66E+02	9 31E+02		
Other Radionuclides					6 44E+02	1 29E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	20	10 to 20 1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	91 22	178 70
Bounding		357 41

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 56	1 96
Bounding	1 12	

Estimated EOL HM/Given EOL HM

1 00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 8.5/20 ITALY
SNF ID #: 478
Fuel Units & Descr: 71 - ELEMENT
Heavy Metal Mass BOL=13.639kg EOL=12.837kg
ROD Storage Site INEEL

¹Fuel decay start date: 1999
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd) 6.65
Template BOL Heavy Metal Mass (MT) 0.000195
Template Decay Time 10 years

Estimated
Canister usage
18"x10"
0.64

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3731E-09	765.88	1,531.76	0.00E+00	1.05E-06	2.10E-06	Avg MeV	
Am-241	2.3865E-03	765.88	1,531.76	0.00E+00	1.83E+00	3.66E+00	0.0150	1.979E+14
Am-242m	1.3812E-06	765.88	1,531.76	0.00E+00	1.06E-03	2.12E-03	0.0250	4.192E+13
Am-243	1.4767E-07	765.88	1,531.76	0.00E+00	1.13E-04	2.26E-04	0.0375	3.581E+13
C-14	1.2863E-04	765.88	1,531.76	0.00E+00	9.85E-02	1.97E-01	0.0575	3.816E+13
Cl-36	2.8120E-06	765.88	1,531.76	0.00E+00	2.15E-03	4.31E-03	0.0850	2.315E+13
Co-243	1.5895E-07	765.88	1,531.76	0.00E+00	1.22E-04	2.43E-04	0.1250	1.522E+13
Co-244	1.4008E-06	765.88	1,531.76	0.00E+00	1.07E-03	2.15E-03	0.2250	1.975E+13
Co-60	6.6541E-01	765.88	1,531.76	0.00E+00	5.10E+02	1.02E+03	0.3750	9.071E+12
Cs-134	1.6887E-02	765.88	1,531.76	0.00E+00	1.29E+01	2.59E+01	0.5750	1.421E+14
Cs-135	3.2195E-05	765.88	1,531.76	0.00E+00	2.47E-02	4.93E-02	0.8500	2.537E+12
Cs-137	2.4556E+00	765.88	1,531.76	0.00E+00	1.88E+03	3.76E+03	1.2500	7.628E+13
Eu-154	1.0268E-02	765.88	1,531.76	0.00E+00	7.86E+00	1.57E+01	1.7500	4.590E+10
Eu-155	1.4570E-02	765.88	1,531.76	0.00E+00	1.12E+01	2.23E+01	2.2500	2.397E+09
Fe-55	2.0361E-01	765.88	1,531.76	0.00E+00	1.56E+02	3.12E+02	2.7500	3.969E+07
H-3	8.3940E-03	765.88	1,531.76	0.00E+00	6.43E+00	1.29E+01	3.5000	4.703E+06
I-129	7.3684E-07	765.88	1,531.76	0.00E+00	5.64E-04	1.13E-03	5.0000	8.078E+02
Kr-85	1.8286E-01	765.88	1,531.76	0.00E+00	1.40E+02	2.80E+02	7.0000	9.136E+01
Np-237	1.2462E-06	765.88	1,531.76	0.00E+00	9.54E-04	1.91E-03	11.0000	1.040E+01
Pa-231	4.9143E-09	765.88	1,531.76	0.00E+00	3.76E-06	7.53E-06		
Pb-210	1.7173E-14	765.88	1,531.76	0.00E+00	1.32E-11	2.63E-11		
Pm-147	5.6165E-01	765.88	1,531.76	0.00E+00	4.30E+02	8.60E+02		
Pu-238	9.9820E-04	765.88	1,531.76	0.00E+00	7.64E-01	1.53E+00		
Pu-239	5.5293E-03	765.88	1,531.76	0.00E+00	4.23E+00	8.47E+00		
Pu-240	2.1263E-03	765.88	1,531.76	0.00E+00	1.63E+00	3.26E+00		
Pu-241	8.0165E-02	765.88	1,531.76	0.00E+00	6.14E+01	1.23E+02		
Pu-242	2.3128E-07	765.88	1,531.76	0.00E+00	1.77E-04	3.54E-04		
Ra-226	9.9774E-14	765.88	1,531.76	0.00E+00	7.64E-11	1.53E-10		
Ra-228	2.1729E-10	765.88	1,531.76	0.00E+00	1.66E-07	3.33E-07		
Ru-106	2.9519E-03	765.88	1,531.76	0.00E+00	2.26E+00	4.52E+00		
Se-79	1.3017E-05	765.88	1,531.76	0.00E+00	9.97E-03	1.99E-02		
Sn-126	1.2167E-05	765.88	1,531.76	0.00E+00	9.32E-03	1.86E-02		
Sr-90	2.3128E+00	765.88	1,531.76	0.00E+00	1.77E+03	3.54E+03		
Tc-99	4.4241E-04	765.88	1,531.76	0.00E+00	3.39E-01	6.78E-01		
Th-229	1.9459E-10	765.88	1,531.76	0.00E+00	1.49E-07	2.98E-07		
Th-230	2.5564E-11	765.88	1,531.76	0.00E+00	1.96E-08	3.92E-08		
Th-232	2.5278E-10	765.88	1,531.76	0.00E+00	1.94E-07	3.87E-07		
Ti-208	1.6947E-08	765.88	1,531.76	0.00E+00	1.30E-05	2.60E-05		
U-232	4.6812E-08	765.88	1,531.76	0.00E+00	3.59E-05	7.17E-05		
U-233	1.2206E-07	765.88	1,531.76	0.00E+00	9.35E-05	1.87E-04		
U-234	1.7323E-07	765.88	1,531.76	0.00E+00	1.33E-04	2.65E-04		
U-235	-2.6194E-06	765.88	0.00	5.90E-03	3.90E-03	5.90E-03		
U-236	1.2693E-05	765.88	1,531.76	0.00E+00	9.72E-03	1.94E-02		
U-238	-3.6331E-08	765.88	0.00	3.67E-03	3.64E-03	3.67E-03		
Y-90	2.3128E+00	765.88	1,531.76	0.00E+00	1.77E+03	3.54E+03		
Other Radionuclides					1.88E+03	3.76E+03		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %	20.02640698	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	465.24	765.88
Bounding		1,531.76

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	1.65	1.65
Bounding	3.29	

Estimated EOL HM/Given EOL HM
1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 ITALY
 SNF ID #: 1080
 Fuel Units & Descr: 140 - ELEMENT
 Heavy Metal Mass: BOL=26.894kg EOL=25.312kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2006
 Estimates as of: 2010
 Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
 Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage
 18"x10"
 1.26

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b		
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	1,510.19	3,020.38	0.00E+00	1.29E-06	2.57E-06	Avg MeV	
Am-241	1.8331E-03	1,510.19	3,020.38	0.00E+00	2.77E+00	5.54E+00	0.0150	4.882E+14
Am-242m	1.4129E-06	1,510.19	3,020.38	0.00E+00	2.13E-03	4.27E-03	0.0250	1.074E+14
Am-243	1.4774E-07	1,510.19	3,020.38	0.00E+00	2.23E-04	4.46E-04	0.0375	9.147E+13
C-14	1.2871E-04	1,510.19	3,020.38	0.00E+00	1.94E-01	3.89E-01	0.0575	9.389E+13
Ct-36	2.8120E-06	1,510.19	3,020.38	0.00E+00	4.25E-03	8.49E-03	0.0850	5.817E+13
Cm-243	1.7940E-07	1,510.19	3,020.38	0.00E+00	2.71E-04	5.42E-04	0.1250	4.224E+13
Cm-244	1.6962E-06	1,510.19	3,020.38	0.00E+00	2.56E-03	5.12E-03	0.2250	4.934E+13
Co-60	1.2839E+00	1,510.19	3,020.38	0.00E+00	1.94E+03	3.88E+03	0.3750	2.504E+13
Cs-134	9.0541E-02	1,510.19	3,020.38	0.00E+00	1.37E+02	2.73E+02	0.5750	3.329E+14
Cs-135	3.2195E-05	1,510.19	3,020.38	0.00E+00	4.86E-02	9.72E-02	0.8500	1.429E+13
Cs-137	2.7564E+00	1,510.19	3,020.38	0.00E+00	4.16E+03	8.33E+03	1.2500	2.902E+14
Eu-154	1.5368E-02	1,510.19	3,020.38	0.00E+00	2.32E+01	4.64E+01	1.7500	1.934E+11
Eu-155	2.9293E-02	1,510.19	3,020.38	0.00E+00	4.42E+01	8.85E+01	2.2500	3.118E+11
Fe-55	7.7158E-01	1,510.19	3,020.38	0.00E+00	1.17E+03	2.33E+03	2.7500	2.474E+09
H-3	1.1111E-02	1,510.19	3,020.38	0.00E+00	1.68E+01	3.36E+01	3.5000	2.879E+08
I-129	7.3684E-07	1,510.19	3,020.38	0.00E+00	1.11E-03	2.23E-03	5.0000	1.600E+03
Kr-85	2.5263E-01	1,510.19	3,020.38	0.00E+00	3.82E+02	7.63E+02	7.0000	1.811E+02
Np-237	1.2427E-06	1,510.19	3,020.38	0.00E+00	1.88E-03	3.75E-03	11.0000	2.063E+01
Pa-231	3.8511E-09	1,510.19	3,020.38	0.00E+00	5.82E-06	1.16E-05		
Pb-210	7.3880E-15	1,510.19	3,020.38	0.00E+00	1.12E-11	2.23E-11		
Pm-147	2.1023E+00	1,510.19	3,020.38	0.00E+00	3.17E+03	6.35E+03		
Pu-238	1.0383E-03	1,510.19	3,020.38	0.00E+00	1.57E+00	3.14E+00		
Pu-239	5.5293E-03	1,510.19	3,020.38	0.00E+00	8.35E+00	1.67E+01		
Pu-240	2.1278E-03	1,510.19	3,020.38	0.00E+00	3.21E+00	6.43E+00		
Pu-241	1.0195E-01	1,510.19	3,020.38	0.00E+00	1.54E+02	3.08E+02		
Pu-242	2.3128E-07	1,510.19	3,020.38	0.00E+00	3.49E-04	6.99E-04		
Ra-226	5.2782E-14	1,510.19	3,020.38	0.00E+00	7.97E-11	1.59E-10		
Ra-228	1.9338E-10	1,510.19	3,020.38	0.00E+00	2.92E-07	5.84E-07		
Ru-106	9.1684E-02	1,510.19	3,020.38	0.00E+00	1.38E+02	2.77E+02		
Se-79	1.3018E-05	1,510.19	3,020.38	0.00E+00	1.97E-02	3.93E-02		
Sn-126	1.2167E-05	1,510.19	3,020.38	0.00E+00	1.84E-02	3.67E-02		
Sr-90	2.6045E+00	1,510.19	3,020.38	0.00E+00	3.93E+03	7.87E+03		
Tc-99	4.4241E-04	1,510.19	3,020.38	0.00E+00	6.68E-01	1.34E+00		
Th-229	1.3713E-10	1,510.19	3,020.38	0.00E+00	2.07E-07	4.14E-07		
Th-230	1.8090E-11	1,510.19	3,020.38	0.00E+00	2.73E-08	5.46E-08		
Th-232	2.5278E-10	1,510.19	3,020.38	0.00E+00	3.82E-07	7.63E-07		
Ti-208	1.6947E-08	1,510.19	3,020.38	0.00E+00	2.56E-05	5.12E-05		
U-232	4.8737E-08	1,510.19	3,020.38	0.00E+00	7.36E-05	1.47E-04		
U-233	1.2203E-07	1,510.19	3,020.38	0.00E+00	1.84E-04	3.69E-04		
U-234	1.5925E-07	1,510.19	3,020.38	0.00E+00	2.40E-04	4.81E-04		
U-235	-2.6194E-06	1,510.19	0.00	1.16E-02	7.68E-03	1.16E-02		
U-236	1.2693E-05	1,510.19	3,020.38	0.00E+00	1.92E-02	3.83E-02		
U-238	-3.6331E-08	1,510.19	0.00	7.23E-03	7.17E-03	7.23E-03		
Y-90	2.6060E+00	1,510.19	3,020.38	0.00E+00	3.94E+03	7.87E+03		
Other Radionuclides					5.44E+03	1.09E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20.026	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	917.38	1,510.19	
Bounding		3,020.38	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	1.65	1.65	
Bounding	3.29		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 8 5/20 JAPAN
SNF ID # 479
Fuel Units & Descr 73 - ELEMENT
Heavy Metal Mass BOL=14.235kg EOL=14 089kg
ROD Storage Site INEEL

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd) 6.65
Template BOL Heavy Metal Mass (MT) 0 000195
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0.66

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	139.37	278.75	0.00E+00	1.19E-07	2.37E-07	Avg MeV	
Am-241	1.8331E-03	139.37	278.75	0.00E+00	2.55E-01	5.11E-01	0.0150	4.505E+13
Am-242m	1.4129E-06	139.37	278.75	0.00E+00	1.97E-04	3.94E-04	0.0250	9.913E+12
Am-243	1.4774E-07	139.37	278.75	0.00E+00	2.06E-05	4.12E-05	0.0375	8.442E+12
C-14	1.2871E-04	139.37	278.75	0.00E+00	1.79E-02	3.59E-02	0.0575	8.665E+12
Cf-252	2.8120E-06	139.37	278.75	0.00E+00	3.92E-04	7.84E-04	0.0850	5.368E+12
Cm-243	1.7940E-07	139.37	278.75	0.00E+00	2.50E-05	5.00E-05	0.1250	3.898E+12
Cm-244	1.6962E-06	139.37	278.75	0.00E+00	2.36E-04	4.73E-04	0.2250	4.554E+12
Co-60	1.2839E+00	139.37	278.75	0.00E+00	1.79E+02	3.58E+02	0.3750	2.311E+12
Cs-134	9.0541E-02	139.37	278.75	0.00E+00	1.26E+01	2.52E+01	0.6750	3.072E+13
Cs-135	3.2195E-05	139.37	278.75	0.00E+00	4.49E-03	8.97E-03	0.8500	1.319E+12
Cs-137	2.7564E+00	139.37	278.75	0.00E+00	3.84E+02	7.68E+02	1.2500	2.678E+13
Eu-154	1.5368E-02	139.37	278.75	0.00E+00	2.14E+00	4.28E+00	1.7500	1.785E+10
Eu-155	2.9293E-02	139.37	278.75	0.00E+00	4.08E+00	8.17E+00	2.2500	2.877E+10
Fe-55	7.7158E-01	139.37	278.75	0.00E+00	1.08E+02	2.15E+02	2.7500	2.283E+08
H-3	1.1111E-02	139.37	278.75	0.00E+00	1.55E+00	3.10E+00	3.5000	2.657E+07
I-129	7.3684E-07	139.37	278.75	0.00E+00	1.03E-04	2.05E-04	5.0000	1.549E+02
Kr-85	2.5263E-01	139.37	278.75	0.00E+00	3.52E+01	7.04E+01	7.0000	1.755E+01
Np-237	1.2427E-06	139.37	278.75	0.00E+00	1.73E-04	3.46E-04	11.0000	2.000E+00
Pa-231	3.8511E-09	139.37	278.75	0.00E+00	5.37E-07	1.07E-06		
Pb-210	7.3880E-15	139.37	278.75	0.00E+00	1.03E-12	2.06E-12		
Pm-147	2.1023E+00	139.37	278.75	0.00E+00	2.93E+02	5.86E+02		
Pu-238	1.0383E-03	139.37	278.75	0.00E+00	1.45E-01	2.89E-01		
Pu-239	5.5293E-03	139.37	278.75	0.00E+00	7.71E-01	1.54E+00		
Pu-240	2.1278E-03	139.37	278.75	0.00E+00	2.97E-01	5.93E-01		
Pu-241	1.0195E-01	139.37	278.75	0.00E+00	1.42E+01	2.84E+01		
Pu-242	2.3128E-07	139.37	278.75	0.00E+00	3.22E-05	6.45E-05		
Ra-226	5.2782E-14	139.37	278.75	0.00E+00	7.36E-12	1.47E-11		
Ra-228	1.9338E-10	139.37	278.75	0.00E+00	2.70E-08	5.39E-08		
Ru-106	9.1684E-02	139.37	278.75	0.00E+00	1.28E+01	2.56E+01		
Se-79	1.3018E-05	139.37	278.75	0.00E+00	1.81E-03	3.63E-03		
Sn-126	1.2167E-05	139.37	278.75	0.00E+00	1.70E-03	3.39E-03		
Sr-90	2.6045E+00	139.37	278.75	0.00E+00	3.63E+02	7.26E+02		
Tc-99	4.4241E-04	139.37	278.75	0.00E+00	6.17E-02	1.23E-01		
Th-229	1.3713E-10	139.37	278.75	0.00E+00	1.91E-08	3.82E-08		
Th-230	1.8090E-11	139.37	278.75	0.00E+00	2.52E-09	5.04E-09		
Th-232	2.5278E-10	139.37	278.75	0.00E+00	3.52E-08	7.05E-08		
Ti-208	1.6947E-08	139.37	278.75	0.00E+00	2.36E-06	4.72E-06		
U-232	4.8737E-08	139.37	278.75	0.00E+00	6.79E-06	1.36E-05		
U-233	1.2203E-07	139.37	278.75	0.00E+00	1.70E-05	3.40E-05		
U-234	1.5925E-07	139.37	278.75	0.00E+00	2.22E-05	4.44E-05		
U-235	-2.6194E-06	139.37	0.00	6.15E-03	5.79E-03	6.15E-03		
U-236	1.2693E-05	139.37	278.75	0.00E+00	1.77E-03	3.54E-03		
U-238	-3.6331E-08	139.37	0.00	3.83E-03	3.82E-03	3.83E-03		
Y-90	2.6060E+00	139.37	278.75	0.00E+00	3.63E+02	7.26E+02		
Other Radionuclides					5.02E+02	1.00E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.11E+00	1.82E+01
Total	Total

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	20	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	138.73	139.37
Bounding		278.75

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.29	1.00
Bounding	0.57	

Estimated EOL HM/Given EOL HM
1.00

¹Reactor shutdown, core removal storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 5/20 KANSAS STATE UNIV
SNF ID #: 253
Fuel Units & Descr: 163 - ELEMENT
Heavy Metal Mass: BOL=31 785kg, EOL=30 481kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd): 6 65
Template BOL Heavy Metal Mass (MT): 0 000195
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
1 47

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 5173E-10	1,244 81	2,489 62	0 00E+00	1 06E-06	2 12E-06	Avg. MeV	
Am-241	1 8331E-03	1,244 81	2,489 62	0 00E+00	2 28E+00	4 56E+00	0 0150	4 024E+14
Am-242m	1 4129E-06	1,244 81	2,489 62	0 00E+00	1 76E-03	3 52E-03	0 0250	8 854E+13
Am-243	1 4774E-07	1,244 81	2,489 62	0 00E+00	1 84E-04	3 68E-04	0 0375	7 540E+13
C-14	1 2871E-04	1,244 81	2,489 62	0 00E+00	1 60E-01	3 20E-01	0 0575	7 739E+13
Cl-36	2 8120E-06	1,244 81	2,489 62	0 00E+00	3 50E-03	7 00E-03	0 0850	4 795E+13
Cm-243	1 7940E-07	1,244 81	2,489 62	0 00E+00	2 23E-04	4 47E-04	0 1250	3 482E+13
Cm-244	1 6962E-06	1,244 81	2,489 62	0 00E+00	2 11E-03	4 22E-03	0 2250	4 067E+13
Co-60	1 2839E+00	1,244 81	2,489 62	0 00E+00	1 60E+03	3 20E+03	0 3750	2 064E+13
Cs-134	9 0541E-02	1,244 81	2,489 62	0 00E+00	1 13E+02	2 25E+02	0 5750	2 744E+14
Cs-135	3 2195E-05	1,244 81	2,489 62	0 00E+00	4 01E-02	8 02E-02	0 8500	1 178E+13
Cs-137	2 7564E+00	1,244 81	2,489 62	0 00E+00	3 43E+03	6 86E+03	1 2500	2 392E+14
Eu-154	1 5368E-02	1,244 81	2,489 62	0 00E+00	1 91E+01	3 83E+01	1 7500	1 594E+11
Eu-155	2 9293E-02	1,244 81	2,489 62	0 00E+00	3 65E+01	7 29E+01	2 2500	2 570E+11
Fe-55	7 7158E-01	1,244 81	2,489 62	0 00E+00	9 60E+02	1 92E+03	2 7500	2 039E+09
H-3	1 1111E-02	1,244 81	2,489 62	0 00E+00	1 38E+01	2 77E+01	3 5000	2 373E+08
I-129	7 3684E-07	1,244 81	2,489 62	0 00E+00	9 17E-04	1 83E-03	5 0000	1 324E+03
Kr-85	2 5263E-01	1,244 81	2,489 62	0 00E+00	3 14E+02	6 29E+02	7 0000	1 499E+02
Np-237	1 2427E-06	1,244 81	2,489 62	0 00E+00	1 55E-03	3 09E-03	11 0000	1 708E+01
Pa-231	3 8511E-09	1,244 81	2,489 62	0 00E+00	4 79E-06	9 59E-06		
Pb-210	7 3880E-15	1,244 81	2,489 62	0 00E+00	9 20E-12	1 84E-11		
Pm-147	2 1023E+00	1,244 81	2,489 62	0 00E+00	2 62E+03	5 23E+03		
Pu-238	1 0383E-03	1,244 81	2,489 62	0 00E+00	1 29E+00	2 59E+00		
Pu-239	5 5293E-03	1,244 81	2,489 62	0 00E+00	6 88E+00	1 38E+01		
Pu-240	2 1278E-03	1,244 81	2,489 62	0 00E+00	2 65E+00	5 30E+00		
Pu-241	1 0195E-01	1,244 81	2,489 62	0 00E+00	1 27E+02	2 54E+02		
Pu-242	2 3128E-07	1,244 81	2,489 62	0 00E+00	2 88E-04	5 76E-04		
Ra-226	5 2782E-14	1,244 81	2,489 62	0 00E+00	6 57E-11	1 31E-10		
Ra-228	1 9338E-10	1,244 81	2,489 62	0 00E+00	2 41E-07	4 81E-07		
Ru-106	9 1684E-02	1,244 81	2,489 62	0 00E+00	1 14E+02	2 28E+02		
Se-79	1 3018E-05	1,244 81	2,489 62	0 00E+00	1 62E-02	3 24E-02		
Sn-126	1 2167E-05	1,244 81	2,489 62	0 00E+00	1 51E-02	3 03E-02		
Sr-90	2 6045E+00	1,244 81	2,489 62	0 00E+00	3 24E+03	6 48E+03		
Tc-99	4 4241E-04	1,244 81	2,489 62	0 00E+00	5 51E-01	1 10E+00		
Th-229	1 3713E-10	1,244 81	2,489 62	0 00E+00	1 71E-07	3 41E-07		
Th-230	1 8090E-11	1,244 81	2,489 62	0 00E+00	2 25E-08	4 50E-08		
Th-232	2 5278E-10	1,244 81	2,489 62	0 00E+00	3 15E-07	6 29E-07		
Ti-208	1 6947E-08	1,244 81	2,489 62	0 00E+00	2 11E-05	4 22E-05		
U-232	4 8737E-08	1,244 81	2,489 62	0 00E+00	6 07E-05	1 21E-04		
U-233	1 2203E-07	1,244 81	2,489 62	0 00E+00	1 52E-04	3 04E-04		
U-234	1 5925E-07	1,244 81	2,489 62	0 00E+00	1 98E-04	3 96E-04		
U-235	-2 6194E-06	1,244 81	0 00	1 37E-02	1 05E-02	1 37E-02		
U-236	1 2693E-05	1,244 81	2,489 62	0 00E+00	1 58E-02	3 16E-02		
U-238	-3 6331E-08	1,244 81	0 00	8 55E-03	8 50E-03	8 55E-03		
Y-90	2 6060E+00	1,244 81	2,489 62	0 00E+00	3 24E+03	6 49E+03		
Other Radionuclides					4 49E+03	8 98E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	LW AND U ZIRC HYDRIDE	Used	
Fuel Cladding:	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20	10 to 20 1	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	774 44	1,244 81	
Bounding		2,489 62	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	1 15	1 61	
Bounding	2 30		1 00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 8 5/20 MEXICO
SNF ID # 482
Fuel Units & Descr: 151 - ELEMENT
Heavy Metal Mass BOL=29 445kg EOL=28 403kg
ROD Storage Site INEEL

¹Fuel decay start date 2006
Estimates as of 2010
Template TRIGA-SS (LW/U-Zrx, SST, 10 to 20% U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT) 0.000195
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
1.36

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	994.60	1,989.21	0.00E+00	8.47E-07	1.69E-06	Avg MeV	
Am-241	1.8331E-03	994.60	1,989.21	0.00E+00	1.82E+00	3.65E+00	0.0150	3.215E+14
Am-242m	1.4129E-06	994.60	1,989.21	0.00E+00	1.41E-03	2.81E-03	0.0250	7.074E+13
Am-243	1.4774E-07	994.60	1,989.21	0.00E+00	1.47E-04	2.94E-04	0.0375	6.024E+13
C-14	1.2871E-04	994.60	1,989.21	0.00E+00	1.28E-01	2.56E-01	0.0575	6.184E+13
Cl-36	2.8120E-06	994.60	1,989.21	0.00E+00	2.80E-03	5.59E-03	0.0850	3.831E+13
Cm-243	1.7940E-07	994.60	1,989.21	0.00E+00	1.78E-04	3.57E-04	0.1250	2.782E+13
Cm-244	1.6962E-06	994.60	1,989.21	0.00E+00	1.69E-03	3.37E-03	0.2250	3.250E+13
Co-60	1.2839E+00	994.60	1,989.21	0.00E+00	1.28E+03	2.55E+03	0.3750	1.649E+13
Cs-134	9.0541E-02	994.60	1,989.21	0.00E+00	9.01E+01	1.80E+02	0.5750	2.192E+14
Cs-135	3.2195E-05	994.60	1,989.21	0.00E+00	3.20E-02	6.40E-02	0.8500	9.410E+12
Cs-137	2.7564E+00	994.60	1,989.21	0.00E+00	2.74E+03	5.48E+03	1.2500	1.911E+14
Eu-154	1.5368E-02	994.60	1,989.21	0.00E+00	1.53E+01	3.06E+01	1.7500	1.274E+11
Eu-155	2.9293E-02	994.60	1,989.21	0.00E+00	2.91E+01	5.83E+01	2.2500	2.053E+11
Fe-55	7.7158E-01	994.60	1,989.21	0.00E+00	7.67E+02	1.53E+03	2.7500	1.629E+09
H-3	1.1111E-02	994.60	1,989.21	0.00E+00	1.11E+01	2.21E+01	3.5000	1.896E+08
I-129	7.3684E-07	994.60	1,989.21	0.00E+00	7.33E-04	1.47E-03	5.0000	1.061E+03
Kr-85	2.5263E-01	994.60	1,989.21	0.00E+00	2.51E+02	5.03E+02	7.0000	1.201E+02
Np-237	1.2427E-06	994.60	1,989.21	0.00E+00	1.24E-03	2.47E-03	11.0000	1.368E+01
Pa-231	3.8511E-09	994.60	1,989.21	0.00E+00	3.83E-06	7.66E-06		
Pb-210	7.3880E-15	994.60	1,989.21	0.00E+00	7.35E-12	1.47E-11		
Pm-147	2.1023E+00	994.60	1,989.21	0.00E+00	2.09E+03	4.18E+03		
Pu-238	1.0383E-03	994.60	1,989.21	0.00E+00	1.03E+00	2.07E+00		
Pu-239	5.5293E-03	994.60	1,989.21	0.00E+00	5.50E+00	1.10E+01		
Pu-240	2.1278E-03	994.60	1,989.21	0.00E+00	2.12E+00	4.23E+00		
Pu-241	1.0195E-01	994.60	1,989.21	0.00E+00	1.01E+02	2.03E+02		
Pu-242	2.3128E-07	994.60	1,989.21	0.00E+00	2.30E-04	4.60E-04		
Ra-226	5.2782E-14	994.60	1,989.21	0.00E+00	5.25E-11	1.05E-10		
Ra-228	1.9338E-10	994.60	1,989.21	0.00E+00	1.92E-07	3.85E-07		
Ru-106	9.1684E-02	994.60	1,989.21	0.00E+00	9.12E+01	1.82E+02		
Se-79	1.3018E-05	994.60	1,989.21	0.00E+00	1.29E-02	2.59E-02		
Sn-126	1.2167E-05	994.60	1,989.21	0.00E+00	1.21E-02	2.42E-02		
Sr-90	2.6045E+00	994.60	1,989.21	0.00E+00	2.59E+03	5.18E+03		
Tc-99	4.4241E-04	994.60	1,989.21	0.00E+00	4.40E-01	8.80E-01		
Th-229	1.3713E-10	994.60	1,989.21	0.00E+00	1.36E-07	2.73E-07		
Th-230	1.8090E-11	994.60	1,989.21	0.00E+00	1.80E-08	3.60E-08		
Th-232	2.5278E-10	994.60	1,989.21	0.00E+00	2.51E-07	5.03E-07		
Ti-208	1.6947E-08	994.60	1,989.21	0.00E+00	1.69E-05	3.37E-05		
U-232	4.8737E-08	994.60	1,989.21	0.00E+00	4.85E-05	9.69E-05		
U-233	1.2203E-07	994.60	1,989.21	0.00E+00	1.21E-04	2.43E-04		
U-234	1.5925E-07	994.60	1,989.21	0.00E+00	1.58E-04	3.17E-04		
U-235	-2.6194E-06	994.60	0.00	1.27E-02	1.01E-02	1.27E-02		
U-236	1.2693E-05	994.60	1,989.21	0.00E+00	1.26E-02	2.52E-02		
U-238	-3.6331E-08	994.60	0.00	7.92E-03	7.88E-03	7.92E-03		
Y-90	2.6060E+00	994.60	1,989.21	0.00E+00	2.59E+03	5.18E+03		
Other Radionuclides					3.59E+03	7.17E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences*
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20.00000041	10 to 20.1	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		994.60	Nominal burnup calculated from the heavy metal mass destroyed
Bounding		1,989.21	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.99		1.00
Bounding	1.98		

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 MNRC

SNF ID #: 254

Fuel Units & Descr: 96 - ELEMENT

Heavy Metal Mass: BOL=17 99kg, EOL=17 933kg

ROD Storage Site: INEEL

¹Fuel decay start date:

2035

Estimates as of:

2010

Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)

²Template Burnup(MWd):

6 65

Template BOL Heavy Metal Mass (MT):

0.000195

Template Decay Time:

5 years

Estimated
Canister usage
18"x10"
0.86

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	350.58	701.16	0.00E+00	2.99E-07	5.97E-07	Avg MeV	
Am-241	1.8331E-03	350.58	701.16	0.00E+00	6.43E-01	1.29E+00	0.0150	1.133E+14
Am-242m	1.4129E-06	350.58	701.16	0.00E+00	4.95E-04	9.91E-04	0.0250	2.494E+13
Am-243	1.4774E-07	350.58	701.16	0.00E+00	5.18E-05	1.04E-04	0.0375	2.124E+13
C-14	1.2871E-04	350.58	701.16	0.00E+00	4.51E-02	9.02E-02	0.0575	2.180E+13
Cl-36	2.8120E-06	350.58	701.16	0.00E+00	9.86E-04	1.97E-03	0.0850	1.350E+13
Cm-243	1.7940E-07	350.58	701.16	0.00E+00	6.29E-05	1.26E-04	0.1250	9.806E+12
Cm-244	1.6962E-06	350.58	701.16	0.00E+00	5.95E-04	1.19E-03	0.2250	1.145E+13
Co-60	1.2839E+00	350.58	701.16	0.00E+00	4.50E+02	9.00E+02	0.3750	5.813E+12
Cs-134	9.0541E-02	350.58	701.16	0.00E+00	3.17E+01	6.35E+01	0.5750	7.728E+13
Cs-135	3.2195E-05	350.58	701.16	0.00E+00	1.13E-02	2.26E-02	0.8500	3.317E+12
Cs-137	2.7564E+00	350.58	701.16	0.00E+00	9.66E+02	1.93E+03	1.2500	6.736E+13
Eu-154	1.5368E-02	350.58	701.16	0.00E+00	5.39E+00	1.08E+01	1.7500	4.490E+10
Eu-155	2.9293E-02	350.58	701.16	0.00E+00	1.03E+01	2.05E+01	2.2500	7.237E+10
Fe-55	7.7158E-01	350.58	701.16	0.00E+00	2.70E+02	5.41E+02	2.7500	5.743E+08
H-3	1.1111E-02	350.58	701.16	0.00E+00	3.90E+00	7.79E+00	3.5000	6.684E+07
I-129	7.3684E-07	350.58	701.16	0.00E+00	2.58E-04	5.17E-04	5.0000	3.787E+02
Kr-85	2.5263E-01	350.58	701.16	0.00E+00	8.86E+01	1.77E+02	7.0000	4.288E+01
Np-237	1.2427E-06	350.58	701.16	0.00E+00	4.36E-04	8.71E-04	11.0000	4.886E+00
Pa-231	3.8511E-09	350.58	701.16	0.00E+00	1.35E-06	2.70E-06		
Pb-210	7.3880E-15	350.58	701.16	0.00E+00	2.59E-12	5.18E-12		
Pm-147	2.1023E+00	350.58	701.16	0.00E+00	7.37E+02	1.47E+03		
Pu-238	1.0383E-03	350.58	701.16	0.00E+00	3.64E-01	7.28E-01		
Pu-239	5.5293E-03	350.58	701.16	0.00E+00	1.94E+00	3.88E+00		
Pu-240	2.1278E-03	350.58	701.16	0.00E+00	7.46E-01	1.49E+00		
Pu-241	1.0195E-01	350.58	701.16	0.00E+00	3.57E+01	7.15E+01		
Pu-242	2.3128E-07	350.58	701.16	0.00E+00	8.11E-05	1.62E-04		
Ra-226	5.2782E-14	350.58	701.16	0.00E+00	1.85E-11	3.70E-11		
Ra-228	1.9338E-10	350.58	701.16	0.00E+00	6.78E-08	1.36E-07		
Ru-106	9.1684E-02	350.58	701.16	0.00E+00	3.21E+01	6.43E+01		
Se-79	1.3018E-05	350.58	701.16	0.00E+00	4.56E-03	9.13E-03		
Sn-126	1.2167E-05	350.58	701.16	0.00E+00	4.27E-03	8.53E-03		
Sr-90	2.6045E+00	350.58	701.16	0.00E+00	9.13E+02	1.83E+03		
Tc-99	4.4241E-04	350.58	701.16	0.00E+00	1.55E-01	3.10E-01		
Th-229	1.3713E-10	350.58	701.16	0.00E+00	4.81E-08	9.61E-08		
Th-230	1.8090E-11	350.58	701.16	0.00E+00	6.34E-09	1.27E-08		
Th-232	2.5278E-10	350.58	701.16	0.00E+00	8.86E-08	1.77E-07		
Ti-208	1.6947E-08	350.58	701.16	0.00E+00	5.94E-06	1.19E-05		
U-232	4.8737E-08	350.58	701.16	0.00E+00	1.71E-05	3.42E-05		
U-233	1.2203E-07	350.58	701.16	0.00E+00	4.28E-05	8.56E-05		
U-234	1.5925E-07	350.58	701.16	0.00E+00	5.58E-05	1.12E-04		
U-235	-2.6194E-06	350.58	0.00	7.58E-03	6.66E-03	7.58E-03		
U-236	1.2693E-05	350.58	701.16	0.00E+00	4.45E-03	8.90E-03		
U-238	-3.6331E-08	350.58	0.00	4.87E-03	4.86E-03	4.87E-03		
Y-90	2.6060E+00	350.58	701.16	0.00E+00	9.14E+02	1.83E+03		
Other Radionuclides					1.26E+02	2.53E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	19.48980681	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	350.58	54.99
Bounding		701.16

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.57	0.16
Bounding	1.14	

Estimated EOL HM/Given EOL HM

0.98

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 5/20 MSU
SNF ID #: 873

Fuel Units & Descr: 48 - ELEMENT

Heavy Metal Mass BOL=9.36kg EOL=8.29kg

ROD Storage Site: INEEL

Fuel decay start date

1982

Estimates as of

2010

Template

TRIGA-SS (LW/U-Zrx, SST, 10 to 20% U)

*Template Burnup(MWd)

6.65

Template BOL Heavy Metal Mass (MT)

0.000195

Template Decay Time

25 years

Estimated
Canister usage:
18"x10"
0.43

II. Estimates		m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.1459E-09	1,021.81	2,043.62	0.00E+00	4.24E-06	8.47E-06	0.0150	1.814E+14	
Am-241	3.5850E-03	1,021.81	2,043.62	0.00E+00	3.66E+00	7.33E+00	0.0250	3.771E+13	
Am-242m	1.2899E-06	1,021.81	2,043.62	0.00E+00	1.32E-03	2.64E-03	0.0375	3.272E+13	
Am-243	1.4747E-07	1,021.81	2,043.62	0.00E+00	1.51E-04	3.01E-04	0.0575	3.523E+13	
C-14	1.2839E-04	1,021.81	2,043.62	0.00E+00	1.31E-01	2.62E-01	0.0850	2.124E+13	
Cl-36	2.8120E-06	1,021.81	2,043.62	0.00E+00	2.87E-03	5.75E-03	0.1250	1.386E+13	
Cm-243	1.1038E-07	1,021.81	2,043.62	0.00E+00	1.13E-04	2.26E-04	0.2250	1.827E+13	
Cm-244	7.8917E-07	1,021.81	2,043.62	0.00E+00	8.06E-04	1.61E-03	0.3750	7.977E+12	
Co-60	9.2647E-02	1,021.81	2,043.62	0.00E+00	9.47E+01	1.89E+02	0.5750	1.322E+14	
Cs-134	1.0940E-04	1,021.81	2,043.62	0.00E+00	1.12E-01	2.24E-01	0.8500	1.420E+12	
Cs-135	3.2195E-05	1,021.81	2,043.62	0.00E+00	3.29E-02	6.58E-02	1.2500	1.458E+13	
Cs-137	1.7368E+00	1,021.81	2,043.62	0.00E+00	1.77E+03	3.55E+03	1.7500	3.695E+10	
Eu-154	3.0677E-03	1,021.81	2,043.62	0.00E+00	3.13E+00	6.27E+00	2.2500	7.793E+07	
Eu-155	1.7925E-03	1,021.81	2,043.62	0.00E+00	1.83E+00	3.66E+00	2.7500	1.318E+06	
Fe-55	3.7444E-03	1,021.81	2,043.62	0.00E+00	3.83E+00	7.65E+00	3.5000	2.740E+03	
H-3	3.6180E-03	1,021.81	2,043.62	0.00E+00	3.70E+00	7.39E+00	5.0000	1.066E+03	
I-129	7.3684E-07	1,021.81	2,043.62	0.00E+00	7.53E-04	1.51E-03	7.0000	1.203E+02	
Kr-85	6.9368E-02	1,021.81	2,043.62	0.00E+00	7.09E+01	1.42E+02	11.0000	1.368E+01	
Np-237	1.2662E-06	1,021.81	2,043.62	0.00E+00	1.29E-03	2.59E-03			
Pa-231	9.1654E-09	1,021.81	2,043.62	0.00E+00	9.37E-06	1.87E-05			
Pb-210	1.3728E-13	1,021.81	2,043.62	0.00E+00	1.40E-10	2.81E-10			
Pm-147	1.0702E-02	1,021.81	2,043.62	0.00E+00	1.09E+01	2.19E+01			
Pu-238	8.8692E-04	1,021.81	2,043.62	0.00E+00	9.06E-01	1.81E+00			
Pu-239	5.5263E-03	1,021.81	2,043.62	0.00E+00	5.65E+00	1.13E+01			
Pu-240	2.1233E-03	1,021.81	2,043.62	0.00E+00	2.17E+00	4.34E+00			
Pu-241	3.8962E-02	1,021.81	2,043.62	0.00E+00	3.98E+01	7.96E+01			
Pu-242	2.3128E-07	1,021.81	2,043.62	0.00E+00	2.36E-04	4.73E-04			
Ra-226	4.6752E-13	1,021.81	2,043.62	0.00E+00	4.78E-10	9.55E-10			
Ra-228	2.4827E-10	1,021.81	2,043.62	0.00E+00	2.54E-07	5.07E-07			
Ru-106	9.8526E-08	1,021.81	2,043.62	0.00E+00	1.01E-04	2.01E-04			
Se-79	1.3015E-05	1,021.81	2,043.62	0.00E+00	1.33E-02	2.66E-02			
Sn-126	1.2165E-05	1,021.81	2,043.62	0.00E+00	1.24E-02	2.49E-02			
Sr-90	1.6195E+00	1,021.81	2,043.62	0.00E+00	1.65E+03	3.31E+03			
Tc-99	4.4241E-04	1,021.81	2,043.62	0.00E+00	4.52E-01	9.04E-01			
Th-229	4.2451E-10	1,021.81	2,043.62	0.00E+00	4.34E-07	8.68E-07			
Th-230	6.1398E-11	1,021.81	2,043.62	0.00E+00	6.27E-08	1.25E-07			
Th-232	2.5278E-10	1,021.81	2,043.62	0.00E+00	2.58E-07	5.17E-07			
Th-208	1.5098E-08	1,021.81	2,043.62	0.00E+00	1.54E-05	3.09E-05			
U-232	4.0662E-08	1,021.81	2,043.62	0.00E+00	4.15E-05	8.31E-05			
U-233	1.2217E-07	1,021.81	2,043.62	0.00E+00	1.25E-04	2.50E-04			
U-234	2.2391E-07	1,021.81	2,043.62	0.00E+00	2.29E-04	4.58E-04			
U-235	-2.6194E-06	1,021.81	0.00	4.05E-03	1.37E-03	4.05E-03			
U-236	1.2695E-05	1,021.81	2,043.62	0.00E+00	1.30E-02	2.59E-02			
U-238	-3.6331E-08	1,021.81	0.00	2.52E-03	2.48E-03	2.52E-03			
Y-90	1.6195E+00	1,021.81	2,043.62	0.00E+00	1.65E+03	3.31E+03			
Other Radionuclides					1.76E+03	3.52E+03			

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:	
Reactor Moderator	From SFD	Used		
Fuel Cladding	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE		
BOL HM Constituents	SST	SST		
BOL Enrichment %	20	10 to 20.1		
Burnup Summary (MWd) ²			Basis for burnup used in estimate:	
Nominal	From SFD	Estimated		
Bounding		1,021.81		
		2,043.62	Nominal burnup calculated from the heavy metal mass destroyed.	
			Bounding burnup assumed to be twice nominal burnup	
Checks			Estimated EOL HM/Given EOL HM	
Nominal	Burnup Multiplier	Estimated Burnup/ Given Burnup		
Bounding	3.20	1.00		
	6.40			

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 5/20 PENN STATE UNIV.
SNF ID #: 237
Fuel Units & Descr: 203 - ELEMENT
Heavy Metal Mass: BOL=39 991kg. EOL=37 575kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd): 6 65
Template BOL Heavy Metal Mass (MT): 0 000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
1 83

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 5173E-10	2,306 04	4,612 09	0 00E+00	1 96E-06	3 93E-06	Avg. MeV	
Am-241	1 8331E-03	2,306 04	4,612 09	0 00E+00	4 23E+00	8 45E+00	0 0150	7 454E+14
Am-242m	1 4129E-06	2,306 04	4,612 09	0 00E+00	3 26E-03	6 52E-03	0 0250	1 640E+14
Am-243	1 4774E-07	2,306 04	4,612 09	0 00E+00	3 41E-04	6 81E-04	0 0375	1 397E+14
C-14	1 2871E-04	2,306 04	4,612 09	0 00E+00	2 97E-01	5 94E-01	0 0575	1 434E+14
Cl-36	2 8120E-06	2,306 04	4,612 09	0 00E+00	6 48E-03	1 30E-02	0 0850	8 882E+13
Cm-243	1 7940E-07	2,306 04	4,612 09	0 00E+00	4 14E-04	8 27E-04	0 1250	6 450E+13
Cm-244	1 6962E-06	2,306 04	4,612 09	0 00E+00	3 91E-03	7 82E-03	0 2250	7 535E+13
Co-60	1 2839E+00	2,306 04	4,612 09	0 00E+00	2 96E+03	5 92E+03	0 3750	3 824E+13
Cs-134	9 0541E-02	2,306 04	4,612 09	0 00E+00	2 09E+02	4 18E+02	0 5750	5 083E+14
Cs-135	3 2195E-05	2,306 04	4,612 09	0 00E+00	7 42E-02	1 48E-01	0 8500	2 182E+13
Cs-137	2 7564E+00	2,306 04	4,612 09	0 00E+00	6 36E+03	1 27E+04	1 2500	4 431E+14
Eu-154	1 5368E-02	2,306 04	4,612 09	0 00E+00	3 54E+01	7 09E+01	1 7500	2 953E+11
Eu-155	2 9293E-02	2,306 04	4,612 09	0 00E+00	6 76E+01	1 35E+02	2 2500	4 760E+11
Fe-55	7 7158E-01	2,306 04	4,612 09	0 00E+00	1 78E+03	3 56E+03	2 7500	3 778E+09
H-3	1 1111E-02	2,306 04	4,612 09	0 00E+00	2 56E+01	5 12E+01	3 5000	4 396E+08
I-129	7 3684E-07	2,306 04	4,612 09	0 00E+00	1 70E-03	3 40E-03	5 0000	2 442E+03
Kr-85	2 5263E-01	2,306 04	4,612 09	0 00E+00	5 83E+02	1 17E+03	7 0000	2 764E+02
Np-237	1 2427E-06	2,306 04	4,612 09	0 00E+00	2 87E-03	5 73E-03	11 0000	3 149E+01
Pa-231	3 8511E-09	2,306 04	4,612 09	0 00E+00	8 88E-06	1 78E-05		
Pb-210	7 3880E-15	2,306 04	4,612 09	0 00E+00	1 70E-11	3 41E-11		
Pm-147	2 1023E+00	2,306 04	4,612 09	0 00E+00	4 85E+03	9 70E+03		
Pu-238	1 0383E-03	2,306 04	4,612 09	0 00E+00	2 39E+00	4 79E+00		
Pu-239	5 5293E-03	2,306 04	4,612 09	0 00E+00	1 28E+01	2 55E+01		
Pu-240	2 1278E-03	2,306 04	4,612 09	0 00E+00	4 91E+00	9 81E+00		
Pu-241	1 0195E-01	2,306 04	4,612 09	0 00E+00	2 35E+02	4 70E+02		
Pu-242	2 3128E-07	2,306 04	4,612 09	0 00E+00	5 33E-04	1 07E-03		
Ra-226	5 2782E-14	2,306 04	4,612 09	0 00E+00	1 22E-10	2 43E-10		
Ra-228	1 9338E-10	2,306 04	4,612 09	0 00E+00	4 46E-07	8 92E-07		
Ru-106	9 1684E-02	2,306 04	4,612 09	0 00E+00	2 11E+02	4 23E+02		
Se-79	1 3018E-05	2,306 04	4,612 09	0 00E+00	3 00E-02	6 00E-02		
Sn-126	1 2167E-05	2,306 04	4,612 09	0 00E+00	2 81E-02	5 61E-02		
Sr-90	2 6045E+00	2,306 04	4,612 09	0 00E+00	6 01E+03	1 20E+04		
Tc-99	4 4241E-04	2,306 04	4,612 09	0 00E+00	1 02E+00	2 04E+00		
Th-229	1 3713E-10	2,306 04	4,612 09	0 00E+00	3 16E-07	6 32E-07		
Th-230	1 8090E-11	2,306 04	4,612 09	0 00E+00	4 17E-08	8 34E-08		
Th-232	2 5278E-10	2,306 04	4,612 09	0 00E+00	5 83E-07	1 17E-06		
Ti-208	1 6947E-08	2,306 04	4,612 09	0 00E+00	3 91E-05	7 82E-05		
U-232	4 8737E-08	2,306 04	4,612 09	0 00E+00	1 12E-04	2 25E-04		
U-233	1 2203E-07	2,306 04	4,612 09	0 00E+00	2 81E-04	5 63E-04		
U-234	1 5925E-07	2,306 04	4,612 09	0 00E+00	3 67E-04	7 34E-04		
U-235	-2 6194E-06	2,306 04	0 00	1 71E-02	1 11E-02	1 71E-02		
U-236	1 2693E-05	2,306 04	4,612 09	0 00E+00	2 93E-02	5 85E-02		
U-238	-3 6331E-08	2,306 04	0 00	1 08E-02	1 07E-02	1 08E-02		
Y-90	2 6060E+00	2,306 04	4,612 09	0 00E+00	6 01E+03	1 20E+04		
Other Radionuclides					8 31E+03	1 66E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	19 79695431	10 to 20 1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		2,306 04	
Bounding		4,612 09	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	1 69		
Bounding	3 38		1 00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 8 5/20 REED COLLEGE
SNF ID # 775
Fuel Units & Descr: 9 - ELEMENT
Heavy Metal Mass BOL=1 719kg, EOL=1 706kg
ROD Storage Site INEEL

¹Fuel decay start date 2026
Estimates as of 2010
Template TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
²Template Burnup(MWd) 6 65
Template BOL Heavy Metal Mass (MT): 0 000195
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0 12

II. Estimates							Gamma Sources	
	m	x _n	x _b	b	y _n	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	8 5173E-10	12 89	25 77	0 00E+00	1 10E-08	2 20E-08	Avg MeV	
Am-241	1 8331E-03	12 89	25 77	0 00E+00	2 36E-02	4 72E-02	0 0150	4 166E+12
Am-242m	1 4129E-06	12 89	25 77	0 00E+00	1 82E-05	3 64E-05	0 0250	9 166E+11
Am-243	1 4774E-07	12 89	25 77	0 00E+00	1 90E-06	3 81E-06	0 0375	7 806E+11
C-14	1 2871E-04	12 89	25 77	0 00E+00	1 66E-03	3 32E-03	0 0575	8 012E+11
Cl-36	2 8120E-06	12 89	25 77	0 00E+00	3 62E-05	7 25E-05	0 0850	4 964E+11
Cm-243	1 7940E-07	12 89	25 77	0 00E+00	2 31E-06	4 62E-06	0 1250	3 605E+11
Cm-244	1 6962E-06	12 89	25 77	0 00E+00	2 19E-05	4 37E-05	0 2250	4 211E+11
Co-60	1 2839E+00	12 89	25 77	0 00E+00	1 65E+01	3 31E+01	0 3750	2 137E+11
Cs-134	9 0541E-02	12 89	25 77	0 00E+00	1 17E+00	2 33E+00	0 5750	2 841E+12
Cs-135	3 2195E-05	12 89	25 77	0 00E+00	4 15E-04	8 30E-04	0 8500	1 219E+11
Cs-137	2 7564E+00	12 89	25 77	0 00E+00	3 55E+01	7 10E+01	1 2500	2 476E+12
Eu-154	1 5368E-02	12 89	25 77	0 00E+00	1 98E-01	3 96E-01	1 7500	1 650E+09
Eu-155	2 9233E-02	12 89	25 77	0 00E+00	3 78E-01	7 55E-01	2 2500	2 660E+09
Fe-55	7 7158E-01	12 89	25 77	0 00E+00	9 94E+00	1 99E+01	2 7500	2 111E+07
H-3	1 1111E-02	12 89	25 77	0 00E+00	1 43E-01	2 86E-01	3 5000	2 457E+06
I-129	7 3684E-07	12 89	25 77	0 00E+00	9 50E-06	1 90E-05	5 0000	1 457E+01
Kr-85	2 5263E-01	12 89	25 77	0 00E+00	3 26E+00	6 51E+00	7 0000	1 651E+00
Np-237	1 2427E-06	12 89	25 77	0 00E+00	1 60E-05	3 20E-05	11 0000	1 882E-01
Pa-231	3 8511E-09	12 89	25 77	0 00E+00	4 96E-08	9 93E-08		
Pb-210	7 3880E-15	12 89	25 77	0 00E+00	9 52E-14	1 90E-13		
Pm-147	2 1023E+00	12 89	25 77	0 00E+00	2 71E+01	5 42E+01		
Pu-238	1 0383E-03	12 89	25 77	0 00E+00	1 34E-02	2 68E-02		
Pu-239	5 5293E-03	12 89	25 77	0 00E+00	7 13E-02	1 43E-01		
Pu-240	2 1278E-03	12 89	25 77	0 00E+00	2 74E-02	5 48E-02		
Pu-241	1 0195E-01	12 89	25 77	0 00E+00	1 31E+00	2 63E+00		
Pu-242	2 3128E-07	12 89	25 77	0 00E+00	2 98E-06	5 96E-06		
Ra-226	5 2782E-14	12 89	25 77	0 00E+00	6 80E-13	1 36E-12		
Ra-228	1 9338E-10	12 89	25 77	0 00E+00	2 49E-09	4 98E-09		
Ru-106	9 1684E-02	12 89	25 77	0 00E+00	1 18E+00	2 36E+00		
Se-79	1 3018E-05	12 89	25 77	0 00E+00	1 68E-04	3 36E-04		
Sn-126	1 2167E-05	12 89	25 77	0 00E+00	1 57E-04	3 14E-04		
Sr-90	2 6045E+00	12 89	25 77	0 00E+00	3 36E+01	6 71E+01		
Tc-99	4 4241E-04	12 89	25 77	0 00E+00	5 70E-03	1 14E-02		
Th-229	1 3713E-10	12 89	25 77	0 00E+00	1 77E-09	3 53E-09		
Th-230	1 8090E-11	12 89	25 77	0 00E+00	2 33E-10	4 66E-10		
Th-232	2 5278E-10	12 89	25 77	0 00E+00	3 26E-09	6 52E-09		
Tl-208	1 6947E-08	12 89	25 77	0 00E+00	2 18E-07	4 37E-07		
U-232	4 8737E-08	12 89	25 77	0 00E+00	6 28E-07	1 26E-06		
U-233	1 2203E-07	12 89	25 77	0 00E+00	1 57E-06	3 15E-06		
U-234	1 5925E-07	12 89	25 77	0 00E+00	2 05E-06	4 10E-06		
U-235	-2 6194E-06	12 89	0 00	7 49E-04	7 15E-04	7 49E-04		
U-236	1 2693E-05	12 89	25 77	0 00E+00	1 64E-04	3 27E-04		
U-238	-3 6331E-08	12 89	0 00	4 61E-04	4 61E-04	4 61E-04		
Y-90	2 6060E+00	12 89	25 77	0 00E+00	3 36E+01	6 72E+01		
Other Radionuclides					4 65E+01	9 29E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7 50E-01	1 50E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary		
	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	20 15706806	10 to 20 1
Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches on all parameters except enrichment (very close to 20%)		

Burnup Summary (MWd) ²		
	From SFD	Estimated
Nominal		12 89
Bounding		25 77
Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup		

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 22	
Bounding	0 44	
Estimated EOL HM/Given EOL HM 1 00		

¹Reactor shutdown, core removal, storage shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 5/20 SLOVENIA
SNF ID #: 488
Fuel Units & Descr: 122 - ELEMENT
Heavy Metal Mass: BOL=23.4kg; EOL=22.594kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA SS (LW/U-ZrX SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
1 10

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	768.65	1.537.30	0.00E+00	6.55E-07	1.31E-06	Avg. MeV	
Am-241	1.8331E-03	768.65	1.537.30	0.00E+00	1.41E+00	2.82E+00	0.0150	2.485E+14
Am-242m	1.4129E-06	768.65	1.537.30	0.00E+00	1.09E-03	2.17E-03	0.0250	5.467E+13
Am-243	1.4774E-07	768.65	1.537.30	0.00E+00	1.14E-04	2.27E-04	0.0375	4.656E+13
C-14	1.2871E-04	768.65	1.537.30	0.00E+00	9.89E-02	1.98E-01	0.0575	4.779E+13
Cl-36	2.8120E-06	768.65	1.537.30	0.00E+00	2.16E-03	4.32E-03	0.0850	2.961E+13
Cm-243	1.7940E-07	768.65	1.537.30	0.00E+00	1.38E-04	2.76E-04	0.1250	2.150E+13
Cm-244	1.6962E-06	768.65	1.537.30	0.00E+00	1.30E-03	2.61E-03	0.2250	2.511E+13
Co-60	1.2839E+00	768.65	1.537.30	0.00E+00	9.87E+02	1.97E+03	0.3750	1.275E+13
Cs-134	9.0541E-02	768.65	1.537.30	0.00E+00	6.96E+01	1.39E+02	0.5750	1.694E+14
Cs-135	3.2195E-05	768.65	1.537.30	0.00E+00	2.47E-02	4.95E-02	0.8500	7.272E+12
Cs-137	2.7564E+00	768.65	1.537.30	0.00E+00	2.12E+03	4.24E+03	1.2500	1.477E+14
Eu-154	1.5368E-02	768.65	1.537.30	0.00E+00	1.18E+01	2.36E+01	1.7500	9.844E+10
Eu-155	2.9293E-02	768.65	1.537.30	0.00E+00	2.25E+01	4.50E+01	2.2500	1.587E+11
Fe-55	7.7158E-01	768.65	1.537.30	0.00E+00	5.93E+02	1.19E+03	2.7500	1.259E+09
H-3	1.1111E-02	768.65	1.537.30	0.00E+00	8.54E+00	1.71E+01	3.5000	1.465E+08
I-129	7.3684E-07	768.65	1.537.30	0.00E+00	5.66E-04	1.13E-03	5.0000	8.202E+02
Kr-85	2.5263E-01	768.65	1.537.30	0.00E+00	1.94E+02	3.88E+02	7.0000	9.286E+01
Np-237	1.2427E-06	768.65	1.537.30	0.00E+00	9.55E-04	1.91E-03	11.0000	1.058E+01
Pa-231	3.8511E-09	768.65	1.537.30	0.00E+00	2.96E-06	5.92E-06		
Pb-210	7.3880E-15	768.65	1.537.30	0.00E+00	5.68E-12	1.14E-11		
Pm-147	2.1023E+00	768.65	1.537.30	0.00E+00	1.62E+03	3.23E+03		
Pu-238	1.0383E-03	768.65	1.537.30	0.00E+00	7.98E-01	1.60E+00		
Pu-239	5.5293E-03	768.65	1.537.30	0.00E+00	4.25E+00	8.50E+00		
Pu-240	2.1278E-03	768.65	1.537.30	0.00E+00	1.64E+00	3.27E+00		
Pu-241	1.0195E-01	768.65	1.537.30	0.00E+00	7.84E+01	1.57E+02		
Pu-242	2.3128E-07	768.65	1.537.30	0.00E+00	1.78E-04	3.56E-04		
Ra-226	5.2782E-14	768.65	1.537.30	0.00E+00	4.06E-11	8.11E-11		
Ra-228	1.9338E-10	768.65	1.537.30	0.00E+00	1.49E-07	2.97E-07		
Ru-106	9.1684E-02	768.65	1.537.30	0.00E+00	7.05E+01	1.41E+02		
Se-79	1.3018E-05	768.65	1.537.30	0.00E+00	1.00E-02	2.00E-02		
Sn-126	1.2167E-05	768.65	1.537.30	0.00E+00	9.35E-03	1.87E-02		
Sr-90	2.6045E+00	768.65	1.537.30	0.00E+00	2.00E+03	4.00E+03		
Tc-99	4.4241E-04	768.65	1.537.30	0.00E+00	3.40E-01	6.80E-01		
Th-229	1.3713E-10	768.65	1.537.30	0.00E+00	1.05E-07	2.11E-07		
Th-230	1.8090E-11	768.65	1.537.30	0.00E+00	1.39E-08	2.78E-08		
Th-232	2.5278E-10	768.65	1.537.30	0.00E+00	1.94E-07	3.89E-07		
Ti-208	1.6947E-08	768.65	1.537.30	0.00E+00	1.30E-05	2.61E-05		
U-232	4.8737E-08	768.65	1.537.30	0.00E+00	3.75E-05	7.49E-05		
U-233	1.2203E-07	768.65	1.537.30	0.00E+00	9.38E-05	1.88E-04	Thermal Power	
U-234	1.5925E-07	768.65	1.537.30	0.00E+00	1.22E-04	2.45E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2.6194E-06	768.65	0.00	1.01E-02	8.04E-03	1.01E-02	4.47E+01	8.95E+01
U-236	1.2693E-05	768.65	1.537.30	0.00E+00	9.76E-03	1.95E-02	Total	Total
U-238	-3.6331E-08	768.65	0.00	6.30E-03	6.27E-03	6.30E-03		
Y-90	2.6060E+00	768.65	1.537.30	0.00E+00	2.00E+03	4.01E+03		
Other Radionuclides					2.77E+03	5.54E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	19.8857762	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		768.65	
Bounding		1.537.30	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.96		
Bounding	1.93		1.00

¹Reactor shutdown, core removal storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 S/20 SLOVENIA

SNF ID #: 1079

Fuel Units & Descr: 149 - ELEMENT

Heavy Metal Mass BOL=28.578kg EOL=27.446kg

ROD Storage Site INEEL

¹Fuel decay start date 2010
Estimates as of 2010

²Template Burnup(MWd)

Template BOL Heavy Metal Mass (MT)

Template Decay Time:

TRIGA-SS (LW/U-Zrx, SST, 10 to 20% U)

6.65

0.000195

5 years

Estimated
Canister usage:
18"x10"
1.34

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	1.081 00	2.161 99	0.00E+00	9.21E-07	1.84E-06	Avg MeV	
Am-241	1.8331E-03	1.081 00	2.161 99	0.00E+00	1.98E+00	3.96E+00	0.0150	3.494E+14
Am-242m	1.4129E-06	1.081 00	2.161 99	0.00E+00	1.53E-03	3.05E-03	0.0250	7.689E+13
Am-243	1.4774E-07	1.081 00	2.161 99	0.00E+00	1.60E-04	3.19E-04	0.0375	6.548E+13
C-14	1.2871E-04	1.081 00	2.161 99	0.00E+00	1.39E-01	2.78E-01	0.0575	6.721E+13
Cl-36	2.8120E-06	1.081 00	2.161 99	0.00E+00	3.04E-03	6.08E-03	0.0850	4.164E+13
Cm-243	1.7940E-07	1.081 00	2.161 99	0.00E+00	1.94E-04	3.88E-04	0.1250	3.024E+13
Cm-244	1.6962E-06	1.081 00	2.161 99	0.00E+00	1.83E-03	3.67E-03	0.2250	3.532E+13
Co-60	1.2839E+00	1.081 00	2.161 99	0.00E+00	1.39E+03	2.78E+03	0.3750	1.792E+13
Cs-134	9.0541E-02	1.081 00	2.161 99	0.00E+00	9.79E+01	1.96E+02	0.5750	2.383E+14
Cs-135	3.2195E-05	1.081 00	2.161 99	0.00E+00	3.48E-02	6.96E-02	0.8500	1.023E+13
Cs-137	2.7564E+00	1.081 00	2.161 99	0.00E+00	2.98E+03	5.96E+03	1.2500	2.077E+14
Eu-154	1.5368E-02	1.081 00	2.161 99	0.00E+00	1.66E+01	3.32E+01	1.7500	1.384E+11
Eu-155	2.9293E-02	1.081 00	2.161 99	0.00E+00	3.17E+01	6.33E+01	2.2500	2.232E+11
Fe-55	7.7158E-01	1.081 00	2.161 99	0.00E+00	8.34E+02	1.67E+03	2.7500	1.771E+09
H-3	1.1111E-02	1.081 00	2.161 99	0.00E+00	1.20E+01	2.40E+01	3.5000	2.061E+08
I-129	7.3684E-07	1.081 00	2.161 99	0.00E+00	7.97E-04	1.59E-03	5.0000	1.151E+03
Kr-85	2.5263E-01	1.081 00	2.161 99	0.00E+00	2.73E+02	5.46E+02	7.0000	1.303E+01
Np-237	1.2427E-06	1.081 00	2.161 99	0.00E+00	1.34E-03	2.69E-03	11.0000	1.484E+01
Pa-231	3.8511E-09	1.081 00	2.161 99	0.00E+00	4.16E-06	8.33E-06		
Pb-210	7.3880E-15	1.081 00	2.161 99	0.00E+00	7.99E-12	1.60E-11		
Pm-147	2.1023E+00	1.081 00	2.161 99	0.00E+00	2.27E+03	4.55E+03		
Pu-238	1.0383E-03	1.081 00	2.161 99	0.00E+00	1.12E+00	2.24E+00		
Pu-239	5.5293E-03	1.081 00	2.161 99	0.00E+00	5.98E+00	1.20E+01		
Pu-240	2.1278E-03	1.081 00	2.161 99	0.00E+00	2.30E+00	4.60E+00		
Pu-241	1.0195E-01	1.081 00	2.161 99	0.00E+00	1.10E+02	2.20E+02		
Pu-242	2.3128E-07	1.081 00	2.161 99	0.00E+00	2.50E-04	5.00E-04		
Ra-226	5.2782E-14	1.081 00	2.161 99	0.00E+00	5.71E-11	1.14E-10		
Ra-228	1.9338E-10	1.081 00	2.161 99	0.00E+00	2.09E-07	4.18E-07		
Ru-106	9.1684E-02	1.081 00	2.161 99	0.00E+00	9.91E+01	1.98E+02		
Se-79	1.3018E-05	1.081 00	2.161 99	0.00E+00	1.41E-02	2.81E-02		
Sn-126	1.2167E-05	1.081 00	2.161 99	0.00E+00	1.32E-02	2.63E-02		
Sr-90	2.6045E+00	1.081 00	2.161 99	0.00E+00	2.82E+03	5.63E+03		
Tc-99	4.4241E-04	1.081 00	2.161 99	0.00E+00	4.78E-01	9.56E-01		
Th-229	1.3713E-10	1.081 00	2.161 99	0.00E+00	1.48E-07	2.96E-07		
Th-230	1.8090E-11	1.081 00	2.161 99	0.00E+00	1.96E-08	3.91E-08		
Th-232	2.5278E-10	1.081 00	2.161 99	0.00E+00	2.73E-07	5.47E-07		
Ti-208	1.6947E-08	1.081 00	2.161 99	0.00E+00	1.83E-05	3.66E-05		
U-232	4.8737E-08	1.081 00	2.161 99	0.00E+00	5.27E-05	1.05E-04		
U-233	1.2203E-07	1.081 00	2.161 99	0.00E+00	1.32E-04	2.64E-04		
U-234	1.5925E-07	1.081 00	2.161 99	0.00E+00	1.72E-04	3.44E-04		
U-235	2.6194E-06	1.081 00	0.00	1.23E-02	9.45E-03	1.23E-02		
U-236	1.2693E-05	1.081 00	2.161 99	0.00E+00	1.37E-02	2.74E-02		
U-238	3.6331E-08	1.081 00	0.00	7.70E-03	7.66E-03	7.70E-03		
Y-90	2.6060E+00	1.081 00	2.161 99	0.00E+00	2.82E+03	5.63E+03		
Other Radionuclides					3.90E+03	7.79E+03		

Thermal Power	
Nominal Heat	Bounding Heat Output
Output (Watts)	Heat Output (Watts)
6.29E+01	1.26E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	19.886	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		1.081 00
Bounding		2.161 99

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	1.11	
Bounding	2.22	

Estimated EOL HM/Given EOL HM

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 5/20 SO KOREA
SNF ID #: 484
Fuel Units & Descr: 104 - ELEMENT
Heavy Metal Mass: BOL=19.76kg; EOL=19.261kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1996
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 10 years

Estimated
Canister usage:
18"x10"
0.94

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3731E-09	476.54	953.08	0.00E+00	6.54E-07	1.31E-06	Avg MeV	
Am-241	2.3865E-03	476.54	953.08	0.00E+00	1.14E+00	2.27E+00	0.0150	1.231E+14
Am-242m	1.3812E-06	476.54	953.08	0.00E+00	6.58E-04	1.32E-03	0.0250	2.608E+13
Am-243	1.4767E-07	476.54	953.08	0.00E+00	7.04E-05	1.41E-04	0.0375	2.228E+13
C-14	1.2863E-04	476.54	953.08	0.00E+00	6.13E-02	1.23E-01	0.0575	2.375E+13
Cl-36	2.8120E-06	476.54	953.08	0.00E+00	1.34E-03	2.68E-03	0.0850	1.441E+13
Cm-243	1.5895E-07	476.54	953.08	0.00E+00	7.57E-05	1.51E-04	0.1250	9.470E+12
Cm-244	1.4008E-06	476.54	953.08	0.00E+00	6.68E-04	1.34E-03	0.2250	1.229E+13
Co-60	6.6541E-01	476.54	953.08	0.00E+00	3.17E+02	6.34E+02	0.3750	5.644E+12
Cs-134	1.6887E-02	476.54	953.08	0.00E+00	8.05E-02	1.61E-01	0.5750	8.842E+13
Cs-135	3.2195E-05	476.54	953.08	0.00E+00	1.53E-02	3.07E-02	0.8500	1.579E+12
Cs-137	2.4556E+00	476.54	953.08	0.00E+00	1.17E+03	2.34E+03	1.2500	4.746E+13
Eu-154	1.0268E-02	476.54	953.08	0.00E+00	4.89E+00	9.79E+00	1.7500	2.856E+10
Eu-155	1.4570E-02	476.54	953.08	0.00E+00	6.94E+00	1.39E+01	2.2500	1.492E+09
Fe-55	2.0361E-01	476.54	953.08	0.00E+00	9.70E+01	1.94E+02	2.7500	2.469E+07
H-3	8.3940E-03	476.54	953.08	0.00E+00	4.00E+00	8.00E+00	3.5000	2.926E+06
I-129	7.3684E-07	476.54	953.08	0.00E+00	3.51E-04	7.02E-04	5.0000	5.096E+02
Kr-85	1.8286E-01	476.54	953.08	0.00E+00	8.71E+01	1.74E+02	7.0000	5.765E+01
Np-237	1.2462E-06	476.54	953.08	0.00E+00	5.94E-04	1.19E-03	11.0000	6.564E+00
Pa-231	4.9143E-09	476.54	953.08	0.00E+00	2.34E-06	4.68E-06		
Pb-210	1.7173E-14	476.54	953.08	0.00E+00	8.18E-12	1.64E-11		
Pm-147	5.6165E-01	476.54	953.08	0.00E+00	2.68E+02	5.35E+02		
Pu-238	9.9820E-04	476.54	953.08	0.00E+00	4.76E-01	9.51E-01		
Pu-239	5.5293E-03	476.54	953.08	0.00E+00	2.63E+00	5.27E+00		
Pu-240	2.1263E-03	476.54	953.08	0.00E+00	1.01E+00	2.03E+00		
Pu-241	8.0165E-02	476.54	953.08	0.00E+00	3.82E+01	7.64E+01		
Pu-242	2.3128E-07	476.54	953.08	0.00E+00	1.10E-04	2.20E-04		
Ra-226	9.9774E-14	476.54	953.08	0.00E+00	4.75E-11	9.51E-11		
Ra-228	2.1729E-10	476.54	953.08	0.00E+00	1.04E-07	2.07E-07		
Ru-106	2.9519E-03	476.54	953.08	0.00E+00	1.41E+00	2.81E+00		
Se-79	1.3017E-05	476.54	953.08	0.00E+00	6.20E-03	1.24E-02		
Sn-126	1.2167E-05	476.54	953.08	0.00E+00	5.80E-03	1.16E-02		
Sr-90	2.3128E+00	476.54	953.08	0.00E+00	1.10E+03	2.20E+03		
Tc-99	4.4241E-04	476.54	953.08	0.00E+00	2.11E-01	4.22E-01		
Th-229	1.9459E-10	476.54	953.08	0.00E+00	9.27E-08	1.85E-07		
Th-230	2.5564E-11	476.54	953.08	0.00E+00	1.22E-08	2.44E-08		
Th-232	2.5278E-10	476.54	953.08	0.00E+00	1.20E-07	2.41E-07		
Ti-208	1.6947E-08	476.54	953.08	0.00E+00	8.08E-06	1.62E-05		
U-232	4.6812E-08	476.54	953.08	0.00E+00	2.23E-05	4.46E-05		
U-233	1.2206E-07	476.54	953.08	0.00E+00	5.82E-05	1.16E-04		
U-234	1.7323E-07	476.54	953.08	0.00E+00	8.26E-05	1.65E-04		
U-235	-2.6194E-06	476.54	0.00	8.54E-03	7.29E-03	8.54E-03		
U-236	1.2693E-05	476.54	953.08	0.00E+00	6.05E-03	1.21E-02		
U-238	-3.6331E-08	476.54	0.00	5.31E-03	5.30E-03	5.31E-03		
Y-90	2.3128E+00	476.54	953.08	0.00E+00	1.10E+03	2.20E+03		
Other Radionuclides					1.17E+03	2.34E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	20	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		476.54
Bounding		953.08

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.71	
Bounding	1.41	

Estimated EOL HM/Given EOL HM

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 8.5/20 TEXAS A&M
SNF ID # 258
Fuel Units & Descr. 85 - ELEMENT
Heavy Metal Mass BOL=14 875kg EOL=14.34kg
ROD Storage Site INEEL

¹Fuel decay start date: 2035
Estimates as of 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd) 6 65
Template BOL Heavy Metal Mass (MT) 0.000195
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0.77

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	8.5173E-10	511.19	1,022.38	0.00E+00	4.35E-07	8.71E-07	0.0150	1.652E+14
Am-241	1.8331E-03	511.19	1,022.38	0.00E+00	9.37E-01	1.87E+00	0.0250	3.636E+13
Am-242m	1.4129E-06	511.19	1,022.38	0.00E+00	7.22E-04	1.44E-03	0.0375	3.096E+13
Am-243	1.4774E-07	511.19	1,022.38	0.00E+00	7.55E-05	1.51E-04	0.0575	3.178E+13
C-14	1.2871E-04	511.19	1,022.38	0.00E+00	6.58E-02	1.32E-01	0.0850	1.969E+13
Cl-36	2.8120E-06	511.19	1,022.38	0.00E+00	1.44E-03	2.87E-03	0.1250	1.430E+13
Cm-243	1.7940E-07	511.19	1,022.38	0.00E+00	9.17E-05	1.83E-04	0.2250	1.670E+13
Cm-244	1.6962E-06	511.19	1,022.38	0.00E+00	6.67E-04	1.33E-03	0.3750	8.476E+12
Co-60	1.2839E+00	511.19	1,022.38	0.00E+00	6.56E+02	1.31E+03	0.5750	1.127E+14
Cs-134	9.0541E-02	511.19	1,022.38	0.00E+00	4.63E+01	9.26E+01	0.8500	4.836E+12
Cs-135	3.2195E-05	511.19	1,022.38	0.00E+00	1.65E-02	3.29E-02	1.2500	9.822E+13
Cs-137	2.7564E+00	511.19	1,022.38	0.00E+00	1.41E+03	2.82E+03	1.7500	6.547E+10
Eu-154	1.5368E-02	511.19	1,022.38	0.00E+00	7.86E+00	1.57E+01	2.2500	1.055E+11
Eu-155	2.9293E-02	511.19	1,022.38	0.00E+00	1.50E+01	2.99E+01	2.7500	8.374E+08
Fe-55	7.7158E-01	511.19	1,022.38	0.00E+00	3.94E+02	7.89E+02	3.5000	9.746E+07
H-3	1.1111E-02	511.19	1,022.38	0.00E+00	5.68E+00	1.14E+01	5.0000	5.450E+02
I-129	7.3684E-07	511.19	1,022.38	0.00E+00	3.77E-04	7.53E-04	7.0000	6.170E+01
Kr-85	2.5263E-01	511.19	1,022.38	0.00E+00	1.29E+02	2.58E+02	11.0000	7.029E+00
Np-237	1.2427E-06	511.19	1,022.38	0.00E+00	6.35E-04	1.27E-03		
Pa-231	3.8511E-09	511.19	1,022.38	0.00E+00	1.97E-06	3.94E-06		
Pb-210	7.3880E-15	511.19	1,022.38	0.00E+00	3.78E-12	7.55E-12		
Pm-147	2.1023E+00	511.19	1,022.38	0.00E+00	1.07E+03	2.15E+03		
Pu-238	1.0383E-03	511.19	1,022.38	0.00E+00	5.31E-01	1.06E+00		
Pu-239	5.5293E-03	511.19	1,022.38	0.00E+00	2.83E+00	5.65E+00		
Pu-240	2.1278E-03	511.19	1,022.38	0.00E+00	1.09E+00	2.18E+00		
Pu-241	1.0195E-01	511.19	1,022.38	0.00E+00	5.21E+01	1.04E+02		
Pu-242	2.3128E-07	511.19	1,022.38	0.00E+00	1.18E-04	2.36E-04		
Ra-226	5.2782E-14	511.19	1,022.38	0.00E+00	2.70E-11	5.40E-11		
Ra-228	1.9338E-10	511.19	1,022.38	0.00E+00	9.89E-08	1.98E-07		
Ru-106	9.1684E-02	511.19	1,022.38	0.00E+00	4.69E+01	9.37E+01		
Se-79	1.3018E-05	511.19	1,022.38	0.00E+00	6.65E-03	1.33E-02		
Sn-126	1.2167E-05	511.19	1,022.38	0.00E+00	6.22E-03	1.24E-02		
Sr-90	2.6045E+00	511.19	1,022.38	0.00E+00	1.33E+03	2.66E+03		
Tc-99	4.4241E-04	511.19	1,022.38	0.00E+00	2.26E-01	4.52E-01		
Th-229	1.3713E-10	511.19	1,022.38	0.00E+00	7.01E-08	1.40E-07		
Th-230	1.8090E-11	511.19	1,022.38	0.00E+00	9.25E-09	1.85E-08		
Th-232	2.5278E-10	511.19	1,022.38	0.00E+00	1.29E-07	2.58E-07		
Ti-208	1.6947E-08	511.19	1,022.38	0.00E+00	8.66E-06	1.73E-05		
U-232	4.8737E-08	511.19	1,022.38	0.00E+00	2.49E-05	4.98E-05		
U-233	1.2203E-07	511.19	1,022.38	0.00E+00	6.24E-05	1.25E-04		
U-234	1.5925E-07	511.19	1,022.38	0.00E+00	8.14E-05	1.63E-04		
U-235	-2.6194E-06	511.19	0.00	6.43E-03	5.09E-03	6.43E-03		
U-236	1.2693E-05	511.19	1,022.38	0.00E+00	6.49E-03	1.30E-02		
U-238	-3.6331E-08	511.19	0.00	4.00E-03	3.98E-03	4.00E-03		
Y-90	2.6060E+00	511.19	1,022.38	0.00E+00	1.33E+03	2.66E+03		
Other Radionuclides					1.84E+03	3.69E+03		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences.
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20	10 to 20.1	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		511.19	Nominal burnup calculated from the heavy metal mass destroyed
Bounding		1,022.38	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	1.01		1.00
Bounding	2.02		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 S/20 THAILAND
SNF ID #: 489
Fuel Units & Descr: 100 - ELEMENT
Heavy Metal Mass: BOL=19.5kg, EOL=19.3kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0.90

II. Estimates

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	190.92	381.84	0.00E+00	1.63E-07	3.25E-07	Avg MeV	
Am-241	1.8331E-03	190.92	381.84	0.00E+00	3.50E-01	7.00E-01	0.0150	6.172E+13
Am-242m	1.4129E-06	190.92	381.84	0.00E+00	2.70E-04	5.40E-04	0.0250	1.358E+13
Am-243	1.4774E-07	190.92	381.84	0.00E+00	2.82E-05	5.64E-05	0.0375	1.156E+13
C-14	1.2871E-04	190.92	381.84	0.00E+00	2.46E-02	4.91E-02	0.0575	1.187E+13
Cl-36	2.8120E-06	190.92	381.84	0.00E+00	5.37E-04	1.07E-03	0.0850	7.354E+12
Cm-243	1.7940E-07	190.92	381.84	0.00E+00	3.43E-05	6.85E-05	0.1250	5.340E+12
Cm-244	1.6962E-06	190.92	381.84	0.00E+00	3.24E-04	6.48E-04	0.2250	6.238E+12
Co-60	1.2839E+00	190.92	381.84	0.00E+00	2.45E+02	4.90E+02	0.3750	3.166E+12
Cs-134	9.0541E-02	190.92	381.84	0.00E+00	1.73E+01	3.46E+01	0.5750	4.209E+13
Cs-135	3.2195E-05	190.92	381.84	0.00E+00	6.15E-03	1.23E-02	0.8500	1.806E+12
Cs-137	2.7564E+00	190.92	381.84	0.00E+00	5.26E+02	1.05E+03	1.2500	3.668E+13
Eu-154	1.5368E-02	190.92	381.84	0.00E+00	2.93E+00	5.87E+00	1.7500	2.445E+10
Eu-155	2.9293E-02	190.92	381.84	0.00E+00	5.59E+00	1.12E+01	2.2500	3.941E+10
Fe-55	7.7158E-01	190.92	381.84	0.00E+00	1.47E+02	2.95E+02	2.7500	3.128E+08
H-3	1.1111E-02	190.92	381.84	0.00E+00	2.12E+00	4.24E+00	3.5000	3.640E+07
I-129	7.3684E-07	190.92	381.84	0.00E+00	1.41E-04	2.81E-04	5.0000	2.122E+02
Kr-85	2.5263E-01	190.92	381.84	0.00E+00	4.82E+01	9.65E+01	7.0000	2.404E+01
Np-237	1.2427E-06	190.92	381.84	0.00E+00	2.37E-04	4.75E-04	11.0000	2.740E+00
Pa-231	3.8511E-09	190.92	381.84	0.00E+00	7.35E-07	1.47E-06		
Pb-210	7.3880E-15	190.92	381.84	0.00E+00	1.41E-12	2.82E-12		
Pm-147	2.1023E+00	190.92	381.84	0.00E+00	4.01E+02	8.03E+02		
Pu-238	1.0383E-03	190.92	381.84	0.00E+00	1.98E-01	3.96E-01		
Pu-239	5.5293E-03	190.92	381.84	0.00E+00	1.06E+00	2.11E+00		
Pu-240	2.1278E-03	190.92	381.84	0.00E+00	4.06E-01	8.12E-01		
Pu-241	1.0195E-01	190.92	381.84	0.00E+00	1.95E+01	3.89E+01		
Pu-242	2.3128E-07	190.92	381.84	0.00E+00	4.42E-05	8.83E-05		
Ra-226	5.2782E-14	190.92	381.84	0.00E+00	1.01E-11	2.02E-11		
Ra-228	1.9338E-10	190.92	381.84	0.00E+00	3.69E-08	7.38E-08		
Ru-106	9.1684E-02	190.92	381.84	0.00E+00	1.75E+01	3.50E+01		
Se-79	1.3018E-05	190.92	381.84	0.00E+00	2.49E-03	4.97E-03		
Sn-126	1.2167E-05	190.92	381.84	0.00E+00	2.32E-03	4.65E-03		
Sr-90	2.6045E+00	190.92	381.84	0.00E+00	4.97E+02	9.95E+02		
Tc-99	4.4241E-04	190.92	381.84	0.00E+00	8.45E-02	1.69E-01		
Th-229	1.3713E-10	190.92	381.84	0.00E+00	2.62E-08	5.24E-08		
Th-230	1.8090E-11	190.92	381.84	0.00E+00	3.45E-09	6.91E-09		
Th-232	2.5278E-10	190.92	381.84	0.00E+00	4.83E-08	9.65E-08		
Th-208	1.6947E-08	190.92	381.84	0.00E+00	3.24E-06	6.47E-06		
U-232	4.8737E-08	190.92	381.84	0.00E+00	9.30E-06	1.86E-05		
U-233	1.2203E-07	190.92	381.84	0.00E+00	2.33E-05	4.66E-05		
U-234	1.5925E-07	190.92	381.84	0.00E+00	3.04E-05	6.08E-05		
U-235	-2.6194E-06	190.92	0.00	8.43E-03	7.93E-03	8.43E-03		
U-236	1.2693E-05	190.92	381.84	0.00E+00	2.42E-03	4.85E-03		
U-238	-3.6331E-08	190.92	0.00	5.24E-03	5.24E-03	5.24E-03		
Y-90	2.6060E+00	190.92	381.84	0.00E+00	4.98E+02	9.95E+02		
Other Radionuclides					6.88E+02	1.38E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			
	From SFD	Used	Basis for Parameter Differences:
/ Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20	10 to 20.1	
Burnup Summary (MWd) ²			
	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		190.92	
Bounding		381.84	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.29		
Bounding	0.57		1.00

¹Reactor shutdown, core removal storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 8 5/20 TURKEY
SNF ID #: 490
Fuel Units & Descr: 79 - ELEMENT
Heavy Metal Mass BOL=15.405kg EOL=15.247kg
ROD Storage Site INEEL

¹Fuel decay start date 2010
Estimates as of 2010
Template TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
²Template Burnup(MWd) 6.65
Template BOL Heavy Metal Mass (MT) 0.000195
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0.71

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	150.83	301.66	0.00E+00	1.28E-07	2.57E-07	Avg MeV	
Am-241	1.8331E-03	150.83	301.66	0.00E+00	2.76E-01	5.53E-01	0.0150	4.876E+13
Am-242m	1.4129E-06	150.83	301.66	0.00E+00	2.13E-04	4.26E-04	0.0250	1.073E+13
Am-243	1.4774E-07	150.83	301.66	0.00E+00	2.23E-05	4.46E-05	0.0375	9.136E+12
C-14	1.2871E-04	150.83	301.66	0.00E+00	1.94E-02	3.88E-02	0.0575	9.377E+12
Cl-36	2.8120E-06	150.83	301.66	0.00E+00	4.24E-04	8.48E-04	0.0850	5.809E+12
Cm-243	1.7940E-07	150.83	301.66	0.00E+00	2.71E-05	5.41E-05	0.1250	4.219E+12
Cm-244	1.6962E-06	150.83	301.66	0.00E+00	2.56E-04	5.12E-04	0.2250	4.928E+12
Co-60	1.2839E+00	150.83	301.66	0.00E+00	1.94E+02	3.87E+02	0.3750	2.501E+12
Cs-134	9.0541E-02	150.83	301.66	0.00E+00	1.37E+01	2.73E+01	0.5750	3.325E+13
Cs-135	3.2195E-05	150.83	301.66	0.00E+00	4.86E-03	9.71E-03	0.8500	1.427E+12
Cs-137	2.7564E+00	150.83	301.66	0.00E+00	4.16E+02	8.31E+02	1.2500	2.898E+13
Eu-154	1.5368E-02	150.83	301.66	0.00E+00	2.32E+00	4.64E+00	1.7500	1.932E+10
Eu-155	2.9293E-02	150.83	301.66	0.00E+00	4.42E+00	8.84E+00	2.2500	3.114E+10
Fe-55	7.7158E-01	150.83	301.66	0.00E+00	1.16E+02	2.33E+02	2.7500	2.471E+08
H-3	1.1111E-02	150.83	301.66	0.00E+00	1.68E+00	3.35E+00	3.5000	2.876E+07
I-129	7.3684E-07	150.83	301.66	0.00E+00	1.11E-04	2.22E-04	5.0000	1.677E+02
Kr-85	2.5263E-01	150.83	301.66	0.00E+00	3.81E+01	7.62E+01	7.0000	1.899E+01
Np-237	1.2427E-06	150.83	301.66	0.00E+00	1.87E-04	3.75E-04	11.0000	2.165E+00
Pa-231	3.8511E-09	150.83	301.66	0.00E+00	5.81E-07	1.16E-06		
Pb-210	7.3880E-15	150.83	301.66	0.00E+00	1.11E-12	2.23E-12		
Pm-147	2.1023E+00	150.83	301.66	0.00E+00	3.17E+02	6.34E+02		
Pu-238	1.0383E-03	150.83	301.66	0.00E+00	1.57E-01	3.13E-01		
Pu-239	5.5293E-03	150.83	301.66	0.00E+00	8.34E-01	1.67E+00		
Pu-240	2.1278E-03	150.83	301.66	0.00E+00	3.21E-01	6.42E-01		
Pu-241	1.0195E-01	150.83	301.66	0.00E+00	1.54E+01	3.08E+01		
Pu-242	2.3128E-07	150.83	301.66	0.00E+00	3.49E-05	6.98E-05		
Ra-226	5.2782E-14	150.83	301.66	0.00E+00	7.96E-12	1.59E-11		
Ra-228	1.9338E-10	150.83	301.66	0.00E+00	2.92E-08	5.83E-08		
Ru-106	9.1684E-02	150.83	301.66	0.00E+00	1.38E+01	2.77E+01		
Se-79	1.3018E-05	150.83	301.66	0.00E+00	1.96E-03	3.93E-03		
Sn-126	1.2167E-05	150.83	301.66	0.00E+00	1.84E-03	3.67E-03		
Sr-90	2.6045E+00	150.83	301.66	0.00E+00	3.93E+02	7.86E+02		
Tc-99	4.4241E-04	150.83	301.66	0.00E+00	6.67E-02	1.33E-01		
Th-229	1.3713E-10	150.83	301.66	0.00E+00	2.07E-08	4.14E-08		
Th-230	1.8090E-11	150.83	301.66	0.00E+00	2.73E-09	5.46E-09		
Th-232	2.5278E-10	150.83	301.66	0.00E+00	3.81E-08	7.63E-08		
Ti-208	1.6947E-08	150.83	301.66	0.00E+00	2.56E-06	5.11E-06		
U-232	4.8737E-08	150.83	301.66	0.00E+00	7.35E-06	1.47E-05		
U-233	1.2203E-07	150.83	301.66	0.00E+00	1.84E-05	3.68E-05		
U-234	1.5925E-07	150.83	301.66	0.00E+00	2.40E-05	4.80E-05		
U-235	-2.6194E-06	150.83	0.00	6.66E-03	6.26E-03	6.66E-03		
U-236	1.2693E-05	150.83	301.66	0.00E+00	1.91E-03	3.83E-03		
U-238	-3.6331E-08	150.83	0.00	4.14E-03	4.14E-03	4.14E-03		
Y-90	2.6060E+00	150.83	301.66	0.00E+00	3.93E+02	7.86E+02		
Other Radionuclides					5.44E+02	1.09E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	20	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		150.83
Bounding		301.66

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.29	
Bounding	0.57	

Estimated EOL HM/Given EOL HM

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 5/20 U OF AZ
SNF ID #: 59
Fuel Units & Descr: 84 - ELEMENT
Heavy Metal Mass: BOL=16.38kg, EOL=15.75kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.76

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	601.40	1,202.81	0.00E+00	5.12E-07	1.02E-06	Avg MeV	
Am-241	1.8331E-03	601.40	1,202.81	0.00E+00	1.10E+00	2.20E+00	0.0150	1.944E+14
Am-242m	1.4129E-06	601.40	1,202.81	0.00E+00	8.50E-04	1.70E-03	0.0250	4.278E+13
Am-243	1.4774E-07	601.40	1,202.81	0.00E+00	8.89E-05	1.78E-04	0.0375	3.643E+13
C-14	1.2871E-04	601.40	1,202.81	0.00E+00	7.74E-02	1.55E-01	0.0575	3.739E+13
Cl-36	2.8120E-06	601.40	1,202.81	0.00E+00	1.69E-03	3.38E-03	0.0850	2.316E+13
Cm-243	1.7940E-07	601.40	1,202.81	0.00E+00	1.08E-04	2.16E-04	0.1250	1.682E+13
Cm-244	1.6962E-06	601.40	1,202.81	0.00E+00	1.02E-03	2.04E-03	0.2250	1.965E+13
Co-60	1.2839E+00	601.40	1,202.81	0.00E+00	7.72E+02	1.54E+03	0.3750	9.972E+12
Cs-134	9.0541E-02	601.40	1,202.81	0.00E+00	5.45E+01	1.09E+02	0.5750	1.326E+14
Cs-135	3.2195E-05	601.40	1,202.81	0.00E+00	1.94E-02	3.87E-02	0.8500	5.690E+12
Cs-137	2.7564E+00	601.40	1,202.81	0.00E+00	1.66E+03	3.32E+03	1.2500	1.155E+14
Eu-154	1.5368E-02	601.40	1,202.81	0.00E+00	9.24E+00	1.85E+01	1.7500	7.702E+10
Eu-155	2.9293E-02	601.40	1,202.81	0.00E+00	1.76E+01	3.52E+01	2.2500	1.241E+11
Fe-55	7.7158E-01	601.40	1,202.81	0.00E+00	4.64E+02	9.28E+02	2.7500	9.852E+08
H-3	1.1111E-02	601.40	1,202.81	0.00E+00	6.68E+00	1.34E+01	3.5000	1.147E+08
I-129	7.3684E-07	601.40	1,202.81	0.00E+00	4.43E-04	8.86E-04	5.0000	6.405E+02
Kr-85	2.5263E-01	601.40	1,202.81	0.00E+00	1.52E+02	3.04E+02	7.0000	7.251E+01
Np-237	1.2427E-06	601.40	1,202.81	0.00E+00	7.47E-04	1.49E-03	11.0000	8.260E+00
Pa-231	3.8511E-09	601.40	1,202.81	0.00E+00	2.32E-06	4.63E-06		
Pb-210	7.3880E-15	601.40	1,202.81	0.00E+00	4.44E-12	8.89E-12		
Pm-147	2.1023E+00	601.40	1,202.81	0.00E+00	1.26E+03	2.53E+03		
Pu-238	1.0383E-03	601.40	1,202.81	0.00E+00	6.24E-01	1.25E+00		
Pu-239	5.5293E-03	601.40	1,202.81	0.00E+00	3.33E+00	6.65E+00		
Pu-240	2.1278E-03	601.40	1,202.81	0.00E+00	1.28E+00	2.56E+00		
Pu-241	1.0195E-01	601.40	1,202.81	0.00E+00	6.13E+01	1.23E+02		
Pu-242	2.3128E-07	601.40	1,202.81	0.00E+00	1.39E-04	2.78E-04		
Ra-226	5.2782E-14	601.40	1,202.81	0.00E+00	3.17E-11	6.35E-11		
Ra-228	1.9338E-10	601.40	1,202.81	0.00E+00	1.16E-07	2.33E-07		
Ru-106	9.1684E-02	601.40	1,202.81	0.00E+00	5.51E+01	1.10E+02		
Se-79	1.3018E-05	601.40	1,202.81	0.00E+00	7.83E-03	1.57E-02		
Sn-126	1.2167E-05	601.40	1,202.81	0.00E+00	7.32E-03	1.46E-02		
Sr-90	2.6045E+00	601.40	1,202.81	0.00E+00	1.57E+03	3.13E+03		
Tc-99	4.4241E-04	601.40	1,202.81	0.00E+00	2.66E-01	5.32E-01		
Th-229	1.3713E-10	601.40	1,202.81	0.00E+00	8.25E-08	1.65E-07		
Th-230	1.8090E-11	601.40	1,202.81	0.00E+00	1.09E-08	2.18E-08		
Th-232	2.5278E-10	601.40	1,202.81	0.00E+00	1.52E-07	3.04E-07		
Ti-208	1.6947E-08	601.40	1,202.81	0.00E+00	1.02E-05	2.04E-05		
U-232	4.8737E-08	601.40	1,202.81	0.00E+00	2.93E-05	5.86E-05		
U-233	1.2203E-07	601.40	1,202.81	0.00E+00	7.34E-05	1.47E-04		
U-234	1.5925E-07	601.40	1,202.81	0.00E+00	9.58E-05	1.92E-04		
U-235	-2.6194E-06	601.40	0.00	7.08E-03	5.50E-03	7.08E-03		
U-236	1.2693E-05	601.40	1,202.81	0.00E+00	7.63E-03	1.53E-02		
U-238	-3.6331E-08	601.40	0.00	4.40E-03	4.38E-03	4.40E-03		
Y-90	2.6060E+00	601.40	1,202.81	0.00E+00	1.57E+03	3.13E+03		
Other Radionuclides					2.17E+03	4.34E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal		601.40
Bounding		1,202.81

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	1.08	
Bounding	2.15	

Estimated EOL HM/Given EOL HM
1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 5/20 U OF AZ
SNF ID #: 975
Fuel Units & Descr: 8 - ELEMENT
Heavy Metal Mass BOL=1.497kg; EOL=1.497kg
ROD Storage Site INEEL

Fuel decay start date 2035
Estimates as of 2010
Template TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
Template Burnup(MWd) 6.65
Template BOL Heavy Metal Mass (MT) 0.000195
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0.07

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group Avg MeV Total Photons/sec (bounding)
Ac-227	8.5173E-10	28.58	57.15	0.00E+00	2.43E-08	4.87E-08	0.0150 9.238E+12
Am-241	1.8331E-03	28.58	57.15	0.00E+00	5.24E-02	1.05E-01	0.0250 2.033E+12
Am-242m	1.4129E-06	28.58	57.15	0.00E+00	4.04E-05	8.08E-05	0.0375 1.731E+12
Am-243	1.4774E-07	28.58	57.15	0.00E+00	4.22E-06	8.44E-06	0.0575 1.777E+12
C-14	1.2871E-04	28.58	57.15	0.00E+00	3.68E-03	7.36E-03	0.0850 1.101E+12
Cl-36	2.8120E-06	28.58	57.15	0.00E+00	8.04E-05	1.61E-04	0.1250 7.993E+11
Cm-243	1.7940E-07	28.58	57.15	0.00E+00	5.13E-06	1.03E-05	0.2250 9.337E+11
Cm-244	1.6962E-06	28.58	57.15	0.00E+00	4.85E-05	9.69E-05	0.3750 4.738E+11
Co-60	1.2839E+00	28.58	57.15	0.00E+00	3.67E+01	7.34E+01	0.5750 6.299E+12
Cs-134	9.0541E-02	28.58	57.15	0.00E+00	2.59E+00	5.17E+00	0.8500 2.704E+11
Cs-135	3.2195E-05	28.58	57.15	0.00E+00	9.20E-04	1.84E-03	1.2500 5.491E+12
Cs-137	2.7564E+00	28.58	57.15	0.00E+00	7.88E+01	1.58E+02	1.7500 3.660E+09
Eu-154	1.5368E-02	28.58	57.15	0.00E+00	4.39E-01	8.78E-01	2.2500 5.899E+09
Eu-155	2.9293E-02	28.58	57.15	0.00E+00	8.37E-01	1.67E+00	2.7500 4.681E+07
Fe-55	7.7158E-01	28.58	57.15	0.00E+00	2.20E+01	4.41E+01	3.5000 5.448E+06
H-3	1.1111E-02	28.58	57.15	0.00E+00	3.18E-01	6.35E-01	5.0000 3.090E+01
I-129	7.3684E-07	28.58	57.15	0.00E+00	2.11E-05	4.21E-05	7.0000 3.499E+00
Kr-85	2.5263E-01	28.58	57.15	0.00E+00	7.22E+00	1.44E+01	11.0000 3.987E-01
Np-237	1.2427E-06	28.58	57.15	0.00E+00	3.55E-05	7.10E-05	
Pa-231	3.8511E-09	28.58	57.15	0.00E+00	1.10E-07	2.20E-07	
Pb-210	7.3880E-15	28.58	57.15	0.00E+00	2.11E-13	4.22E-13	
Pm-147	2.1023E+00	28.58	57.15	0.00E+00	6.01E+01	1.20E+02	
Pu-238	1.0383E-03	28.58	57.15	0.00E+00	2.97E-02	5.93E-02	
Pu-239	5.5293E-03	28.58	57.15	0.00E+00	1.58E-01	3.16E-01	
Pu-240	2.1278E-03	28.58	57.15	0.00E+00	6.08E-02	1.22E-01	
Pu-241	1.0195E-01	28.58	57.15	0.00E+00	2.91E+00	5.83E+00	
Pu-242	2.3128E-07	28.58	57.15	0.00E+00	6.61E-06	1.32E-05	
Ra-226	5.2782E-14	28.58	57.15	0.00E+00	1.51E-12	3.02E-12	
Ra-228	1.9338E-10	28.58	57.15	0.00E+00	5.53E-09	1.11E-08	
Ru-106	9.1684E-02	28.58	57.15	0.00E+00	2.62E+00	5.24E+00	
Se-79	1.3018E-05	28.58	57.15	0.00E+00	3.72E-04	7.44E-04	
Sn-126	1.2167E-05	28.58	57.15	0.00E+00	3.48E-04	6.95E-04	
Sr-90	2.6045E+00	28.58	57.15	0.00E+00	7.44E+01	1.49E+02	
Tc-99	4.4241E-04	28.58	57.15	0.00E+00	1.26E-02	2.53E-02	
Th-229	1.3713E-10	28.58	57.15	0.00E+00	3.92E-09	7.84E-09	
Th-230	1.8090E-11	28.58	57.15	0.00E+00	5.17E-10	1.03E-09	
Th-232	2.5278E-10	28.58	57.15	0.00E+00	7.22E-09	1.44E-08	
Ti-208	1.6947E-08	28.58	57.15	0.00E+00	4.84E-07	9.69E-07	
U-232	4.8737E-08	28.58	57.15	0.00E+00	1.39E-06	2.79E-06	
U-233	1.2203E-07	28.58	57.15	0.00E+00	3.49E-06	6.97E-06	
U-234	1.5925E-07	28.58	57.15	0.00E+00	4.55E-06	9.10E-06	
U-235	-2.6194E-06	28.58	0.00	5.95E-04	5.20E-04	5.95E-04	
U-236	1.2693E-05	28.58	57.15	0.00E+00	3.63E-04	7.25E-04	
U-238	-3.6331E-08	28.58	0.00	4.11E-04	4.09E-04	4.11E-04	
Y-90	2.6060E+00	28.58	57.15	0.00E+00	7.45E+01	1.49E+02	
Other Radionuclides					1.03E+02	2.06E+02	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	18.3974873	10 to 20.1

Basis for Parameter Differences*

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		28.58
Bounding		57.15

Basis for burnup used in estimate:

Nominal burnup assumed to be 2% of BOL heavy metal mass
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.56	
Bounding	1.12	

Estimated EOL HM/Given EOL HM

0.98

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 U OF IL
SNF ID #: 449
Fuel Units & Descr: 139 - ELEMENT
Heavy Metal Mass: BOL=27.8kg; EOL=26.41kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20% U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
1.25

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	1.326 90	2.653 81	0.00E+00	1.13E-06	2.26E-06	Avg. MeV	
Am-241	1.8331E-03	1.326 90	2.653 81	0.00E+00	2.43E+00	4.86E+00	0.0150	4.289E+14
Am-242m	1.4129E-06	1.326 90	2.653 81	0.00E+00	1.87E-03	3.75E-03	0.0250	9.438E+13
Am-243	1.4774E-07	1.326 90	2.653 81	0.00E+00	1.96E-04	3.92E-04	0.0375	8.037E+13
C-14	1.2871E-04	1.326 90	2.653 81	0.00E+00	1.71E-01	3.42E-01	0.0575	8.250E+13
Cl-36	2.8120E-06	1.326 90	2.653 81	0.00E+00	3.73E-03	7.46E-03	0.0850	5.111E+13
Cm-243	1.7940E-07	1.326 90	2.653 81	0.00E+00	2.38E-04	4.76E-04	0.1250	3.711E+13
Cm-244	1.6962E-06	1.326 90	2.653 81	0.00E+00	2.25E-03	4.50E-03	0.2250	4.336E+13
Co-60	1.2839E+00	1.326 90	2.653 81	0.00E+00	1.70E+03	3.41E+03	0.3750	2.200E+13
Cs-134	9.0541E-02	1.326 90	2.653 81	0.00E+00	1.20E+02	2.40E+02	0.5750	2.925E+14
Cs-135	3.2195E-05	1.326 90	2.653 81	0.00E+00	4.27E-02	8.54E-02	0.8500	1.255E+13
Cs-137	2.7564E+00	1.326 90	2.653 81	0.00E+00	3.66E+03	7.31E+03	1.2500	2.549E+14
Eu-154	1.5368E-02	1.326 90	2.653 81	0.00E+00	2.04E+01	4.08E+01	1.7500	1.699E+11
Eu-155	2.9293E-02	1.326 90	2.653 81	0.00E+00	3.89E+01	7.77E+01	2.2500	2.739E+11
Fe-55	7.7158E-01	1.326 90	2.653 81	0.00E+00	1.02E+03	2.05E+03	2.7500	2.174E+09
H-3	1.1111E-02	1.326 90	2.653 81	0.00E+00	1.47E+01	2.95E+01	3.5000	2.530E+08
I-129	7.3684E-07	1.326 90	2.653 81	0.00E+00	9.78E-04	1.96E-03	5.0000	1.408E+03
Kr-85	2.5263E-01	1.326 90	2.653 81	0.00E+00	3.35E+02	6.70E+02	7.0000	1.594E+02
Np-237	1.2427E-06	1.326 90	2.653 81	0.00E+00	1.65E-03	3.30E-03	11.0000	1.816E+01
Pa-231	3.8511E-09	1.326 90	2.653 81	0.00E+00	5.11E-06	1.02E-05		
Pb-210	7.3880E-15	1.326 90	2.653 81	0.00E+00	9.80E-12	1.96E-11		
Pm-147	2.1023E+00	1.326 90	2.653 81	0.00E+00	2.79E+03	5.58E+03		
Pu-238	1.0383E-03	1.326 90	2.653 81	0.00E+00	1.38E+00	2.76E+00		
Pu-239	5.5293E-03	1.326 90	2.653 81	0.00E+00	7.34E+00	1.47E+01		
Pu-240	2.1278E-03	1.326 90	2.653 81	0.00E+00	2.82E+00	5.65E+00		
Pu-241	1.0195E-01	1.326 90	2.653 81	0.00E+00	1.35E+02	2.71E+02		
Pu-242	2.3128E-07	1.326 90	2.653.81	0.00E+00	3.07E-04	6.14E-04		
Ra-226	5.2782E-14	1.326 90	2.653 81	0.00E+00	7.00E-11	1.40E-10		
Ra-228	1.9338E-10	1.326 90	2.653 81	0.00E+00	2.57E-07	5.13E-07		
Ru-106	9.1684E-02	1.326 90	2.653 81	0.00E+00	1.22E+02	2.43E+02		
Se-79	1.3018E-05	1.326 90	2.653 81	0.00E+00	1.73E-02	3.45E-02		
Sn-126	1.2167E-05	1.326 90	2.653 81	0.00E+00	1.61E-02	3.23E-02		
Sr-90	2.6045E+00	1.326 90	2.653 81	0.00E+00	3.46E+03	6.91E+03		
Tc-99	4.4241E-04	1.326 90	2.653 81	0.00E+00	5.87E-01	1.17E+00		
Th-229	1.3713E-10	1.326 90	2.653 81	0.00E+00	1.82E-07	3.64E-07		
Th-230	1.8090E-11	1.326 90	2.653 81	0.00E+00	2.40E-08	4.80E-08		
Th-232	2.5278E-10	1.326 90	2.653 81	0.00E+00	3.35E-07	6.71E-07		
Ti-208	1.6947E-08	1.326 90	2.653 81	0.00E+00	2.25E-05	4.50E-05		
U-232	4.8737E-08	1.326 90	2.653 81	0.00E+00	6.47E-05	1.29E-04		
U-233	1.2203E-07	1.326 90	2.653 81	0.00E+00	1.62E-04	3.24E-04		
U-234	1.5925E-07	1.326 90	2.653 81	0.00E+00	2.11E-04	4.23E-04		
U-235	-2.6194E-06	1.326 90	0.00	1.20E-02	8.54E-03	1.20E-02		
U-236	1.2693E-05	1.326 90	2.653 81	0.00E+00	1.68E-02	3.37E-02		
U-238	-3.6331E-08	1.326 90	0.00	7.47E-03	7.43E-03	7.47E-03		
Y-90	2.6060E+00	1.326 90	2.653 81	0.00E+00	3.46E+03	6.92E+03		
Other Radionuclides					4.78E+03	9.57E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	20.0000115	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		1.326 90
Bounding		2.653.81

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	1.40	
Bounding	2.80	

Estimated EOL HM/Given EOL HM

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 8 5/20 U OF TX AUSTIN
SNF ID # 265
Fuel Units & Descr 156 - ELEMENT
Heavy Metal Mass BOL=30 124kg EOL=29 765kg
ROD Storage Site INEEL

¹Fuel decay start date 2035
Estimates as of 2010
Template TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd): 6 65
Template BOL Heavy Metal Mass (MT) 0 000195
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
1 41

II. Estimates							Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 5173E-10	342 51	685 03	0 00E+00	2 92E-07	5 83E-07	Avg MeV	
Am-241	1 8331E-03	342 51	685 03	0 00E+00	6 28E-01	1 26E+00	0 0150	1 107E+14
Am-242m	1 4129E-06	342 51	685 03	0 00E+00	4 84E-04	9 68E-04	0 0250	2 436E+13
Am-243	1 4774E-07	342 51	685 03	0 00E+00	5 06E-05	1 01E-04	0 0375	2 075E+13
C-14	1 2871E-04	342 51	685 03	0 00E+00	4 41E-02	8 82E-02	0 0575	2 129E+13
Cl-36	2 8120E-06	342 51	685 03	0 00E+00	9 63E-04	1 93E-03	0 0850	1 319E+13
Cm-243	1 7940E-07	342 51	685 03	0 00E+00	6 14E-05	1 23E-04	0 1250	9 580E+12
Cm-244	1 6962E-06	342 51	685 03	0 00E+00	5 81E-04	1 16E-03	0 2250	1 119E+13
Co-60	1 2839E+00	342 51	685 03	0 00E+00	4 40E+02	8 80E+02	0 3750	5 679E+12
Cs-134	9 0541E-02	342 51	685 03	0 00E+00	3 10E+01	6 20E+01	0 5750	7 550E+13
Cs-135	3 2195E-05	342 51	685 03	0 00E+00	1 10E-02	2 21E-02	0 8500	3 240E+12
Cs-137	2 7564E+00	342 51	685 03	0 00E+00	9 44E+02	1 89E+03	1 2500	6 581E+13
Eu-154	1 5368E-02	342 51	685 03	0 00E+00	5 26E+00	1 05E+01	1 7500	4 387E+10
Eu-155	2 9293E-02	342 51	685 03	0 00E+00	1 00E+01	2 01E+01	2 2500	7 071E+10
Fe-55	7 7158E-01	342 51	685 03	0 00E+00	2 64E+02	5 29E+02	2 7500	5 611E+08
H-3	1 1111E-02	342 51	685 03	0 00E+00	3 81E+00	7 61E+00	3 5000	6 530E+07
I-129	7 3684E-07	342 51	685 03	0 00E+00	2 52E-04	5 05E-04	5 0000	3 778E+02
Kr-85	2 5263E-01	342 51	685 03	0 00E+00	8 65E+01	1 73E+02	7 0000	4 279E+01
Np-237	1 2427E-06	342 51	685 03	0 00E+00	4 26E-04	8 51E-04	11 0000	4 876E+00
Pa-231	3 8511E-09	342 51	685 03	0 00E+00	1 32E-06	2 64E-06		
Pb-210	7 3880E-15	342 51	685 03	0 00E+00	2 53E-12	5 06E-12		
Pm-147	2 1023E+00	342 51	685 03	0 00E+00	7 20E+02	1 44E+03		
Pu-238	1 0383E-03	342 51	685 03	0 00E+00	3 56E-01	7 11E-01		
Pu-239	5 5293E-03	342 51	685 03	0 00E+00	1 89E+00	3 79E+00		
Pu-240	2 1278E-03	342 51	685 03	0 00E+00	7 29E-01	1 46E+00		
Pu-241	1 0195E-01	342 51	685 03	0 00E+00	3 49E+01	6 98E+01		
Pu-242	2 3128E-07	342 51	685 03	0 00E+00	7 92E-05	1 58E-04		
Ra-226	5 2782E-14	342 51	685 03	0 00E+00	1 81E-11	3 62E-11		
Ra-228	1 9338E-10	342 51	685 03	0 00E+00	6 62E-08	1 32E-07		
Ru-106	9 1684E-02	342 51	685 03	0 00E+00	3 14E+01	6 28E+01		
Se-79	1 3018E-05	342 51	685 03	0 00E+00	4 46E-03	8 92E-03		
Sn-126	1 2167E-05	342 51	685 03	0 00E+00	4 17E-03	8 33E-03		
Sr-90	2 6045E+00	342 51	685 03	0 00E+00	8 92E+02	1 78E+03		
Tc-99	4 4241E-04	342 51	685 03	0 00E+00	1 52E-01	3 03E-01		
Th-229	1 3713E-10	342 51	685 03	0 00E+00	4 70E-08	9 39E-08		
Th-230	1 8090E-11	342 51	685 03	0 00E+00	6 20E-09	1 24E-08		
Th-232	2 5278E-10	342 51	685 03	0 00E+00	8 66E-08	1 73E-07		
Ti-208	1 6947E-08	342 51	685 03	0 00E+00	5 80E-06	1 16E-05		
U-232	4 8737E-08	342 51	685 03	0 00E+00	1 67E-05	3 34E-05		
U-233	1 2203E-07	342 51	685 03	0 00E+00	4 18E-05	8 36E-05		
U-234	1 5925E-07	342 51	685 03	0 00E+00	5 45E-05	1 09E-04		
U-235	-2 6194E-06	342 51	0 00	1 29E-02	1 20E-02	1 29E-02		
U-236	1 2693E-05	342 51	685 03	0 00E+00	4 35E-03	8 70E-03		
U-238	-3 6331E-08	342 51	0 00	8 12E-03	8 11E-03	8 12E-03		
Y-90	2 6060E+00	342 51	685 03	0 00E+00	8 93E+02	1 79E+03		
Other Radionuclides					1 23E+03	2 47E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	19 78958118	10 to 20 1	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		342 51	
Bounding		685 03	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0 33		
Bounding	0 67		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 5/20 U OF UTAH
SNF ID #: 261
Fuel Units & Descr: 85 - ELEMENT
Heavy Metal Mass BOL=14 773kg EOL=14 518kg
ROD Storage Site INEEL

¹Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd): 6 65
Template BOL Heavy Metal Mass (MT): 0 000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0 77

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	243 42	486 85	0 00E+00	2 07E-07	4 15E-07	Avg. MeV	
Am-241	1 8331E-03	243 42	486 85	0 00E+00	4 46E-01	8 92E-01	0 0150	7 869E+13
Am-242m	1 4129E-06	243 42	486 85	0 00E+00	3 44E-04	6 88E-04	0 0250	1 731E+13
Am-243	1 4774E-07	243 42	486 85	0 00E+00	3 60E-05	7 19E-05	0 0375	1 474E+13
C-14	1.2871E-04	243 42	486 85	0 00E+00	3.13E-02	6 27E-02	0 0575	1 513E+13
Cl-36	2 8120E-06	243 42	486 85	0 00E+00	6.85E-04	1 37E-03	0 0850	9 376E+12
Cm-243	1 7940E-07	243 42	486 85	0 00E+00	4.37E-05	8 73E-05	0 1250	6 809E+12
Cm-244	1 6962E-06	243 42	486 85	0 00E+00	4.13E-04	8 26E-04	0 2250	7 954E+12
Co-60	1 2839E+00	243 42	486 85	0 00E+00	3 13E+02	6 25E+02	0 3750	4 036E+12
Cs-134	9 0541E-02	243 42	486 85	0 00E+00	2 20E+01	4 41E+01	0 5750	5 366E+13
Cs-135	3.2195E-05	243 42	486 85	0 00E+00	7 84E-03	1.57E-02	0 8500	2 303E+12
Cs-137	2 7564E+00	243 42	486 85	0 00E+00	6 71E+02	1.34E+03	1 2500	4 677E+13
Eu-154	1 5368E-02	243 42	486 85	0 00E+00	3 74E+00	7 48E+00	1 7500	3 118E+10
Eu-155	2 9293E-02	243 42	486 85	0 00E+00	7 13E+00	1.43E+01	2 2500	5 025E+10
Fe-55	7 7158E-01	243 42	486 85	0 00E+00	1 88E+02	3.76E+02	2 7500	3 988E+08
H-3	1 1111E-02	243 42	486 85	0 00E+00	2 70E+00	5 41E+00	3 5000	4 641E+07
I-129	7 3684E-07	243 42	486 85	0 00E+00	1 79E-04	3.59E-04	5 0000	2 643E+02
Kr-85	2 5263E-01	243 42	486 85	0 00E+00	6 15E+01	1.23E+02	7 0000	2 993E+01
Np-237	1 2427E-06	243 42	486 85	0 00E+00	3 03E-04	6 05E-04	11 0000	3 411E+00
Pa-231	3 8511E-09	243 42	486 85	0 00E+00	9 37E-07	1.87E-06		
Pb-210	7 3880E-15	243 42	486 85	0 00E+00	1 80E-12	3 60E-12		
Pm-147	2 1023E+00	243 42	486 85	0 00E+00	5 12E+02	1 02E+03		
Pu-238	1 0383E-03	243 42	486 85	0 00E+00	2 53E-01	5 06E-01		
Pu-239	5 5293E-03	243 42	486 85	0 00E+00	1 35E+00	2 69E+00		
Pu-240	2 1278E-03	243 42	486 85	0 00E+00	5 18E-01	1 04E+00		
Pu-241	1 0195E-01	243 42	486 85	0 00E+00	2 48E+01	4 96E+01		
Pu-242	2 3128E-07	243 42	486 85	0 00E+00	5 63E-05	1 13E-04		
Ra-226	5 2782E-14	243 42	486 85	0 00E+00	1 28E-11	2 57E-11		
Ra-228	1 9338E-10	243 42	486 85	0 00E+00	4 71E-08	9 41E-08		
Ru-106	9 1684E-02	243 42	486 85	0 00E+00	2 23E+01	4 46E+01		
Sa-79	1 3018E-05	243 42	486 85	0 00E+00	3 17E-03	6 34E-03		
Sn-126	1 2167E-05	243 42	486 85	0 00E+00	2 96E-03	5 92E-03		
Sr-90	2 6045E+00	243 42	486 85	0 00E+00	6 34E+02	1 27E+03		
Tc-99	4 4241E-04	243 42	486 85	0 00E+00	1 08E-01	2 15E-01		
Th-229	1 3713E-10	243 42	486 85	0 00E+00	3 34E-08	6 68E-08		
Th-230	1 8090E-11	243 42	486 85	0 00E+00	4 40E-09	8 81E-09		
Th-232	2 5278E-10	243 42	486 85	0 00E+00	6 15E-08	1 23E-07		
Ti-208	1 6947E-08	243 42	486 85	0 00E+00	4 13E-06	8 25E-06		
U-232	4 8737E-08	243 42	486 85	0 00E+00	1.19E-05	2 37E-05	Thermal Power	
U-233	1.2203E-07	243 42	486 85	0 00E+00	2.97E-05	5 94E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1 5925E-07	243 42	486 85	0 00E+00	3 88E-05	7 75E-05	1 42E+01	2 83E+01
U-235	-2 6194E-06	243 42	0 00	6.35E-03	5.72E-03	6 35E-03	Total	Total
U-236	1.2693E-05	243 42	486 85	0 00E+00	3.09E-03	6 18E-03		
U-238	-3 6331E-08	243 42	0 00	3 98E-03	3.97E-03	3 98E-03		
Y-90	2.6060E+00	243 42	486 85	0 00E+00	6 34E+02	1.27E+03		
Other Radionuclides					8 78E+02	1 76E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19 8999888	10 to 20 1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		243 42
Bounding:		486 85

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 48	
Bounding	0 97	

Estimated EOL HM/Given EOL HM

1 00

¹Reactor shutdown core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.520 UC @ Berkeley
 SNF ID #: 874
 Fuel Units & Descr: 111 - ELEMENT
 Heavy Metal Mass BOL=21 645kg, EOL=19 17kg
 ROD Storage Site INEEL

¹Fuel decay start date 1982
 Estimates as of 2010
 Template TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd) 6 65
 Template BOL Heavy Metal Mass (MT) 0 000195
 Template Decay Time 25 years

Estimated
 Canister usage
 18"x10"
 1 00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4 1459E-09	2,362 94	4,725 88	0 00E+00	9 80E-06	1 96E-05	Avg MeV	
Am-241	3 5850E-03	2,362 94	4,725 88	0 00E+00	8 47E+00	1 69E+01	0 0150	4 195E+14
Am-242m	1 2899E-06	2,362 94	4,725 88	0 00E+00	3 05E-03	6 10E-03	0 0250	8 721E+13
Am-243	1 4747E-07	2,362 94	4,725 88	0 00E+00	3 48E-04	6 97E-04	0 0375	7 566E+13
C-14	1 2839E-04	2,362 94	4,725 88	0 00E+00	3 03E-01	6 07E-01	0 0575	8 148E+13
Cl-36	2 8120E-06	2,362 94	4,725 88	0 00E+00	6 64E-03	1 33E-02	0 0850	4 911E+13
Cm-243	1 1038E-07	2,362 94	4,725 88	0 00E+00	2 61E-04	5 22E-04	0 1250	3 204E+13
Cm-244	7 8917E-07	2,362 94	4,725 88	0 00E+00	1 86E-03	3 73E-03	0 2250	4 224E+13
Co-60	9 2647E-02	2,362 94	4,725 88	0 00E+00	2 19E+02	4 38E+02	0 3750	1 845E+13
Cs-134	1 0940E-04	2,362 94	4,725 88	0 00E+00	2 59E-01	5 17E-01	0 5750	3 058E+14
Cs-135	3 2195E-05	2,362 94	4,725 88	0 00E+00	7 61E-02	1 52E-01	0 8500	3 283E+12
Cs-137	1 7368E+00	2,362 94	4,725 88	0 00E+00	4 10E+03	8 21E+03	1 2500	3 371E+13
Eu-154	3 0677E-03	2,362 94	4,725 88	0 00E+00	7 25E+00	1 45E+01	1 7500	8 546E+10
Eu-155	1 7925E-03	2,362 94	4,725 88	0 00E+00	4 24E+00	8 47E+00	2 2500	1 802E+08
Fe-55	3 7444E-03	2,362 94	4,725 88	0 00E+00	8 85E+00	1 77E+01	2 7500	3 047E+06
H-3	3 6180E-03	2,362 94	4,725 88	0 00E+00	8 55E+00	1 71E+01	3 5000	6 336E+03
I-129	7 3684E-07	2,362 94	4,725 88	0 00E+00	1 74E-03	3 48E-03	5 0000	2 465E+03
Kr-85	6 9368E-02	2,362 94	4,725 88	0 00E+00	1 64E+02	3 28E+02	7 0000	2 782E+02
Np-237	1 2662E-06	2,362 94	4,725 88	0 00E+00	2 99E-03	5 98E-03	11 0000	3 163E+01
Pa-231	9 1654E-09	2,362 94	4,725 88	0 00E+00	2 17E-05	4 33E-05		
Pb-210	1 3728E-13	2,362 94	4,725 88	0 00E+00	3 24E-10	6 49E-10		
Pm-147	1 0702E-02	2,362 94	4,725 88	0 00E+00	2 53E+01	5 06E+01		
Pu-238	8 8692E-04	2,362 94	4,725 88	0 00E+00	2 10E+00	4 19E+00		
Pu-239	5 5263E-03	2,362 94	4,725 88	0 00E+00	1 31E+01	2 61E+01		
Pu-240	2 1233E-03	2,362 94	4,725 88	0 00E+00	5 02E+00	1 00E+01		
Pu-241	3 8962E-02	2,362 94	4,725 88	0 00E+00	9 21E+01	1 84E+02		
Pu-242	2 3128E-07	2,362 94	4,725 88	0 00E+00	5 46E-04	1 09E-03		
Ra-226	4 6752E-13	2,362 94	4,725 88	0 00E+00	1 10E-09	2 21E-09		
Ra-228	2 4827E-10	2,362 94	4,725 88	0 00E+00	5 87E-07	1 17E-06		
Ru-106	9 8526E-08	2,362 94	4,725 88	0 00E+00	2 33E-04	4 66E-04		
Se-79	1 3015E-05	2,362 94	4,725 88	0 00E+00	3 08E-02	6 15E-02		
Sn-126	1 2165E-05	2,362 94	4,725 88	0 00E+00	2 87E-02	5 75E-02		
Sr-90	1 6195E+00	2,362 94	4,725 88	0 00E+00	3 83E+03	7 65E+03		
Tc-99	4 4241E-04	2,362 94	4,725 88	0 00E+00	1 05E+00	2 09E+00		
Th-229	4 2451E-10	2,362 94	4,725 88	0 00E+00	1 00E-06	2 01E-06		
Th-230	6 1398E-11	2,362 94	4,725 88	0 00E+00	1 45E-07	2 90E-07		
Th-232	2 5278E-10	2,362 94	4,725 88	0 00E+00	5 97E-07	1 19E-06		
Ti-208	1 5098E-08	2,362 94	4,725 88	0 00E+00	3 57E-05	7 14E-05		
U-232	4 0662E-08	2,362 94	4 725 88	0 00E+00	9 61E-05	1 92E-04		
U-233	1 2217E-07	2,362 94	4,725 88	0 00E+00	2 89E-04	5 77E-04		
U-234	2 2391E-07	2,362 94	4,725 88	0 00E+00	5 29E-04	1 06E-03		
U-235	-2 6194E-06	2,362 94	0 00	9 35E-03	3 17E-03	9 35E-03		
U-236	1 2695E-05	2,362 94	4,725 88	0 00E+00	3 00E-02	6 00E-02	5 01E+01	1 00E+02
U-238	-3 6331E-08	2,362 94	0 00	5 82E-03	5 73E-03	5 82E-03	Total	Total
Y-90	1 6195E+00	2,362 94	4,725 88	0 00E+00	3 83E+03	7 65E+03		
Other Radionuclides					4 07E+03	8 13E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20	10 to 20 1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		2,362 94	
Bounding		4,725 88	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	3.20		
Bounding	6.40		1 00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 5/20 UNIV OF MARYLAND
SNF ID #: 260
Fuel Units & Descr: 93 - ELEMENT
Heavy Metal Mass: BOL=17.205kg, EOL=16.489kg
ROD Storage Site: INEEL

Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0.84

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	683.59	1,367.19	0.00E+00	5.82E-07	1.16E-06	Avg MeV	
Am-241	1.8331E-03	683.59	1,367.19	0.00E+00	1.25E+00	2.51E+00	0.0150	2.210E+14
Am-242m	1.4129E-06	683.59	1,367.19	0.00E+00	9.66E-04	1.93E-03	0.0250	4.862E+13
Am-243	1.4774E-07	683.59	1,367.19	0.00E+00	1.01E-04	2.02E-04	0.0375	4.141E+13
C-14	1.2871E-04	683.59	1,367.19	0.00E+00	8.80E-02	1.76E-01	0.0575	4.250E+13
Cl-36	2.8120E-06	683.59	1,367.19	0.00E+00	1.92E-03	3.84E-03	0.0850	2.633E+13
Cm-243	1.7940E-07	683.59	1,367.19	0.00E+00	1.23E-04	2.45E-04	0.1250	1.912E+13
Cm-244	1.6962E-06	683.59	1,367.19	0.00E+00	1.16E-03	2.32E-03	0.2250	2.234E+13
Co-60	1.2839E+00	683.59	1,367.19	0.00E+00	8.78E+02	1.76E+03	0.3750	1.133E+13
Cs-134	9.0541E-02	683.59	1,367.19	0.00E+00	6.19E+01	1.24E+02	0.5750	1.507E+14
Cs-135	3.2195E-05	683.59	1,367.19	0.00E+00	2.20E-02	4.40E-02	0.8500	6.467E+12
Cs-137	2.7564E+00	683.59	1,367.19	0.00E+00	1.88E+03	3.77E+03	1.2500	1.313E+14
Eu-154	1.5368E-02	683.59	1,367.19	0.00E+00	1.05E+01	2.10E+01	1.7500	8.755E+10
Eu-155	2.9293E-02	683.59	1,367.19	0.00E+00	2.00E+01	4.00E+01	2.2500	1.411E+11
Fe-55	7.7158E-01	683.59	1,367.19	0.00E+00	5.27E+02	1.05E+03	2.7500	1.120E+09
H-3	1.1111E-02	683.59	1,367.19	0.00E+00	7.60E+00	1.52E+01	3.5000	1.303E+08
I-129	7.3684E-07	683.59	1,367.19	0.00E+00	5.04E-04	1.01E-03	5.0000	7.272E+02
Kr-85	2.5263E-01	683.59	1,367.19	0.00E+00	1.73E+02	3.45E+02	7.0000	8.232E+01
Np-237	1.2427E-06	683.59	1,367.19	0.00E+00	8.50E-04	1.70E-03	11.0000	9.378E+00
Pa-231	3.8511E-09	683.59	1,367.19	0.00E+00	2.63E-06	5.27E-06		
Pb-210	7.3880E-15	683.59	1,367.19	0.00E+00	5.05E-12	1.01E-11		
Pm-147	2.1023E+00	683.59	1,367.19	0.00E+00	1.44E+03	2.87E+03		
Pu-238	1.0383E-03	683.59	1,367.19	0.00E+00	7.10E-01	1.42E+00		
Pu-239	5.5293E-03	683.59	1,367.19	0.00E+00	3.78E+00	7.56E+00		
Pu-240	2.1278E-03	683.59	1,367.19	0.00E+00	1.45E+00	2.91E+00		
Pu-241	1.0195E-01	683.59	1,367.19	0.00E+00	6.97E+01	1.39E+02		
Pu-242	2.3128E-07	683.59	1,367.19	0.00E+00	1.58E-04	3.16E-04		
Ra-226	5.2782E-14	683.59	1,367.19	0.00E+00	3.61E-11	7.22E-11		
Ra-228	1.9338E-10	683.59	1,367.19	0.00E+00	1.32E-07	2.64E-07		
Ru-106	9.1684E-02	683.59	1,367.19	0.00E+00	6.27E+01	1.25E+02		
Se-79	1.3018E-05	683.59	1,367.19	0.00E+00	8.90E-03	1.78E-02		
Sn-126	1.2167E-05	683.59	1,367.19	0.00E+00	8.32E-03	1.66E-02		
Sr-90	2.6045E+00	683.59	1,367.19	0.00E+00	1.78E+03	3.56E+03		
Tc-99	4.4241E-04	683.59	1,367.19	0.00E+00	3.02E-01	6.05E-01		
Th-229	1.3713E-10	683.59	1,367.19	0.00E+00	9.37E-08	1.87E-07		
Th-230	1.8090E-11	683.59	1,367.19	0.00E+00	1.24E-08	2.47E-08		
Th-232	2.5278E-10	683.59	1,367.19	0.00E+00	1.73E-07	3.46E-07		
Ti-208	1.6947E-08	683.59	1,367.19	0.00E+00	1.16E-05	2.32E-05		
U-232	4.8737E-08	683.59	1,367.19	0.00E+00	3.33E-05	6.66E-05		
U-233	1.2203E-07	683.59	1,367.19	0.00E+00	8.34E-05	1.67E-04	Thermal Power	
U-234	1.5925E-07	683.59	1,367.19	0.00E+00	1.09E-04	2.18E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2.6194E-06	683.59	0.00	7.44E-03	5.65E-03	7.44E-03	3.98E+01	7.96E+01
U-236	1.2693E-05	683.59	1,367.19	0.00E+00	8.68E-03	1.74E-02	Total	Total
U-238	-3.6331E-08	683.59	0.00	4.63E-03	4.60E-03	4.63E-03		
Y-90	2.6060E+00	683.59	1,367.19	0.00E+00	1.78E+03	3.56E+03		
Other Radionuclides					2.46E+03	4.93E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE		
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
Bounding		683.59 1,367.19	

Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/Given Burnup	
Bounding	1.17 2.33		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 UNIV OF CAL-IRVINE
SNF ID #: 264
Fuel Units & Descr: 104 - ELEMENT
Heavy Metal Mass BOL=19 926kg, EOL=19 77kg
ROD Storage Site INEEL

¹Fuel decay start date 2035
Estimates as of 2010
Template TRIGA-SS (LW/U-ZrC, SST, 10 to 20%, U)
²Template Burnup(MWd) 6.65
Template BOL Heavy Metal Mass (MT) 0.000195
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0.94

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	148.92	297.84	0.00E+00	1.27E-07	2.54E-07	Avg MeV	
Am-241	1.8331E-03	148.92	297.84	0.00E+00	2.73E-01	5.46E-01	0.0150	4.814E+13
Am-242m	1.4129E-06	148.92	297.84	0.00E+00	2.10E-04	4.21E-04	0.0250	1.059E+13
Am-243	1.4774E-07	148.92	297.84	0.00E+00	2.20E-05	4.40E-05	0.0375	9.020E+12
C-14	1.2871E-04	148.92	297.84	0.00E+00	1.92E-02	3.83E-02	0.0575	9.259E+12
Cl-36	2.8120E-06	148.92	297.84	0.00E+00	4.19E-04	8.38E-04	0.0850	5.736E+12
Cm-243	1.7940E-07	148.92	297.84	0.00E+00	2.67E-05	5.34E-05	0.1250	4.165E+12
Cm-244	1.6962E-06	148.92	297.84	0.00E+00	2.53E-04	5.05E-04	0.2250	4.866E+12
Co-60	1.2839E+00	148.92	297.84	0.00E+00	1.91E+02	3.82E+02	0.3750	2.469E+12
Cs-134	9.0541E-02	148.92	297.84	0.00E+00	1.35E+01	2.70E+01	0.5750	3.283E+13
Cs-135	3.2195E-05	148.92	297.84	0.00E+00	4.79E-03	9.59E-03	0.8500	1.409E+12
Cs-137	2.7564E+00	148.92	297.84	0.00E+00	4.10E+02	8.21E+02	1.2500	2.861E+13
Eu-154	1.5368E-02	148.92	297.84	0.00E+00	2.29E+00	4.58E+00	1.7500	1.907E+10
Eu-155	2.9293E-02	148.92	297.84	0.00E+00	4.36E+00	8.72E+00	2.2500	3.074E+10
Fe-55	7.7158E-01	148.92	297.84	0.00E+00	1.15E+02	2.30E+02	2.7500	2.440E+08
H-3	1.1111E-02	148.92	297.84	0.00E+00	1.65E+00	3.31E+00	3.5000	2.839E+07
I-129	7.3684E-07	148.92	297.84	0.00E+00	1.10E-04	2.19E-04	5.0000	1.685E+02
Kr-85	2.5263E-01	148.92	297.84	0.00E+00	3.76E+01	7.52E+01	7.0000	1.909E+01
Np-237	1.2427E-06	148.92	297.84	0.00E+00	1.85E-04	3.70E-04	11.0000	2.176E+00
Pa-231	3.8511E-09	148.92	297.84	0.00E+00	5.74E-07	1.15E-06		
Pb-210	7.3880E-15	148.92	297.84	0.00E+00	1.10E-12	2.20E-12		
Pm-147	2.1023E+00	148.92	297.84	0.00E+00	3.13E+02	6.26E+02		
Pu-238	1.0383E-03	148.92	297.84	0.00E+00	1.55E-01	3.09E-01		
Pu-239	5.5293E-03	148.92	297.84	0.00E+00	8.23E-01	1.65E+00		
Pu-240	2.1278E-03	148.92	297.84	0.00E+00	3.17E-01	6.34E-01		
Pu-241	1.0195E-01	148.92	297.84	0.00E+00	1.52E+01	3.04E+01		
Pu-242	2.3128E-07	148.92	297.84	0.00E+00	3.44E-05	6.89E-05		
Ra-226	5.2782E-14	148.92	297.84	0.00E+00	7.86E-12	1.57E-11		
Ra-228	1.9338E-10	148.92	297.84	0.00E+00	2.88E-08	5.76E-08		
Ru-106	9.1684E-02	148.92	297.84	0.00E+00	1.37E+01	2.73E+01		
Se-79	1.3018E-05	148.92	297.84	0.00E+00	1.94E-03	3.88E-03		
Sn-126	1.2167E-05	148.92	297.84	0.00E+00	1.81E-03	3.62E-03		
Sr-90	2.6045E+00	148.92	297.84	0.00E+00	3.88E+02	7.76E+02		
Tc-99	4.4241E-04	148.92	297.84	0.00E+00	6.59E-02	1.32E-01		
Th-229	1.3713E-10	148.92	297.84	0.00E+00	2.04E-08	4.08E-08		
Th-230	1.8090E-11	148.92	297.84	0.00E+00	2.69E-09	5.39E-09		
Th-232	2.5278E-10	148.92	297.84	0.00E+00	3.76E-08	7.53E-08		
Ti-208	1.6947E-08	148.92	297.84	0.00E+00	2.52E-06	5.05E-06		
U-232	4.8737E-08	148.92	297.84	0.00E+00	7.26E-06	1.45E-05		
U-233	1.2203E-07	148.92	297.84	0.00E+00	1.82E-05	3.63E-05		
U-234	1.5925E-07	148.92	297.84	0.00E+00	2.37E-05	4.74E-05		
U-235	-2.6194E-06	148.92	0.00	8.61E-03	8.22E-03	8.61E-03		
U-236	1.2693E-05	148.92	297.84	0.00E+00	1.89E-03	3.78E-03		
U-238	-3.6331E-08	148.92	0.00	5.36E-03	5.35E-03	-5.36E-03		
Y-90	2.6060E+00	148.92	297.84	0.00E+00	3.88E+02	7.76E+02		
Other Radionuclides					5.37E+02	1.07E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	20.00002088	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		148.92
Bounding		297.84

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.22	
Bounding	0.44	

Estimated EOL HM/Given EOL HM

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 5/20 UNIV OF WISCONSIN
SNF ID #: 262
Fuel Units & Descr: 128 - ELEMENT
Heavy Metal Mass: BOL=24 96kg, EOL=22.182kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20% U)
²Template Burnup(MWd): 6 65
Template BOL Heavy Metal Mass (MT): 0 000195
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
1 15

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 5173E-10	2,651 52	5,303 03	0 00E+00	2 26E-06	4 52E-06	Avg MeV	
Am-241	1 8331E-03	2,651 52	5,303 03	0 00E+00	4 86E+00	9 72E+00	0.0150	8 571E+14
Am-242m	1 4129E-06	2,651 52	5,303 03	0 00E+00	3 75E-03	7 49E-03	0.0250	1.886E+14
Am-243	1 4774E-07	2,651 52	5,303 03	0 00E+00	3 92E-04	7 83E-04	0 0375	1 606E+14
C-14	1 2871E-04	2,651 52	5,303 03	0 00E+00	3 41E-01	6 83E-01	0.0575	1 649E+14
Cl-36	2 8120E-06	2,651 52	5,303 03	0 00E+00	7 46E-03	1 49E-02	0 0850	1 021E+14
Cm-243	1 7940E-07	2,651 52	5,303 03	0 00E+00	4 76E-04	9 51E-04	0 1250	7 416E+13
Cm-244	1 6962E-06	2,651 52	5,303 03	0 00E+00	4 50E-03	9 00E-03	0.2250	8 664E+13
Co-60	1 2839E+00	2,651 52	5,303 03	0 00E+00	3 40E+03	6 81E+03	0.3750	4.397E+13
Cs-134	9 0541E-02	2,651 52	5,303 03	0 00E+00	2 40E+02	4 80E+02	0.5750	5 845E+14
Cs-135	3 2195E-05	2,651 52	5,303 03	0 00E+00	8 54E-02	1 71E-01	0.8500	2 509E+13
Cs-137	2 7564E+00	2,651 52	5,303 03	0 00E+00	7 31E+03	1 46E+04	1.2500	5 094E+14
Eu-154	1 5368E-02	2,651 52	5,303 03	0 00E+00	4 07E+01	8 15E+01	1 7500	3 396E+11
Eu-155	2 9293E-02	2,651 52	5,303 03	0 00E+00	7 77E+01	1 55E+02	2.2500	5 474E+11
Fe-55	7 7158E-01	2,651 52	5,303 03	0 00E+00	2 05E+03	4 09E+03	2.7500	4 344E+09
H-3	1 1111E-02	2,651 52	5,303 03	0 00E+00	2 95E+01	5 89E+01	3 5000	5 055E+08
I-129	7 3684E-07	2,651 52	5,303 03	0 00E+00	1 95E-03	3 91E-03	5 0000	2 795E+03
Kr-85	2 5263E-01	2,651 52	5,303 03	0 00E+00	6 70E+02	1 34E+03	7.0000	3 163E+01
Np-237	1 2427E-06	2,651 52	5,303 03	0 00E+00	3 30E-03	6 59E-03	11 0000	3 603E+01
Pa-231	3 8511E-09	2,651 52	5,303 03	0 00E+00	1 02E-05	2 04E-05		
Pb-210	7 3880E-15	2,651 52	5,303 03	0 00E+00	1 96E-11	3 92E-11		
Pm-147	2 1023E+00	2,651 52	5,303 03	0 00E+00	5 57E+03	1 11E+04		
Pu-238	1 0383E-03	2,651 52	5,303 03	0 00E+00	2 75E+00	5 51E+00		
Pu-239	5 5293E-03	2,651 52	5,303 03	0 00E+00	1 47E+01	2 93E+01		
Pu-240	2 1278E-03	2,651 52	5,303 03	0 00E+00	5 64E+00	1 13E+01		
Pu-241	1 0195E-01	2,651 52	5,303 03	0 00E+00	2 70E+02	5 41E+02		
Pu-242	2 3128E-07	2,651 52	5,303 03	0 00E+00	6 13E-04	1 23E-03		
Ra-226	5 2782E-14	2,651 52	5,303 03	0 00E+00	1 40E-10	2 80E-10		
Ra-228	1 9338E-10	2,651 52	5,303 03	0 00E+00	5 13E-07	1 03E-06		
Ru-106	9 1684E-02	2,651 52	5,303 03	0 00E+00	2 43E+02	4 86E+02		
Se-79	1 3018E-05	2,651 52	5,303 03	0 00E+00	3 45E-02	6 90E-02		
Sn-126	1 2167E-05	2,651 52	5,303 03	0 00E+00	3 23E-02	6 45E-02		
Sr-90	2 6045E+00	2,651 52	5,303 03	0 00E+00	6 91E+03	1 38E+04		
Tc-99	4 4241E-04	2,651 52	5,303 03	0 00E+00	1 17E+00	2 35E+00		
Th-229	1 3713E-10	2,651 52	5,303 03	0 00E+00	3 64E-07	7 27E-07		
Th-230	1 8090E-11	2,651 52	5,303 03	0 00E+00	4 80E-08	9 59E-08		
Th-232	2 5278E-10	2,651 52	5,303 03	0 00E+00	6 70E-07	1 34E-06		
Ti-208	1 6947E-08	2,651 52	5,303 03	0 00E+00	4 49E-05	8 99E-05		
U-232	4 8737E-08	2,651 52	5,303 03	0 00E+00	1 29E-04	2 58E-04		
U-233	1 2203E-07	2,651 52	5,303 03	0 00E+00	3 24E-04	6 47E-04		
U-234	1 5925E-07	2,651 52	5,303 03	0 00E+00	4 22E-04	8 44E-04		
U-235	-2 6194E-06	2,651 52	0 00	1 08E-02	3 84E-03	1 08E-02		
U-236	1 2693E-05	2,651 52	5,303 03	0 00E+00	3 37E-02	6 73E-02		
U-238	-3 6331E-08	2,651 52	0 00	6 71E-03	6 61E-03	6 71E-03		
Y-90	2 6060E+00	2,651 52	5,303 03	0 00E+00	6 91E+03	1 38E+04		
Other Radionuclides					9 56E+03	1 91E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1 54E+02	3 09E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
BOL HM Constituents	SST	SST	
BOL Enrichment %	U	U	
	20	10 to 20 1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		2 651 52	
Bounding		5 303 03	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	3 12		
Bounding	6.23		1 00

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 8.5/20 USGS
SNF ID # 964

Fuel Units & Descr 1 - ELEMENT

Heavy Metal Mass BOL=0 184kg EOL=0 183kg

ROD Storage Site INEEL

*Fuel decay start date

2035

Estimates as of

2010

Template

TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)

*Template Burnup(MWd)

6 65

Template BOL Heavy Metal Mass (MT)

0.000195

Template Decay Time

5 years

Estimated

Canister usage

18"x10"

0 01

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	0.76	1.53	0.00E+00	6.50E-10	1.30E-09	Avg MeV	
Am-241	1.8331E-03	0.76	1.53	0.00E+00	1.40E-03	2.80E-03	0.0150	2.469E+11
Am-242m	1.4129E-06	0.76	1.53	0.00E+00	1.08E-06	2.16E-06	0.0250	5.432E+10
Am-243	1.4774E-07	0.76	1.53	0.00E+00	1.13E-07	2.26E-07	0.0375	4.626E+10
C-14	1.2871E-04	0.76	1.53	0.00E+00	9.83E-05	1.97E-04	0.0575	4.748E+10
Cl-36	2.8120E-06	0.76	1.53	0.00E+00	2.15E-06	4.30E-06	0.0850	2.942E+10
Cm-243	1.7940E-07	0.76	1.53	0.00E+00	1.37E-07	2.74E-07	0.1250	2.136E+10
Cm-244	1.6962E-06	0.76	1.53	0.00E+00	1.30E-06	2.59E-06	0.2250	2.495E+10
Co-60	1.2839E+00	0.76	1.53	0.00E+00	9.81E-01	1.96E+00	0.3750	1.266E+10
Cs-134	9.0541E-02	0.76	1.53	0.00E+00	6.91E-02	1.38E-01	0.5750	1.683E+11
Cs-135	3.2195E-05	0.76	1.53	0.00E+00	2.46E-05	4.92E-05	0.8500	7.225E+09
Cs-137	2.7564E+00	0.76	1.53	0.00E+00	2.11E+00	4.21E+00	1.2500	1.467E+11
Eu-154	1.5368E-02	0.76	1.53	0.00E+00	1.17E-02	2.35E-02	1.7500	9.781E+07
Eu-155	2.9293E-02	0.76	1.53	0.00E+00	2.24E-02	4.47E-02	2.2500	1.577E+08
Fe-55	7.7158E-01	0.76	1.53	0.00E+00	5.89E-01	1.18E+00	2.7500	1.251E+06
H-3	1.1111E-02	0.76	1.53	0.00E+00	8.49E-03	1.70E-02	3.5000	1.456E+05
I-129	7.3684E-07	0.76	1.53	0.00E+00	5.63E-07	1.13E-06	5.0000	9.154E-01
Kr-85	2.5263E-01	0.76	1.53	0.00E+00	1.93E-01	3.86E-01	7.0000	1.038E-01
Np-237	1.2427E-06	0.76	1.53	0.00E+00	9.49E-07	1.90E-06	11.0000	1.184E-02
Pa-231	3.8511E-09	0.76	1.53	0.00E+00	2.94E-09	5.88E-09		
Pb-210	7.3880E-15	0.76	1.53	0.00E+00	5.64E-15	1.13E-14		
Pm-147	2.1023E+00	0.76	1.53	0.00E+00	1.61E+00	3.21E+00		
Pu-238	1.0383E-03	0.76	1.53	0.00E+00	7.93E-04	1.59E-03		
Pu-239	5.5293E-03	0.76	1.53	0.00E+00	4.22E-03	8.45E-03		
Pu-240	2.1278E-03	0.76	1.53	0.00E+00	1.62E-03	3.25E-03		
Pu-241	1.0195E-01	0.76	1.53	0.00E+00	7.79E-02	1.56E-01		
Pu-242	2.3128E-07	0.76	1.53	0.00E+00	1.77E-07	3.53E-07		
Ra-226	5.2782E-14	0.76	1.53	0.00E+00	4.03E-14	8.06E-14		
Ra-228	1.9338E-10	0.76	1.53	0.00E+00	1.48E-10	2.95E-10		
Ru-106	9.1684E-02	0.76	1.53	0.00E+00	7.00E-02	1.40E-01		
Se-79	1.3018E-05	0.76	1.53	0.00E+00	9.94E-06	1.99E-05		
Sn-126	1.2167E-05	0.76	1.53	0.00E+00	9.29E-06	1.86E-05		
Sr-90	2.6045E+00	0.76	1.53	0.00E+00	1.99E+00	3.98E+00		
Tc-99	4.4241E-04	0.76	1.53	0.00E+00	3.38E-04	6.76E-04		
Th-229	1.3713E-10	0.76	1.53	0.00E+00	1.05E-10	2.09E-10		
Th-230	1.8090E-11	0.76	1.53	0.00E+00	1.38E-11	2.76E-11		
Th-232	2.5278E-10	0.76	1.53	0.00E+00	1.93E-10	3.86E-10		
Ti-208	1.6947E-08	0.76	1.53	0.00E+00	1.29E-08	2.59E-08		
U-232	4.8737E-08	0.76	1.53	0.00E+00	3.72E-08	7.44E-08		
U-233	1.2203E-07	0.76	1.53	0.00E+00	9.32E-08	1.86E-07		
U-234	1.5925E-07	0.76	1.53	0.00E+00	1.22E-07	2.43E-07		
U-235	-2.6194E-06	0.76	0.00	7.79E-05	7.59E-05	7.79E-05		
U-236	1.2693E-05	0.76	1.53	0.00E+00	9.69E-06	1.94E-05		
U-238	-3.6331E-08	0.76	0.00	4.97E-05	4.97E-05	4.97E-05		
Y-90	2.6060E+00	0.76	1.53	0.00E+00	1.99E+00	3.98E+00		
Other Radionuclides					2.75E+00	5.51E+00		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	19.58243102	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		0.76
Bounding		1.53

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.12	
Bounding	0.24	

Estimated EOL HM/Given EOL HM

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8 5/20 WSU
SNF ID #: 268
Fuel Units & Descr: 137 - ELEMENT
Heavy Metal Mass: BOL=26 715kg; EOL=23.482kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
²Template Burnup(MWd): 6 65
Template BOL Heavy Metal Mass (MT): 0 000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
1.23

II. Estimates	m	X _n	X _b	b	Y _n	Y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 5173E-10	3,086 44	6,172 87	0 00E+00	2,63E-06	5,26E-06	Avg MeV	
Am-241	1 8331E-03	3,086 44	6,172 87	0 00E+00	5 66E+00	1 13E+01	0 0150	9 977E+14
Am-242m	1 4129E-06	3,086 44	6,172 87	0 00E+00	4 36E-03	8,72E-03	0 0250	2 195E+14
Am-243	1,4774E-07	3,086 44	6,172 87	0 00E+00	4 56E-04	9,12E-04	0 0375	1 869E+14
C-14	1,2871E-04	3,086 44	6,172 87	0 00E+00	3 97E-01	7 94E-01	0 0575	1 919E+14
Cl-36	2 8120E-06	3,086 44	6,172 87	0 00E+00	8 68E-03	1,74E-02	0 0850	1 189E+14
Cm-243	1,7940E-07	3,086 44	6,172 87	0 00E+00	5 54E-04	1,11E-03	0 1250	8 633E+13
Cm-244	1 6962E-06	3,086 44	6,172 87	0 00E+00	5 24E-03	1 05E-02	0 2250	1 008E+14
Co-60	1,2839E+00	3,086 44	6,172 87	0 00E+00	3 96E+03	7 93E+03	0 3750	5 118E+13
Cs-134	9 0541E-02	3,086 44	6,172 87	0 00E+00	2 79E+02	5 59E+02	0 5750	6 804E+14
Cs-135	3,2195E-05	3,086 44	6,172 87	0 00E+00	9 94E-02	1 99E-01	0 8500	2,920E+13
Cs-137	2 7564E+00	3,086 44	6,172 87	0 00E+00	8 51E+03	1 70E+04	1,2500	5 930E+14
Eu-154	1 5368E-02	3,086 44	6,172 87	0 00E+00	4 74E+01	9 49E+01	1 7500	3 953E+11
Eu-155	2 9293E-02	3,086 44	6,172 87	0 00E+00	9 04E+01	1 81E+02	2,2500	6,371E+11
Fe-55	7 7158E-01	3,086 44	6,172 87	0 00E+00	2 38E+03	4 76E+03	2 7500	5 056E+09
H-3	1 1111E-02	3 086 44	6,172 87	0 00E+00	3 43E+01	6 86E+01	3 5000	5,884E+08
I-129	7 3684E-07	3,086 44	6,172 87	0 00E+00	2 27E-03	4 55E-03	5 0000	3,252E+03
Kr-85	2 5263E-01	3,086 44	6,172 87	0 00E+00	7 80E+02	1 56E+03	7 0000	3 680E+02
Np-237	1 2427E-06	3,086 44	6,172 87	0 00E+00	3 84E-03	7 67E-03	11 0000	4 192E+01
Pa-231	3 8511E-09	3 086 44	6,172 87	0 00E+00	1 19E-05	2 38E-05		
Pb-210	7 3880E-15	3,086 44	6,172 87	0 00E+00	2 28E-11	4 56E-11		
Pm-147	2 1023E+00	3,086 44	6,172 87	0 00E+00	6,49E+03	1 30E+04		
Pu-238	1 0383E-03	3,086 44	6,172 87	0 00E+00	3,20E+00	6,41E+00		
Pu-239	5 5293E-03	3,086 44	6,172 87	0 00E+00	1,71E+01	3,41E+01		
Pu-240	2 1278E-03	3,086 44	6,172 87	0 00E+00	6,57E+00	1,31E+01		
Pu-241	1 0195E-01	3,086,44	6,172,87	0 00E+00	3,15E+02	6,29E+02		
Pu-242	2 3128E-07	3,086,44	6,172,87	0 00E+00	7,14E-04	1 43E-03		
Ra-226	5 2782E-14	3,086,44	6,172,87	0 00E+00	1,63E-10	3,26E-10		
Ra-228	1 9338E-10	3,086 44	6,172 87	0 00E+00	5,97E-07	1,19E-06		
Ru-106	9 1684E-02	3,086 44	6,172 87	0 00E+00	2 83E+02	5 66E+02		
Se-79	1 3018E-05	3,086 44	6,172 87	0 00E+00	4 02E-02	8 04E-02		
Sn-126	1 2167E-05	3,086 44	6,172 87	0 00E+00	3,76E-02	7,51E-02		
Sr-90	2 6045E+00	3,086 44	6,172 87	0 00E+00	8 04E+03	1 61E+04		
Tc-99	4 4241E-04	3,086 44	6,172 87	0 00E+00	1 37E+00	2 73E+00		
Th-229	1,3713E-10	3,086 44	6,172 87	0 00E+00	4 23E-07	8 46E-07		
Th-230	1 8090E-11	3,086 44	6,172 87	0 00E+00	5 58E-08	1 12E-07		
Th-232	2 5278E-10	3,086 44	6,172 87	0 00E+00	7 80E-07	1 56E-06		
Ti-208	1 6947E-08	3,086 44	6,172 87	0 00E+00	5 23E-05	1 05E-04		
U-232	4 8737E-08	3,086 44	6,172 87	0 00E+00	1 50E-04	3 01E-04		
U-233	1,2203E-07	3,086 44	6,172 87	0 00E+00	3 77E-04	7 53E-04		
U-234	1,5925E-07	3,086 44	6,172 87	0 00E+00	4 92E-04	9 83E-04		
U-235	-2 6194E-06	3,086 44	0 00	1 14E-02	3 35E-03	1 14E-02		
U-236	1,2693E-05	3,086 44	6,172 87	0 00E+00	3 92E-02	7 84E-02		
U-238	-3 6331E-08	3,086 44	0 00	7 20E-03	7 09E-03	7 20E-03		
Y-90	2 6060E+00	3,086 44	6,172 87	0 00E+00	8 04E+03	1 61E+04		
Other Radionuclides					1,11E+04	2,23E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1,80E+02	3,59E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	19.8	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		3,086 44
Bounding		6 172,87

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	3.39	
Bounding	6.78	

Estimated EOL HM/Given EOL HM
1.00

¹Reactor shutdown, core removal storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 8 5/20 ZAIRE
SNF ID # 486

Fuel Units & Descr: 80 - ELEMENT

Heavy Metal Mass BOL=15 448kg EOL=15.288kg

ROD Storage Site INEEL

¹Fuel decay start date 2010

Estimates as of 2010

Template TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)

²Template Burnup(MWd) 6 65

Template BOL Heavy Metal Mass (MT) 0 000195

Template Decay Time 5 years

Estimated

Canister usage:

18"x10"

0 72

II. Estimates

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 5173E-10	152.74	305.47	0 00E+00	1 30E-07	2 60E-07	Avg MeV	
Am-241	1.8331E-03	152.74	305.47	0 00E+00	2 80E-01	5 60E-01	0 0150	4 937E+13
Am-242m	1.4129E-06	152.74	305.47	0 00E+00	2 16E-04	4.32E-04	0 0250	1 086E+13
Am-243	1.4774E-07	152.74	305.47	0 00E+00	2 26E-05	4.51E-05	0 0375	9.252E+12
C-14	1.2871E-04	152.74	305.47	0 00E+00	1 97E-02	3.93E-02	0 0575	9 496E+12
Cl-36	2 8120E-06	152.74	305.47	0 00E+00	4.30E-04	8.59E-04	0 0850	5.883E+12
Cm-243	1 7940E-07	152.74	305.47	0 00E+00	2.74E-05	5 48E-05	0 1250	4 272E+12
Cm-244	1 6962E-06	152.74	305.47	0.00E+00	2.59E-04	5 18E-04	0.2250	4 991E+12
Co-60	1 2839E+00	152.74	305.47	0 00E+00	1 96E+02	3 92E+02	0.3750	2.533E+12
Cs-134	9 0541E-02	152.74	305.47	0 00E+00	1.38E+01	2.77E+01	0.5750	3 367E+13
Cs-135	3 2195E-05	152.74	305.47	0 00E+00	4 92E-03	9 83E-03	0.8500	1 445E+12
Cs-137	2 7564E+00	152.74	305.47	0 00E+00	4.21E+02	8 42E+02	1.2500	2 935E+13
Eu-154	1.5368E-02	152.74	305.47	0 00E+00	2.35E+00	4 69E+00	1.7500	1 956E+10
Eu-155	2.9293E-02	152.74	305.47	0 00E+00	4 47E+00	8 95E+00	2.2500	3 153E+10
Fe-55	7 7158E-01	152.74	305.47	0 00E+00	1 18E+02	2 36E+02	2.7500	2 502E+08
H-3	1 1111E-02	152.74	305.47	0 00E+00	1 70E+00	3 39E+00	3.5000	2 912E+07
I-129	7 3684E-07	152.74	305.47	0 00E+00	1 13E-04	2.25E-04	5 0000	1 697E+02
Kr-85	2 5263E-01	152.74	305.47	0 00E+00	3 86E+01	7 72E+01	7 0000	1 922E+01
Np-237	1 2427E-06	152.74	305.47	0 00E+00	1.90E-04	3 80E-04	11 0000	2.191E+00
Pa-231	3 8511E-09	152.74	305.47	0 00E+00	5.88E-07	1 18E-06		
Pb-210	7 3880E-15	152.74	305.47	0 00E+00	1 13E-12	2.26E-12		
Pm-147	2 1023E+00	152.74	305.47	0 00E+00	3.21E+02	6 42E+02		
Pu-238	1 0383E-03	152.74	305.47	0 00E+00	1.59E-01	3 17E-01		
Pu-239	5 5293E-03	152.74	305.47	0 00E+00	8 45E-01	1 69E+00		
Pu-240	2.1278E-03	152.74	305.47	0 00E+00	3 25E-01	6 50E-01		
Pu-241	1 0195E-01	152.74	305.47	0 00E+00	1 56E+01	3 11E+01		
Pu-242	2.3128E-07	152.74	305.47	0 00E+00	3 53E-05	7 06E-05		
Ra-226	5.2782E-14	152.74	305.47	0 00E+00	8 06E-12	1 61E-11		
Ra-228	1 9338E-10	152.74	305.47	0 00E+00	2 95E-08	5 91E-08		
Ru-106	9 1684E-02	152.74	305.47	0 00E+00	1 40E+01	2 80E+01		
Se-79	1 3018E-05	152.74	305.47	0.00E+00	1.99E-03	3 98E-03		
Sn-126	1 2167E-05	152.74	305.47	0 00E+00	1.86E-03	3 72E-03		
Sr-90	2 6045E+00	152.74	305.47	0 00E+00	3 98E+02	7.96E+02		
Tc-99	4 4241E-04	152.74	305.47	0 00E+00	6 76E-02	1.35E-01		
Th-229	1.3713E-10	152.74	305.47	0 00E+00	2 09E-08	4 19E-08		
Th-230	1 8090E-11	152.74	305.47	0 00E+00	2 76E-09	5 53E-09		
Th-232	2.5278E-10	152.74	305.47	0 00E+00	3 86E-08	7 72E-08		
Ti-208	1.6947E-08	152.74	305.47	0 00E+00	2 59E-06	5 18E-06		
U-232	4 8737E-08	152.74	305.47	0 00E+00	7 44E-06	1 49E-05	Thermal Power	
U-233	1.2203E-07	152.74	305.47	0 00E+00	1 86E-05	3 73E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1 5925E-07	152.74	305.47	0 00E+00	2 43E-05	4.86E-05	8.89E+00	1 78E+01
U-235	-2 6194E-06	152.74	0 00	6 68E-03	6.28E-03	6 68E-03	Total	Total
U-236	1 2693E-05	152.74	305.47	0 00E+00	1.94E-03	3 88E-03		
U-238	-3.6331E-08	152.74	0 00	4 15E-03	4 15E-03	4 15E-03		
Y-90	2 6060E+00	152.74	305.47	0 00E+00	3 98E+02	7 96E+02		
Other Radionuclides					5 51E+02	1 10E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	20 00000041	10 to 20 1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		152.74
Bounding		305.47

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.29	
Bounding	0.58	

Estimated EOL HM/ Given EOL HM

1 00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRU SCRAP SNF (MOX)
SNF ID #: 368
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=106 338g
ROD Storage Site: INEEL

¹Fuel decay start date: 1994
Estimates as of: 2010
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
²Template Burnup(MWd): 5011.2
Template BOL Heavy Metal Mass (MT): 0 0329181
Template Decay Time: 15 years

Estimated
Canister usage
MIC
1 00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 3735E-12	106,140.24	106,140.24	0 00E+00	1 46E-07	1 46E-07	Avg MeV	
Am-241	7 9527E-02	106,140.24	106,140.24	4 10E+02	8 85E+03	8 85E+03	0 0150	5 280E+15
Am-242m	2 1053E-03	106,140.24	106,140.24	0 00E+00	2 23E+02	2 23E+02	0 0250	1 150E+15
Am-243	1 0760E-04	106,140.24	106,140.24	0 00E+00	1 14E+01	1 14E+01	0 0375	1 316E+15
C-14	2 6141E-05	106,140.24	106,140.24	0 00E+00	2 77E+00	2 77E+00	0 0575	1 105E+15
Cl-36	3 4243E-10	106,140.24	106,140.24	0 00E+00	3 63E-05	3 63E-05	0 0850	6 557E+14
Cm-243	6 6092E-04	106,140.24	106,140.24	0 00E+00	7 02E+01	7 02E+01	0 1250	4 897E+14
Cm-244	2 9933E-03	106,140.24	106,140.24	0 00E+00	3 18E+02	3 18E+02	0 2250	4 966E+14
Co-60	1 5934E-02	106,140.24	106,140.24	0 00E+00	1 69E+03	1 69E+03	0 3750	2 553E+14
Cs-134	4 6356E-02	106,140.24	106,140.24	0 00E+00	4 92E+03	4 92E+03	0 5750	8 530E+15
Cs-135	4 7693E-05	106,140.24	106,140.24	0 00E+00	5 06E+00	5 06E+00	0 8500	2 855E+14
Cs-137	2 1113E+00	106,140.24	106,140.24	0 00E+00	2 24E+05	2 24E+05	1 2500	2 486E+14
Eu-154	4 8092E-02	106,140.24	106,140.24	0 00E+00	5 10E+03	5 10E+03	1 7500	4 083E+12
Eu-155	6 8447E-02	106,140.24	106,140.24	0 00E+00	7 26E+03	7 26E+03	2 2500	1 374E+11
Fe-55	5 8479E-03	106,140.24	106,140.24	0 00E+00	6 21E+02	6 21E+02	2 7500	1 433E+10
H-3	8 9300E-03	106,140.24	106,140.24	0 00E+00	9 48E+02	9 48E+02	3 5000	1 616E+09
I-129	1 2891E-06	106,140.24	106,140.24	0 00E+00	1 37E-01	1 37E-01	5 0000	2 967E+06
Kr-85	7 0941E-02	106,140.24	106,140.24	0 00E+00	7 53E+03	7 53E+03	7 0000	3 402E+05
Nd-237	2 6541E-06	106,140.24	106,140.24	0 00E+00	2 82E-01	2 82E-01	11 0000	3 898E+04
Pa-231	4 8970E-12	106,140.24	106,140.24	0 00E+00	5 20E-07	5 20E-07		
Pb-210	2 2170E-13	106,140.24	106,140.24	0 00E+00	2 35E-08	2 35E-08		
Pm-147	2 3617E-01	106,140.24	106,140.24	0 00E+00	2 51E+04	2 51E+04		
Pu-238	2 8636E-02	106,140.24	106,140.24	0 00E+00	3 04E+03	3 04E+03		
Pu-239	-3 5520E-02	106,140.24	0 00	3 37E+03	0 00E+00	3 37E+03		
Pu-240	2 0790E-02	106,140.24	106,140.24	1 71E+03	3 92E+03	3 92E+03		
Pu-241	-4 8316E-01	106,140.24	0 00	7 68E+04	2 55E+04	7 68E+04		
Pu-242	1 1052E-05	106,140.24	106,140.24	4 56E-01	1 63E+00	1 63E+00		
Ra-226	5 7471E-13	106,140.24	106,140.24	0 00E+00	6 10E-08	6 10E-08		
Ra-228	5 4957E-17	106,140.24	106,140.24	0 00E+00	5 83E-12	5 83E-12		
Ru-106	1 4582E-02	106,140.24	106,140.24	0 00E+00	1 55E+03	1 55E+03		
Se-79	1 0137E-05	106,140.24	106,140.24	0 00E+00	1 08E+00	1 08E+00		
Sn-126	4 3922E-05	106,140.24	106,140.24	0 00E+00	4 66E+00	4 66E+00		
Sr-90	7 6329E-01	106,140.24	106,140.24	0 00E+00	8 10E+04	8 10E+04		
Tc-99	3 9412E-04	106,140.24	106,140.24	0 00E+00	4 18E+01	4 18E+01		
Th-229	1 6457E-12	106,140.24	106,140.24	0 00E+00	1 75E-07	1 75E-07		
Th-230	1 8822E-10	106,140.24	106,140.24	0 00E+00	2 00E-05	2 00E-05		
Th-232	9 7601E-17	106,140.24	106,140.24	0 00E+00	1 04E-11	1 04E-11		
Th-208	5 2722E-07	106,140.24	106,140.24	0 00E+00	5 60E-02	5 60E-02		
U-232	1 4925E-06	106,140.24	106,140.24	0 00E+00	1 58E-01	1 58E-01		
U-233	2 1113E-10	106,140.24	106,140.24	0 00E+00	2 24E-05	2 24E-05		
U-234	1 9528E-06	106,140.24	106,140.24	0 00E+00	2 07E-01	2 07E-01		
U-235	-9 7920E-09	106,140.24	0 00	6 91E-04	0 00E+00	6 91E-04		
U-236	1 1570E-07	106,140.24	106,140.24	0 00E+00	1 23E-02	1 23E-02		
U-238	-1 7914E-07	106,140.24	0 00	5 03E-02	3 13E-02	5 03E-02		
Y-90	7 6329E-01	106,140.24	106,140.24	0 00E+00	8 10E+04	8 10E+04		
Other Radionuclides					2 30E+05	2 30E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
Fuel Cladding	FAST	FAST	This Template was used for the following reasons: This fuel matches on all parameters except cladding (SST is conservative) and enrichment (unknown)
BOL HM Constituents	UNKNOWN	SST	
BOL Enrichment %	Pu and U	Pu and U	
		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		106 140.24	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding		106 140.24	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	3.28		1 05
Bounding	3.28		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRU SCRAP SNF (U METAL)
 SNF ID # 904
 Fuel Units & Descr 1 - CANISTER OF SCRAP
 Heavy Metal Mass BOL= , EOL=106 338kg
 ROD Storage Site INEEL

¹Fuel decay start date 1994
 Estimates as of 2010
 Template FERMI (Fast, Zirc, 10 to 40%, U)
²Template Burnup(MWd) 58 6725048
 Template BOL Heavy Metal Mass (MT) 0 018774
 Template Decay Time 15 years

Estimated
 Canister usage
 HIC
 4 00

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	2 1509E-08	93,768 99	93,768 99	0 00E+00	2 02E-03	2 02E-03	0 0150	1 005E+16
Am-241	4 6529E-07	93,768 99	93,768 99	0 00E+00	4 36E-02	4 36E-02	0 0250	2 131E+15
Am-242m	0 0000E+00	93,768 99	93,768 99	0 00E+00	0 00E+00	0 00E+00	0 0375	1 852E+15
Am-243	8 3923E-15	93,768 99	93,768 99	0 00E+00	7 87E-10	7 87E-10	0 0575	1 945E+15
C-14	2 1765E-05	93,768 99	93,768 99	0 00E+00	2 04E+00	2 04E+00	0 0850	1 196E+15
Cl-36	5 5188E-08	93,768 99	93,768 99	0 00E+00	5 17E-03	5 17E-03	0 1250	7 729E+14
Cm-243	2 5208E-14	93,768 99	93,768 99	0 00E+00	2 36E-09	2 36E-09	0 2250	1 009E+15
Cm-244	1 1259E-15	93,768 99	93,768 99	0 00E+00	1 06E-10	1 06E-10	0 3750	4 620E+14
Co-60	2 9094E-02	93,768 99	93,768 99	0 00E+00	2 73E+03	2 73E+03	0 5750	7 659E+15
Cs-134	5 1932E-04	93,768 99	93,768 99	0 00E+00	4 87E+01	4 87E+01	0 8500	7 397E+13
Cs-135	4 4996E-05	93,768 99	93,768 99	0 00E+00	4 22E+00	4 22E+00	1 2500	2 271E+14
Cs-137	2 1867E+00	93,768 99	93,768 99	0 00E+00	2 05E+05	2 05E+05	1 7500	1 880E+12
Eu-154	9 2837E-04	93,768 99	93,768 99	0 00E+00	8 71E+01	8 71E+01	2 2500	5 378E+09
Eu-155	2 3180E-02	93,768 99	93,768 99	0 00E+00	2 17E+03	2 17E+03	2 7500	2 457E+08
Fe-55	2 9332E-03	93,768 99	93,768 99	0 00E+00	2 75E+02	2 75E+02	3 5000	2 836E+07
H-3	1 0871E-02	93,768 99	93,768 99	0 00E+00	1 02E+03	1 02E+03	5 0000	5 353E+03
I-129	1 1426E-06	93,768 99	93,768 99	0 00E+00	1 07E-01	1 07E-01	7 0000	4 351E+02
Kr-85	1 4068E-01	93,768 99	93,768 99	0 00E+00	1 32E+04	1 32E+04	11 0000	3 798E+01
Np-237	3 3099E-06	93,768 99	93,768 99	0 00E+00	3 10E-01	3 10E-01		
Pa-231	7 8640E-08	93,768 99	93,768 99	0 00E+00	7 37E-03	7 37E-03		
Pb-210	7 4277E-13	93,768 99	93,768 99	0 00E+00	6 96E-08	6 96E-08		
Pm-147	2 2856E-01	93,768 99	93,768 99	0 00E+00	2 14E+04	2 14E+04		
Pu-238	2 0095E-04	93,768 99	93,768 99	0 00E+00	1 88E+01	1 88E+01		
Pu-239	1 9481E-02	93,768 99	93,768 99	0 00E+00	1 83E+03	1 83E+03		
Pu-240	6 8056E-05	93,768 99	93,768 99	0 00E+00	6 38E+00	6 38E+00		
Pu-241	1 0939E-05	93,768 99	93,768 99	0 00E+00	1 03E+00	1 03E+00		
Pu-242	4 3751E-13	93,768 99	93,768 99	0 00E+00	4 10E-08	4 10E-08		
Ra-226	4 0428E-12	93,768 99	93,768 99	0 00E+00	3 79E-07	3 79E-07		
Ra-228	2 1032E-11	93,768 99	93,768 99	0 00E+00	1 97E-06	1 97E-06		
Ru-106	2 9077E-04	93,768 99	93,768 99	0 00E+00	2 73E+01	2 73E+01		
Se-79	1 6492E-05	93,768 99	93,768 99	0 00E+00	1 55E+00	1 55E+00		
Sn-126	3 7564E-05	93,768 99	93,768 99	0 00E+00	3 52E+00	3 52E+00		
Sr-90	1 9396E+00	93,768 99	93,768 99	0 00E+00	1 82E+05	1 82E+05		
Tc-99	4 4842E-04	93,768 99	93,768 99	0 00E+00	4 20E+01	4 20E+01		
Th-229	1 8544E-11	93,768 99	93,768 99	0 00E+00	1 74E-06	1 74E-06		
Th-230	9 0605E-10	93,768 99	93,768 99	0 00E+00	8 50E-05	8 50E-05		
Th-232	2 3674E-11	93,768 99	93,768 99	0 00E+00	2 22E-06	2 22E-06		
Ti-208	7 0323E-09	93,768 99	93,768 99	0 00E+00	6 59E-04	6 59E-04		
U-232	1 9106E-08	93,768 99	93,768 99	0 00E+00	1 79E-03	1 79E-03		
U-233	9 6774E-09	93,768 99	93,768 99	0 00E+00	9 07E-04	9 07E-04		
U-234	4 8796E-06	93,768 99	93,768 99	0 00E+00	4 58E-01	4 58E-01		
U-235	2 3191E-06	93,768 99	0 00	1 18E-01	0 00E+00	1 18E-01		
U-236	1 2633E-05	93,768 99	93,768 99	0 00E+00	1 18E+00	1 18E+00		
U-238	9 5407E-08	93,768 99	0 00	5 32E-02	4 42E-02	5 32E-02		
Y-90	1 9396E+00	93,768 99	93,768 99	0 00E+00	1 82E+05	1 82E+05		
Other Radionuclides					2 04E+05	2 04E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches on all parameters except cladding (unknown) and enrichment (unknown)
Reactor Moderator:	From SFD	Used	
Fuel Cladding	FAST	FAST	
BOL HM Constituents	UNKNOWN	ZIRC	
BOL Enrichment %	U	U	
		10 to 40	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL
	From SFD	Estimated	
Nominal		93,768 99	
Bounding		93 768 99	

Checks			Estimated EOL HM/Given EOL HM 1 69
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	141 08		
Bounding	141 08		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TURKEY POINT
SNF ID #: 271
Fuel Units & Descr. 5 - 15 X 15 ROD ARRAY
Heavy Metal Mass. BOL=2285kg, EOL=2221 6kg
ROD Storage Site INEEL

Fuel decay start date: 1977
Estimates as of: 2010
Template: PWR (Light Water, Zirc, 0 to 5%, U)
Template Burnup(MWd): 61 92
Template BOL Heavy Metal Mass (MT): 0 00176911
Template Decay Time: 25 years

Estimated
Canister usage:
Bare Fuel Transfer

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6 6376E-10	63,036 30	63,666 96	0 00E+00	4 18E-05	4 23E-05	Avg MeV	
Am-241	1 3144E-01	63,036 30	63,666 96	0 00E+00	8 29E+03	8 37E+03	0 0150	4 330E+15
Am-242m	3 0039E-04	63,036 30	63,666 96	0 00E+00	1 89E+01	1 91E+01	0 0250	8 769E+14
Am-243	6 2629E-04	63,036 30	63,666 96	0 00E+00	3 95E+01	3 99E+01	0 0375	8 486E+14
C-14	4 7965E-05	63,036 30	63,666 96	0 00E+00	3 02E+00	3 05E+00	0 0575	9 258E+14
Cf-252	8 0297E-07	63,036 30	63,666 96	0 00E+00	5 06E-02	5 11E-02	0 0850	4 906E+14
Cm-243	3 1993E-04	63,036 30	63,666 96	0 00E+00	2 02E+01	2 04E+01	0 1250	3 584E+14
Cm-244	7 1851E-02	63,036 30	63,666 96	0 00E+00	4 53E+03	4 57E+03	0 2250	4 211E+14
Co-60	9 5220E-03	63,036 30	63,666 96	0 00E+00	6 00E+02	6 06E+02	0 3750	1 807E+14
Cs-134	1 1662E-03	63,036 30	63,666 96	0 00E+00	7 35E+01	7 42E+01	0 5750	4 152E+15
Cs-135	1 4433E-05	63,036 30	63,666 96	0 00E+00	9 10E-01	9 19E-01	0 8500	8 196E+13
Cs-137	1 7603E+00	63,036 30	63,666 96	0 00E+00	1 11E+05	1 12E+05	1 2500	1 107E+14
Eu-154	4 5203E-02	63,036 30	63,666 96	0 00E+00	2 85E+03	2 88E+03	1 7500	2 426E+12
Eu-155	7 1479E-03	63,036 30	63,666 96	0 00E+00	4 51E+02	4 55E+02	2 2500	4 480E+08
Fe-55	6 1919E-04	63,036 30	63,666 96	0 00E+00	3 90E+01	3 94E+01	2 7500	5 036E+08
H-3	3 6386E-02	63,036 30	63,666 96	0 00E+00	2 29E+03	2 32E+03	3 5000	6 598E+07
I-129	9 8288E-07	63,036 30	63,666 96	0 00E+00	6 20E-02	6 26E-02	5 0000	2 820E+07
Kr-85	5 3844E-02	63,036 30	63,666 96	0 00E+00	3 39E+03	3 43E+03	7 0000	3 251E+06
Np-237	1 0546E-05	63,036 30	63,666 96	0 00E+00	6 65E-01	6 71E-01	11 0000	3 734E+05
Pa-231	1 1370E-09	63,036 30	63,666 96	0 00E+00	7 17E-05	7 24E-05		
Pb-210	3 3624E-11	63,036 30	63,666 96	0 00E+00	2 12E-06	2 14E-06		
Pm-147	5 1211E-03	63,036 30	63,666 96	0 00E+00	3 23E+02	3 26E+02		
Pu-238	8 0669E-02	63,036 30	63,666 96	0 00E+00	5 09E+03	5 14E+03		
Pu-239	1 1626E-02	63,036 30	63,666 96	0 00E+00	7 33E+02	7 40E+02		
Pu-240	1 5097E-02	63,036 30	63,666 96	0 00E+00	9 52E+02	9 61E+02		
Pu-241	1 4567E+00	63,036 30	63,666 96	0 00E+00	9 18E+04	9 27E+04		
Pu-242	6 4260E-05	63,036 30	63,666 96	0 00E+00	4 05E+00	4 09E+00		
Ra-226	1 1392E-10	63,036 30	63,666 96	0 00E+00	7 18E-06	7 25E-06		
Ra-228	5 1841E-12	63,036 30	63,666 96	0 00E+00	3 27E-07	3 30E-07		
Ru-106	5 9012E-07	63,036 30	63,666 96	0 00E+00	3 72E-02	3 76E-02		
Se-79	1 2379E-05	63,036 30	63,666 96	0 00E+00	7 80E-01	7 88E-01		
Sn-126	2 5210E-05	63,036 30	63,666 96	0 00E+00	1 59E+00	1 61E+00		
Sr-90	1 1630E+00	63,036 30	63,666 96	0 00E+00	7 33E+04	7 40E+04		
Tc-99	3 9357E-04	63,036 30	63,666 96	0 00E+00	2 48E+01	2 51E+01		
Th-229	8 5691E-11	63,036 30	63,666 96	0 00E+00	5 40E-06	5 46E-06		
Th-230	1 4493E-08	63,036 30	63,666 96	0 00E+00	9 14E-04	9 23E-04		
Th-232	5 2923E-12	63,036 30	63,666 96	0 00E+00	3 34E-07	3 37E-07		
Th-208	1 9202E-07	63,036 30	63,666 96	0 00E+00	1 21E-02	1 22E-02		
U-232	5 2083E-07	63,036 30	63,666 96	0 00E+00	3 28E-02	3 32E-02	Thermal Power	
U-233	2 4386E-08	63,036 30	63,666 96	0 00E+00	1 54E-03	1 55E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	4 7012E-05	63,036 30	63,666 96	0 00E+00	2 96E+00	2 99E+00	1 73E+03	1 75E+03
U-235	-1 4492E-06	63,036 30	0 00	1 26E-01	3 51E-02	1 26E-01	Total	Total
U-236	7 5759E-06	63,036 30	63,666 96	0 00E+00	4 78E-01	4 82E-01		
U-238	-2 6129E-07	63,036 30	0 00	7 48E-01	7 32E-01	7 48E-01		
Y-90	1 1631E+00	63,036 30	63,666 96	0 00E+00	7 33E+04	7 41E+04		
Other Radionuclides					1 06E+05	1 08E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	2.55999934	0 to 5	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	63,036 30	60 290 40	
Bounding	63 666 96	120 580 80	

Nominal burnup taken directly from SFD (converted to MWd)
Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0 79	0 96	
Bounding	0 80	1 89	

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name USUK FUEL PINS
SNF ID # 356
Fuel Units & Descr 66 - ROD
Heavy Metal Mass BOL= ; EOL=8 039kg
ROD Storage Site INEEL

Fuel decay start date 1994
Estimates as of 2010
Template (Worst Case)
*Template Burnup(MWd) 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time 15 years

Estimated
Canister usage
18"x10"
0.51

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources		
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)	
Ac-227	1.4157E-06	7,639.69	7,639.69	0.00E+00	1.08E-02	1.08E-02	Avg MeV		
Am-241	6.2608E+00	7,639.69	7,639.69	0.00E+00	4.78E+04	4.78E+04	0.0150	2.005E+16	
Am-242m	1.8448E-02	7,639.69	7,639.69	0.00E+00	1.41E+02	1.41E+02	0.0250	3.913E+15	
Am-243	1.6352E-02	7,639.69	7,639.69	0.00E+00	1.25E+02	1.25E+02	0.0375	3.495E+15	
C-14	1.2112E-01	7,639.69	7,639.69	0.00E+00	9.25E+02	9.25E+02	0.0575	4.034E+15	
Cl-36	2.2860E-03	7,639.69	7,639.69	0.00E+00	1.75E+01	1.75E+01	0.0850	1.943E+15	
Cm-243	1.4088E-03	7,639.69	7,639.69	0.00E+00	1.08E+01	1.08E+01	0.1250	1.890E+15	
Cm-244	3.6224E-01	7,639.69	7,639.69	0.00E+00	2.77E+03	2.77E+03	0.2250	1.528E+15	
Co-60	3.8998E+02	7,639.69	7,639.69	0.00E+00	2.98E+06	2.98E+06	0.3750	6.379E+14	
Cs-134	2.8276E-01	7,639.69	7,639.69	0.00E+00	2.16E+03	2.16E+03	0.5750	9.797E+15	
Cs-135	4.3976E-04	7,639.69	7,639.69	0.00E+00	3.36E+00	3.36E+00	0.8500	1.021E+15	
Cs-137	3.3405E+01	7,639.69	7,639.69	0.00E+00	2.55E+05	2.55E+05	1.2500	2.214E+17	
Eu-154	6.2585E+00	7,639.69	7,639.69	0.00E+00	4.78E+04	4.78E+04	1.7500	3.044E+13	
Eu-155	1.1271E+00	7,639.69	7,639.69	0.00E+00	8.61E+03	8.61E+03	2.2500	1.174E+12	
Fe-55	6.0624E+01	7,639.69	7,639.69	0.00E+00	4.63E+05	4.63E+05	2.7500	3.233E+10	
H-3	7.4678E-01	7,639.69	7,639.69	0.00E+00	5.71E+03	5.71E+03	3.5000	6.992E+07	
I-129	1.0618E-05	7,639.69	7,639.69	0.00E+00	8.11E-02	8.11E-02	5.0000	1.698E+07	
Kr-85	2.1802E+00	7,639.69	7,639.69	0.00E+00	1.67E+04	1.67E+04	7.0000	1.953E+06	
Np-237	1.5626E-04	7,639.69	7,639.69	0.00E+00	1.19E+00	1.19E+00	11.0000	2.241E+05	
Pa-231	2.8608E-06	7,639.69	7,639.69	0.00E+00	2.19E-02	2.19E-02			
Pb-210	2.0448E-09	7,639.69	7,639.69	0.00E+00	1.56E-05	1.56E-05			
Pm-147	3.3212E+00	7,639.69	7,639.69	0.00E+00	2.54E+04	2.54E+04			
Pu-238	-3.5400E-01	7,639.69	0.00	2.07E+03	0.00E+00	2.07E+03			
Pu-239	-4.8280E-02	7,639.69	0.00	2.50E+02	0.00E+00	2.50E+02			
Pu-240	-3.0095E-01	7,639.69	0.00	3.19E+02	0.00E+00	3.19E+02			
Pu-241	-2.5280E+01	7,639.69	0.00	8.22E+04	0.00E+00	8.22E+04			
Pu-242	-1.1381E-04	7,639.69	0.00	1.38E+00	5.12E-01	1.38E+00			
Ra-226	1.0977E-08	7,639.69	7,639.69	0.00E+00	8.39E-05	8.39E-05			
Ra-228	5.4624E-07	7,639.69	7,639.69	0.00E+00	4.17E-03	4.17E-03			
Ru-106	3.7939E-03	7,639.69	7,639.69	0.00E+00	2.90E+01	2.90E+01			
Se-79	1.9186E-04	7,639.69	7,639.69	0.00E+00	1.47E+00	1.47E+00			
Sn-126	1.6673E-04	7,639.69	7,639.69	0.00E+00	1.27E+00	1.27E+00			
Sr-90	3.1860E+01	7,639.69	7,639.69	0.00E+00	2.43E+05	2.43E+05			
Tc-99	6.7678E-03	7,639.69	7,639.69	0.00E+00	5.17E+01	5.17E+01			
Th-229	7.2928E-07	7,639.69	7,639.69	0.00E+00	5.57E-03	5.57E-03			
Th-230	2.4191E-06	7,639.69	7,639.69	0.00E+00	1.85E-02	1.85E-02			
Th-232	6.0208E-07	7,639.69	7,639.69	0.00E+00	4.60E-03	4.60E-03			
Ti-208	1.0599E-04	7,639.69	7,639.69	0.00E+00	8.10E-01	8.10E-01			
U-232	2.8743E-04	7,639.69	7,639.69	0.00E+00	2.20E+00	2.20E+00	Thermal Power		
U-233	3.6128E-04	7,639.69	7,639.69	0.00E+00	2.76E+00	2.76E+00	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
U-234	1.2788E-02	7,639.69	7,639.69	0.00E+00	9.77E+01	9.77E+01			
U-235	5.7486E-04	7,639.69	7,639.69	6.92E-03	4.40E+00	4.40E+00	5.18E+04	5.19E+04	
U-236	2.3485E-04	7,639.69	7,639.69	0.00E+00	1.79E+00	1.79E+00			
U-238	1.1581E-04	7,639.69	7,639.69	8.61E-04	8.86E-01	8.86E-01	Total		
Y-90	3.1860E+01	7,639.69	7,639.69	0.00E+00	2.43E+05	2.43E+05	Total		
Other Radionuclides					6.14E+05	6.14E+05			

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	GRAPHITE	(Worst Case)	
Fuel Cladding	SST	SST/Inconel	This fuel didn't closely match any existing templates, therefore the worst case template was used.
BOL HM Constituents	Pu and U	U, Th, & Pu	
BOL Enrichment %		0 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		7,639.69	
Bounding		7,639.69	Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	14.21		
Bounding	14.21		591.64

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: VBWR (GENEVA)
SNF ID #: 285
Fuel Units & Descr: 4 - 6 X 6 ROD ARRAY
Heavy Metal Mass: BOL=12.536kg; EOL=12.392kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1961
Estimates as of: 2010
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
²Template Burnup(MWd): 6 01
Template BOL Heavy Metal Mass (MT) 0 00012882
Template Decay Time 35 years

Estimated
Canister usage:
18"x10"
0.31

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2 3344E-08	135 65	271.30	0 00E+00	3 17E-06	6 33E-06	Avg MeV	
Am-241	1 1135E-04	135 65	271.30	0 00E+00	1 51E-02	3 02E-02	0 0150	2.025E+13
Am-242m	8 5075E-09	135 65	271.30	0 00E+00	1 15E-06	2 31E-06	0 0250	4 208E+12
Am-243	9 8519E-10	135 65	271.30	0 00E+00	1 34E-07	2 67E-07	0 0375	3 640E+12
C-14	2 3012E-04	135 65	271.30	0 00E+00	3 12E-02	6 24E-02	0 0575	3 923E+12
Cl-36	1 2261E-06	135 65	271.30	0 00E+00	1 66E-04	3 33E-04	0 0850	2 370E+12
Cm-243	2 4875E-10	135 65	271.30	0 00E+00	3 37E-08	6 75E-08	0 1250	1 539E+12
Cm-244	2 3178E-09	135 65	271.30	0 00E+00	3 14E-07	6 29E-07	0 2250	2 040E+11
Co-60	7 0849E-02	135 65	271.30	0 00E+00	9 61E+00	1 92E+01	0 3750	8 900E+11
Cs-134	3 0266E-06	135 65	271.30	0 00E+00	4 11E-04	8 21E-04	0 5750	1 466E+13
Cs-135	3 0316E-05	135 65	271.30	0 00E+00	4 11E-03	8 22E-03	0 8500	1 484E+11
Cs-137	1 4511E+00	135 65	271.30	0 00E+00	1 97E+02	3 94E+02	1 2500	1 475E+12
Eu-154	6 6955E-04	135 65	271.30	0 00E+00	9 08E-02	1 82E-01	1 7500	3 828E+09
Eu-155	6 9850E-04	135 65	271.30	0 00E+00	9 48E-02	1 90E-01	2 2500	7 947E+06
Fe-55	1 2318E-03	135 65	271.30	0 00E+00	1 67E-01	3 34E-01	2 7500	2 297E+05
H-3	2 5141E-03	135 65	271.30	0 00E+00	3 41E-01	6 82E-01	3 5000	3 378E+01
I-129	7 3195E-07	135 65	271.30	0 00E+00	9 93E-05	1 99E-04	5 0000	1 421E+01
Kr-85	4 1281E-02	135 65	271.30	0 00E+00	5 60E+00	1 12E+01	7 0000	1 605E+00
Np-237	1 1489E-06	135 65	271.30	0 00E+00	1 56E-04	3 12E-04	11 0000	1 825E-01
Pa-231	4 5241E-08	135 65	271.30	0 00E+00	6 14E-06	1 23E-05		
Pb-210	6 4476E-13	135 65	271.30	0 00E+00	8 75E-11	1 75E-10		
Pm-147	1 1651E-03	135 65	271.30	0 00E+00	1 58E-01	3 16E-01		
Pu-238	2 9517E-04	135 65	271.30	0 00E+00	4 00E-02	8 01E-02		
Pu-239	6 6772E-04	135 65	271.30	0 00E+00	9 06E-02	1 81E-01		
Pu-240	8 6839E-05	135 65	271.30	0 00E+00	1 18E-02	2 36E-02		
Pu-241	7 1514E-04	135 65	271.30	0 00E+00	9 70E-02	1 94E-01		
Pu-242	1 9717E-09	135 65	271.30	0 00E+00	2 67E-07	5 35E-07		
Ra-226	1 7654E-12	135 65	271.30	0 00E+00	2 39E-10	4 79E-10		
Ra-228	8 2928E-12	135 65	271.30	0 00E+00	1 12E-09	2 25E-09		
Ru-106	1 8419E-10	135 65	271.30	0 00E+00	2 50E-08	5 00E-08		
Se-79	1 3223E-05	135 65	271.30	0 00E+00	1 79E-03	3 59E-03		
Sn-126	1 1493E-05	135 65	271.30	0 00E+00	1 56E-03	3 12E-03		
Sr-90	1 3649E+00	135 65	271.30	0 00E+00	1 85E+02	3 70E+02		
Tc-99	4 6656E-04	135 65	271.30	0 00E+00	6 33E-02	1 27E-01		
Th-229	1 4547E-11	135 65	271.30	0 00E+00	1 97E-09	3 95E-09		
Th-230	1 6617E-10	135 65	271.30	0 00E+00	2 25E-08	4 51E-08		
Th-232	8 3361E-12	135 65	271.30	0 00E+00	1 13E-09	2 26E-09		
Th-208	2 1664E-08	135 65	271.30	0 00E+00	2 94E-06	5 88E-06		
U-232	5 8669E-08	135 65	271.30	0 00E+00	7 96E-06	1 59E-05		
U-233	3 1847E-09	135 65	271.30	0 00E+00	4 32E-07	8 64E-07		
U-234	3 8769E-07	135 65	271.30	0 00E+00	5 26E-05	1 05E-04		
U-235	-2 7761E-06	135 65	0 00	5 99E-03	5 62E-03	5 99E-03		
U-236	1 6190E-05	135 65	271.30	0 00E+00	2 20E-03	4 39E-03		
U-238	-2 8547E-09	135 65	0 00	3 28E-03	3 28E-03	3 28E-03		
Y-90	1 3652E+00	135 65	271.30	0 00E+00	1 85E+02	3 70E+02		
Other Radionuclides					2 24E+02	4 48E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons. This fuel matches on all parameters except enrichment.
Reactor Moderator	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	22.12897667	60 to 100	

Burnup Summary (MWd) ³			Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup.
	From SFD	Estimated	
Nominal		135 65	
Bounding		271 30	

Checks			Estimated EOL HM/Given EOL HM 1 00
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 23		
Bounding	0 46		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name VEPCO
SNF ID # 286
Fuel Units & Descr 20 - 15 X 15 ROD ARRAY
Heavy Metal Mass BOL=9148.286kg EOL=8832 178kg
ROD Storage Site INEEL

Fuel decay start date 1983
Estimates as of 2010
Template PWR (Light Water, Zirc, 0 to 5% U)
Template Burnup (MWd) 61.92
Template BOL Heavy Metal Mass (MT) 0.00176911
Template Decay Time 25 years

Estimated
Canister Usage
Bare Fuel Transfer

II. Estimates							Gamma Sources	
	m	X _n	X _b	b	Y _n	Y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)		
Ac-227	6.6376E-10	300,603.76	601,207.51	0.00E+00	2.00E-04	3.99E-04	Avg MeV	
Am-241	1.3144E-01	300,603.76	601,207.51	0.00E+00	3.95E+04	7.90E+04	0.0150	4.088E+16
Am-242m	3.0039E-04	300,603.76	601,207.51	0.00E+00	9.03E+01	1.81E+02	0.0250	8.280E+15
Am-243	6.2629E-04	300,603.76	601,207.51	0.00E+00	1.88E+02	3.77E+02	0.0375	8.014E+15
C-14	4.7965E-05	300,603.76	601,207.51	0.00E+00	1.44E+01	2.88E+01	0.0575	8.742E+15
Cl-36	8.0297E-07	300,603.76	601,207.51	0.00E+00	2.41E-01	4.83E-01	0.0850	4.632E+15
Cm-243	3.1993E-04	300,603.76	601,207.51	0.00E+00	9.62E+01	1.92E+02	0.1250	3.384E+15
Cm-244	7.1851E-02	300,603.76	601,207.51	0.00E+00	2.16E+04	4.32E+04	0.2250	3.977E+15
Co-60	9.5220E-03	300,603.76	601,207.51	0.00E+00	2.86E+03	5.72E+03	0.3750	1.706E+15
Cs-134	1.1662E-03	300,603.76	601,207.51	0.00E+00	3.51E+02	7.01E+02	0.5750	3.921E+16
Cs-135	1.4433E-05	300,603.76	601,207.51	0.00E+00	4.34E+00	8.68E+00	0.8500	7.739E+14
Cs-137	1.7603E+00	300,603.76	601,207.51	0.00E+00	5.29E+05	1.06E+06	1.2500	1.045E+15
Eu-154	4.5203E-02	300,603.76	601,207.51	0.00E+00	1.36E+04	2.72E+04	1.7500	2.290E+13
Eu-155	7.1479E-03	300,603.76	601,207.51	0.00E+00	2.15E+03	4.30E+03	2.2500	4.231E+09
Fe-55	6.1919E-04	300,603.76	601,207.51	0.00E+00	1.86E+02	3.72E+02	2.7500	4.755E+09
H-3	3.6386E-02	300,603.76	601,207.51	0.00E+00	1.09E+04	2.19E+04	3.5000	6.231E+08
I-129	9.8288E-07	300,603.76	601,207.51	0.00E+00	2.95E-01	5.91E-01	5.0000	2.663E+08
Kr-85	5.3844E-02	300,603.76	601,207.51	0.00E+00	1.62E+04	3.24E+04	7.0000	3.070E+07
Np-237	1.0546E-05	300,603.76	601,207.51	0.00E+00	3.17E+00	6.34E+00	11.0000	3.526E+06
Pa-231	1.1370E-09	300,603.76	601,207.51	0.00E+00	3.42E-04	6.84E-04		
Pb-210	3.3624E-11	300,603.76	601,207.51	0.00E+00	1.01E-05	2.02E-05		
Pm-147	5.1211E-03	300,603.76	601,207.51	0.00E+00	1.54E+03	3.08E+03		
Pu-238	8.0669E-02	300,603.76	601,207.51	0.00E+00	2.42E+04	4.85E+04		
Pu-239	1.1626E-02	300,603.76	601,207.51	0.00E+00	3.49E+03	6.99E+03		
Pu-240	1.5097E-02	300,603.76	601,207.51	0.00E+00	4.54E+03	9.08E+03		
Pu-241	1.4567E+00	300,603.76	601,207.51	0.00E+00	4.38E+05	8.76E+05		
Pu-242	6.4260E-05	300,603.76	601,207.51	0.00E+00	1.93E+01	3.86E+01		
Ra-226	1.1392E-10	300,603.76	601,207.51	0.00E+00	3.42E-05	6.85E-05		
Ra-228	5.1841E-12	300,603.76	601,207.51	0.00E+00	1.56E-06	3.12E-06		
Ru-106	5.9012E-07	300,603.76	601,207.51	0.00E+00	1.77E-01	3.55E-01		
Se-79	1.2379E-05	300,603.76	601,207.51	0.00E+00	3.72E+00	7.44E+00		
Sn-126	2.5210E-05	300,603.76	601,207.51	0.00E+00	7.58E+00	1.52E+01		
Sr-90	1.1630E+00	300,603.76	601,207.51	0.00E+00	3.50E+05	6.99E+05		
Tc-99	3.9357E-04	300,603.76	601,207.51	0.00E+00	1.18E+02	2.37E+02		
Th-229	8.5691E-11	300,603.76	601,207.51	0.00E+00	2.58E-05	5.15E-05		
Th-230	1.4493E-08	300,603.76	601,207.51	0.00E+00	4.36E-03	8.71E-03		
Th-232	5.2923E-12	300,603.76	601,207.51	0.00E+00	1.59E-06	3.18E-06		
Ti-208	1.9202E-07	300,603.76	601,207.51	0.00E+00	5.77E-02	1.15E-01		
U-232	5.2083E-07	300,603.76	601,207.51	0.00E+00	1.57E-01	3.13E-01	Thermal Power	
U-233	2.4386E-08	300,603.76	601,207.51	0.00E+00	7.33E-03	1.47E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	4.7012E-05	300,603.76	601,207.51	0.00E+00	1.41E+01	2.83E+01	8.24E+03	1.65E+04
U-235	-1.4492E-06	300,603.76	0.00	5.90E-01	1.55E-01	5.90E-01	Total	Total
U-236	7.5759E-06	300,603.76	601,207.51	0.00E+00	2.28E+00	4.55E+00		
U-238	-2.6129E-07	300,603.76	0.00	2.98E+00	2.90E+00	2.98E+00		
Y-90	1.1631E+00	300,603.76	601,207.51	0.00E+00	3.50E+05	6.99E+05		
Other Radionuclides					5.08E+05	1.02E+06		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences
Reactor Moderator Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ZIRC	ZIRC	
	U	U	
	2.986167273	0 to 5	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	268,593.68	300,603.76	
Bounding	268,637.57	601,207.51	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.94	1.12	
Bounding	1.88	2.08	
			1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: VEP
 SNF ID #: 700
 Fuel Units & Descr: 12 - 15 X 15 ROD ARRAY
 Heavy Metal Mass: BOL=5488.2kg, EOL=5313.52kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1981
 Estimates as of: 2010
 Template: PWR (Light Water, Zirc, 0 to 5% U)
²Template Burnup(MWd): 61 92
 Template BOL Heavy Metal Mass (MT): 0 00176911
 Template Decay Time: 25 years

Estimated
 Canister usage
 Bare Fuel Transfer

II. Estimates		m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)	
Ac-227	6 6376E-10	166,112 80	332,225 60	0 00E+00	1 10E-04	2 21E-04	Avg MeV		
Am-241	1 3144E-01	166,112 80	332,225 60	0 00E+00	2 18E+04	4 37E+04	0 0150	2 259E+16	
Am-242m	3 0039E-04	166,112 80	332,225 60	0 00E+00	4 99E+01	9 98E+01	0 0250	4 576E+15	
Am-243	6 2629E-04	166,112 80	332,225 60	0 00E+00	1 04E+02	2 08E+02	0 0375	4 428E+15	
C-14	4 7965E-05	166,112 80	332,225 60	0 00E+00	7 97E+00	1 59E+01	0 0575	4 831E+15	
Cl-36	8 0297E-07	166,112 80	332,225 60	0 00E+00	1 33E-01	2 67E-01	0 0850	2 560E+15	
Cm-243	3 1993E-04	166,112 80	332,225 60	0 00E+00	5 31E+01	1 06E+02	0 1250	1 870E+15	
Cm-244	7 1851E-02	166,112 80	332,225 60	0 00E+00	1 19E+04	2 39E+04	0 2250	2 198E+15	
Co-60	9 5220E-03	166,112 80	332,225 60	0 00E+00	1 58E+03	3 16E+03	0 3750	9 429E+14	
Cs-134	1 1662E-03	166,112 80	332,225 60	0 00E+00	1 94E+02	3 87E+02	0 5750	2 167E+16	
Cs-135	1 4433E-05	166,112 80	332,225 60	0 00E+00	2 40E+00	4 80E+00	0 8500	4 277E+14	
Cs-137	1 7603E+00	166,112 80	332,225 60	0 00E+00	2 92E+05	5 85E+05	1 2500	5 777E+14	
Eu-154	4 5203E-02	166,112 80	332,225 60	0 00E+00	7 51E+03	1 50E+04	1 7500	1 266E+13	
Eu-155	7 1479E-03	166,112 80	332,225 60	0 00E+00	1 19E+03	2 37E+03	2 2500	2 338E+09	
Fe-55	6 1919E-04	166,112 80	332,225 60	0 00E+00	1 03E+02	2 06E+02	2 7500	2 628E+09	
H-3	3 6386E-02	166,112 80	332,225 60	0 00E+00	6 04E+03	1 21E+04	3 5000	3 443E+08	
I-129	9 8288E-07	166,112 80	332,225 60	0 00E+00	1 63E-01	3 27E-01	5 0000	1 472E+08	
Kr-85	5 3844E-02	166,112 80	332,225 60	0 00E+00	8 94E+03	1 79E+04	7 0000	1 696E+07	
Np-237	1 0546E-05	166,112 80	332,225 60	0 00E+00	1 75E+00	3 50E+00	11 0000	1 949E+06	
Pa-231	1 1370E-09	166,112 80	332,225 60	0 00E+00	1 89E-04	3 78E-04			
Pb-210	3 3624E-11	166,112 80	332,225 60	0 00E+00	5 59E-06	1 12E-05			
Pm-147	5 1211E-03	166,112 80	332,225 60	0 00E+00	8 51E+02	1 70E+03			
Pu-238	8 0669E-02	166,112 80	332,225 60	0 00E+00	1 34E+04	2 68E+04			
Pu-239	1 1626E-02	166,112 80	332,225 60	0 00E+00	1 93E+03	3 86E+03			
Pu-240	1 5097E-02	166,112 80	332,225 60	0 00E+00	2 51E+03	5 02E+03			
Pu-241	1 4567E+00	166,112 80	332,225 60	0 00E+00	2 42E+05	4 84E+05			
Pu-242	6 4260E-05	166,112 80	332,225 60	0 00E+00	1 07E+01	2 13E+01			
Ra-226	1 1392E-10	166,112 80	332,225 60	0 00E+00	1 89E-05	3 78E-05			
Ra-228	5 1841E-12	166,112 80	332,225 60	0 00E+00	8 61E-07	1 72E-06			
Ru-106	5 9012E-07	166,112 80	332,225 60	0 00E+00	9 80E-02	1 96E-01			
Se-79	1 2379E-05	166,112 80	332,225 60	0 00E+00	2 06E+00	4 11E+00			
Sn-126	2 5210E-05	166,112 80	332,225 60	0 00E+00	4 19E+00	8 38E+00			
Sr-90	1 1630E+00	166,112 80	332,225 60	0 00E+00	1 93E+05	3 86E+05			
Tc-99	3 9357E-04	166,112 80	332,225 60	0 00E+00	6 54E+01	1 31E+02			
Th-229	8 5691E-11	166,112 80	332,225 60	0 00E+00	1 42E-05	2 85E-05			
Th-230	1 4493E-08	166,112 80	332,225 60	0 00E+00	2 41E-03	4 81E-03			
Th-232	5 2923E-12	166,112 80	332,225 60	0 00E+00	8 79E-07	1 76E-06			
Tl-208	1 9202E-07	166,112 80	332,225 60	0 00E+00	3 19E-02	6 38E-02			
U-232	5 2083E-07	166,112 80	332,225 60	0 00E+00	8 65E-02	1 73E-01			
U-233	2 4386E-08	166,112 80	332,225 60	0 00E+00	4 05E-03	8 10E-03			
U-234	4 7012E-05	166,112 80	332,225 60	0 00E+00	7 81E+00	1 56E+01			
U-235	-1 4492E-06	166,112 80	0 00	3 36E-01	9 53E-02	3 36E-01			
U-236	7 5759E-06	166,112 80	332,225 60	0 00E+00	1 26E+00	2 52E+00			
U-238	-2 6129E-07	166,112 80	0 00	1 79E+00	1 75E+00	1 79E+00			
Y-90	1 1631E+00	166,112 80	332,225 60	0 00E+00	1 93E+05	3 86E+05			
Other Radionuclides					2 81E+05	5 61E+05			

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Reactor Moderator	From SFD	Used	Basis for Parameter Differences
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	2 833496228	0 to 5	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
	161,133 55	166,112 80	
Nominal			Nominal burnup calculated from the heavy metal mass destroyed
Bounding	173 158 20	332,225 60	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
	0 86	1 03	
Nominal			
Bounding	1 73	1 92	1 00

¹ Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

² Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name VEPCO (T-11 ASSEMBLY)

SNF ID #: 993

Fuel Units & Descr: 1 - 15 X 15 ROD ARRAY

Heavy Metal Mass BOL=457.414kg EOL=440kg

ROD Storage Site INEEL

Fuel decay start date: 1983

Estimates as of: 2010

Template: PWR (Light Water, Zirc, 0 to 5%, U)

Template Burnup (MWd) 61.92

Template BOL Heavy Metal Mass (MT) 0.00176911

Template Decay Time 25 years

Estimated

Canister usage

HIC

1.00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6376E-10	16,560.18	33,120.35	0.00E+00	1.10E-05	2.20E-05	Avg MeV	
Am-241	1.3144E-01	16,560.18	33,120.35	0.00E+00	2.18E+03	4.35E+03	0.0150	2.252E+15
Am-242m	3.0039E-04	16,560.18	33,120.35	0.00E+00	4.97E+00	9.95E+00	0.0250	4.562E+14
Am-243	6.2629E-04	16,560.18	33,120.35	0.00E+00	1.04E+01	2.07E+01	0.0375	4.415E+14
C-14	4.7965E-05	16,560.18	33,120.35	0.00E+00	7.94E-01	1.59E+00	0.0575	4.816E+14
Cl-36	8.0297E-07	16,560.18	33,120.35	0.00E+00	1.33E-02	2.66E-02	0.0850	2.552E+14
Cm-243	3.1993E-04	16,560.18	33,120.35	0.00E+00	5.30E+00	1.06E+01	0.1250	1.864E+14
Cm-244	7.1851E-02	16,560.18	33,120.35	0.00E+00	1.19E+03	2.38E+03	0.2250	2.191E+14
Co-60	9.5220E-03	16,560.18	33,120.35	0.00E+00	1.58E+02	3.15E+02	0.3750	9.400E+13
Cs-134	1.1662E-03	16,560.18	33,120.35	0.00E+00	1.93E+01	3.86E+01	0.5750	2.160E+15
Cs-135	1.4433E-05	16,560.18	33,120.35	0.00E+00	2.39E-01	4.78E-01	0.8500	4.264E+13
Cs-137	1.7603E+00	16,560.18	33,120.35	0.00E+00	2.92E+04	5.83E+04	1.2500	5.759E+13
Eu-154	4.5203E-02	16,560.18	33,120.35	0.00E+00	7.49E+02	1.50E+03	1.7500	1.262E+12
Eu-155	7.1479E-03	16,560.18	33,120.35	0.00E+00	1.18E+02	2.37E+02	2.2500	2.331E+08
Fe-55	6.1919E-04	16,560.18	33,120.35	0.00E+00	1.03E+01	2.05E+01	2.7500	2.620E+08
H-3	3.6386E-02	16,560.18	33,120.35	0.00E+00	6.03E+02	1.21E+03	3.5000	3.432E+07
I-129	9.8288E-07	16,560.18	33,120.35	0.00E+00	1.63E-02	3.26E-02	5.0000	1.467E+07
Kr-85	5.3844E-02	16,560.18	33,120.35	0.00E+00	8.92E+02	1.78E+03	7.0000	1.691E+06
Np-237	1.0546E-05	16,560.18	33,120.35	0.00E+00	1.75E-01	3.49E-01	11.0000	1.943E+05
Pa-231	1.1370E-09	16,560.18	33,120.35	0.00E+00	5.57E-07	1.11E-06		
Pb-210	3.3624E-11	16,560.18	33,120.35	0.00E+00	8.48E+01	1.70E+02		
Pm-147	5.1211E-03	16,560.18	33,120.35	0.00E+00	1.34E+03	2.67E+03		
Pu-238	8.0669E-02	16,560.18	33,120.35	0.00E+00	1.93E+02	3.85E+02		
Pu-239	1.1626E-02	16,560.18	33,120.35	0.00E+00	2.50E+02	5.00E+02		
Pu-240	1.5097E-02	16,560.18	33,120.35	0.00E+00	2.41E+04	4.82E+04		
Pu-241	1.4567E+00	16,560.18	33,120.35	0.00E+00	1.06E+00	2.13E+00		
Pu-242	6.4260E-05	16,560.18	33,120.35	0.00E+00	1.89E-06	3.77E-06		
Ra-226	1.1392E-10	16,560.18	33,120.35	0.00E+00	8.58E-08	1.72E-07		
Ra-228	5.1841E-12	16,560.18	33,120.35	0.00E+00	9.77E-03	1.95E-02		
Ru-106	5.9012E-07	16,560.18	33,120.35	0.00E+00	2.05E-01	4.10E-01		
Se-79	1.2379E-05	16,560.18	33,120.35	0.00E+00	4.17E-01	8.35E-01		
Sn-126	2.5210E-05	16,560.18	33,120.35	0.00E+00	1.93E+04	3.85E+04		
Sr-90	1.1630E+00	16,560.18	33,120.35	0.00E+00	6.52E+00	1.30E+01		
Tc-99	3.9357E-04	16,560.18	33,120.35	0.00E+00	1.42E-06	2.84E-06		
Th-229	8.5691E-11	16,560.18	33,120.35	0.00E+00	2.40E-04	4.80E-04		
Th-230	1.4493E-08	16,560.18	33,120.35	0.00E+00	8.76E-08	1.75E-07		
Th-232	5.2923E-12	16,560.18	33,120.35	0.00E+00	3.18E-03	6.36E-03		
Ti-208	1.9202E-07	16,560.18	33,120.35	0.00E+00	8.63E-03	1.73E-02		
U-232	5.2083E-07	16,560.18	33,120.35	0.00E+00	4.04E-04	8.08E-04		
U-233	2.4386E-08	16,560.18	33,120.35	0.00E+00	7.79E-01	1.56E+00		
U-234	4.7012E-05	16,560.18	33,120.35	0.00E+00	1.25E-01	2.51E-01		
U-235	1.4492E-06	16,560.18	0.00	2.95E-02	5.52E-03	2.95E-02		
U-236	7.5759E-06	16,560.18	33,120.35	0.00E+00	1.45E-01	1.49E-01		
U-238	2.6129E-07	16,560.18	0.00	1.49E-01	1.93E+04	3.85E+04		
Y-90	1.1631E+00	16,560.18	33,120.35	0.00E+00	2.80E+04	5.60E+04		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LIGHT WATER	LIGHT WATER
Fuel Cladding	ZIRC	ZIRC
BOL HM Constituents	U	U
BOL Enrichment %	2.986167273	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	13,429.68	16,560.18
Bounding	14,431.88	33,120.35

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	1.03	1.23
Bounding	2.07	2.29

Estimated EOL HM/Given EOL HM

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: VEPCO (T-11 RODS)

SNF ID #: 1049

Fuel Units & Descr: 9 - ROD

Heavy Metal Mass: BOL=20 18kg, EOL=19 678kg

ROD Storage Site: INEEL

¹Fuel decay start date: 1983

Estimates as of: 2010

Template: PWR (Light Water, Zirc, 0 to 5%, U)

²Template Burnup(MWd): 61 92

Template BOL Heavy Metal Mass (MT): 0 00176911

Template Decay Time: 25 years

Estimated
Canister usage:
18"x10"
0 07

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6 6376E-10	592 48	636 69	0 00E+00	3 93E-07	4 23E-07	Avg. MeV	
Am-241	1 3144E-01	592 48	636 69	0 00E+00	7 79E+01	8 37E+01	0 0150	4 330E+13
Am-242m	3 0039E-04	592 48	636 69	0 00E+00	1 78E-01	1 91E-01	0 0250	8 769E+12
Am-243	6 2629E-04	592 48	636 69	0 00E+00	3 71E-01	3 99E-01	0 0375	8 487E+12
C-14	4 7965E-05	592 48	636 69	0 00E+00	2 84E-02	3 05E-02	0 0575	9 258E+12
Cl-36	8 0297E-07	592 48	636 69	0 00E+00	4 76E-04	5 11E-04	0 0850	4 906E+12
Cm-243	3 1993E-04	592 48	636 69	0 00E+00	1 90E-01	2 04E-01	0 1250	3 584E+12
Cm-244	7 1851E-02	592 48	636 69	0 00E+00	4 26E+01	4 57E+01	0 2250	4 212E+12
Co-60	9 5220E-03	592 48	636 69	0 00E+00	5 64E+00	6 06E+00	0 3750	1 807E+12
Cs-134	1 1662E-03	592 48	636 69	0 00E+00	6 91E-01	7 42E-01	0 5750	4 152E+13
Cs-135	1 4433E-05	592 48	636 69	0 00E+00	8 55E-03	9 19E-03	0 8500	8 196E+11
Cs-137	1 7603E+00	592 48	636 69	0 00E+00	1 04E+03	1 12E+03	1 2500	1 107E+12
Eu-154	4 5203E-02	592 48	636 69	0 00E+00	2 68E+01	2 88E+01	1 7500	2 426E+10
Eu-155	7 1479E-03	592 48	636 69	0 00E+00	4 23E+00	4 55E+00	2 2500	4 480E+06
Fe-55	6 1919E-04	592 48	636 69	0 00E+00	3 67E-01	3 94E-01	2 7500	5 036E+06
H-3	3 6386E-02	592 48	636 69	0 00E+00	2 16E+01	2 32E+01	3 5000	6 598E+05
I-129	9 8288E-07	592 48	636 69	0 00E+00	5 82E-04	6 26E-04	5 0000	2 820E+05
Kr-85	5 3844E-02	592 48	636 69	0 00E+00	3 19E+01	3 43E+01	7 0000	3 251E+04
Np-237	1 0546E-05	592 48	636 69	0 00E+00	6 25E-03	6 71E-03	11 0000	3 734E+03
Pa-231	1 1370E-09	592 48	636 69	0 00E+00	6 74E-07	7 24E-07		
Pb-210	3 3624E-11	592 48	636 69	0 00E+00	1 99E-08	2 14E-08		
Pm-147	5 1211E-03	592 48	636 69	0 00E+00	3 03E+00	3 26E+00		
Pu-238	8 0669E-02	592 48	636 69	0 00E+00	4 78E+01	5 14E+01		
Pu-239	1 1626E-02	592 48	636 69	0 00E+00	6 89E+00	7 40E+00		
Pu-240	1 5097E-02	592 48	636 69	0 00E+00	8 94E+00	9 61E+00		
Pu-241	1 4567E+00	592 48	636 69	0 00E+00	8 63E+02	9 27E+02		
Pu-242	6 4260E-05	592 48	636 69	0 00E+00	3 81E-02	4 09E-02		
Ra-226	1 1392E-10	592 48	636 69	0 00E+00	6 75E-08	7 25E-08		
Ra-228	5 1841E-12	592 48	636 69	0 00E+00	3 07E-09	3 30E-09		
Ru-106	5 9012E-07	592 48	636 69	0 00E+00	3 50E-04	3 76E-04		
Se-79	1 2379E-05	592 48	636 69	0 00E+00	7 33E-03	7 88E-03		
Sn-126	2 5210E-05	592 48	636 69	0 00E+00	1 49E-02	1 61E-02		
Sr-90	1 1630E+00	592 48	636 69	0 00E+00	6 89E+02	7 40E+02		
Tc-99	3 9357E-04	592 48	636 69	0 00E+00	2 33E-01	2 51E-01		
Th-229	8 5691E-11	592 48	636 69	0 00E+00	5 08E-08	5 46E-08		
Th-230	1 4493E-08	592 48	636 69	0 00E+00	8 59E-06	9 23E-06		
Th-232	5 2923E-12	592 48	636 69	0 00E+00	3 14E-09	3 37E-09		
Ti-208	1 9202E-07	592 48	636 69	0 00E+00	1 14E-04	1 22E-04		
U-232	5 2083E-07	592 48	636 69	0 00E+00	3 09E-04	3 32E-04		
U-233	2 4386E-08	592 48	636 69	0 00E+00	1 44E-05	1 55E-05		
U-234	4 7012E-05	592 48	636 69	0 00E+00	2 79E-02	2 99E-02		
U-235	-1 4492E-06	592 48	0 00	1 30E-03	4 44E-04	1 30E-03		
U-236	7 5759E-06	592 48	636 69	0 00E+00	4 49E-03	4 82E-03		
U-238	-2 6129E-07	592 48	0 00	6 58E-03	6 43E-03	6 58E-03		
Y-90	1 1631E+00	592 48	636 69	0 00E+00	6 89E+02	7 41E+02		
Other Radionuclides					1 00E+03	1 08E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.986165227	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	592 48	477 57
Bounding	636 69	955 14

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup taken directly from SFD (converted to MWd)

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 84	0 81
Bounding	0 90	1 50

Estimated EOL HM/Given EOL HM

0 99

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name VEPOT-11
SNF ID # 994
Fuel Units & Descr 3 - ROD
Heavy Metal Mass BOL=6.727kg, EOL=6.559kg
ROD Storage Site INEEL

¹Fuel decay start date 1983
Estimates as of 2010
Template PWR (Light Water, Zirc 0 to 5%, U)
²Template Burnup(MWd) 61.92
Template BOL Heavy Metal Mass (MT) 0.00176911
Template Decay Time 25 years

Estimated
Canister usage
18"x10"
0.02

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6376E-10	197.49	212.23	0.00E+00	1.31E-07	1.41E-07	Avg MeV	
Am-241	1.3144E-01	197.49	212.23	0.00E+00	2.60E+01	2.79E+01	0.0150	1.443E+13
Am-242m	3.0039E-04	197.49	212.23	0.00E+00	5.93E-02	6.38E-02	0.0250	2.923E+12
Am-243	6.2629E-04	197.49	212.23	0.00E+00	1.24E-01	1.33E-01	0.0375	2.829E+12
C-14	4.7965E-05	197.49	212.23	0.00E+00	9.47E-03	1.02E-02	0.0575	3.086E+12
Cl-36	8.0297E-07	197.49	212.23	0.00E+00	1.59E-04	1.70E-04	0.0850	1.635E+12
Cm-243	3.1993E-04	197.49	212.23	0.00E+00	6.32E-02	6.79E-02	0.1250	1.195E+12
Cm-244	7.1851E-02	197.49	212.23	0.00E+00	1.42E+01	1.52E+01	0.2250	1.404E+12
Co-60	9.5220E-03	197.49	212.23	0.00E+00	1.88E+00	2.02E+00	0.3750	6.024E+11
Cs-134	1.1662E-03	197.49	212.23	0.00E+00	2.30E-01	2.47E-01	0.5750	1.384E+13
Cs-135	1.4433E-05	197.49	212.23	0.00E+00	2.85E-03	3.06E-03	0.8500	2.732E+11
Cs-137	1.7603E+00	197.49	212.23	0.00E+00	3.48E+02	3.74E+02	1.2500	3.690E+11
Eu-154	4.5203E-02	197.49	212.23	0.00E+00	8.93E+00	9.59E+00	1.7500	8.085E+09
Eu-155	7.1479E-03	197.49	212.23	0.00E+00	1.41E+00	1.52E+00	2.2500	1.493E+06
Fe-55	6.1919E-04	197.49	212.23	0.00E+00	1.22E-01	1.31E-01	2.7500	1.679E+06
H-3	3.6386E-02	197.49	212.23	0.00E+00	7.19E+00	7.72E+00	3.5000	2.199E+05
I-129	9.8288E-07	197.49	212.23	0.00E+00	1.94E-04	2.09E-04	5.0000	9.401E+04
Kr-85	5.3844E-02	197.49	212.23	0.00E+00	1.06E+01	1.14E+01	7.0000	1.084E+04
Np-237	1.0546E-05	197.49	212.23	0.00E+00	2.08E-03	2.24E-03	11.0000	1.245E+03
Pa-231	1.1370E-09	197.49	212.23	0.00E+00	2.25E-07	2.41E-07		
Pb-210	3.3624E-11	197.49	212.23	0.00E+00	6.64E-09	7.14E-09		
Pm-147	5.1211E-03	197.49	212.23	0.00E+00	1.01E+00	1.09E+00		
Pu-238	8.0669E-02	197.49	212.23	0.00E+00	1.59E+01	1.71E+01		
Pu-239	1.1626E-02	197.49	212.23	0.00E+00	2.30E+00	2.47E+00		
Pu-240	1.5097E-02	197.49	212.23	0.00E+00	2.98E+00	3.20E+00		
Pu-241	1.4567E+00	197.49	212.23	0.00E+00	2.88E+02	3.09E+02		
Pu-242	6.4260E-05	197.49	212.23	0.00E+00	1.27E-02	1.36E-02		
Ra-226	1.1392E-10	197.49	212.23	0.00E+00	2.25E-08	2.42E-08		
Ra-228	5.1841E-12	197.49	212.23	0.00E+00	1.02E-09	1.10E-09		
Ru-106	5.9012E-07	197.49	212.23	0.00E+00	1.17E-04	1.25E-04		
Se-79	1.2379E-05	197.49	212.23	0.00E+00	2.44E-03	2.63E-03		
Sn-126	2.5210E-05	197.49	212.23	0.00E+00	4.98E-03	5.35E-03		
Sr-90	1.1630E+00	197.49	212.23	0.00E+00	2.30E+02	2.47E+02		
Tc-99	3.9357E-04	197.49	212.23	0.00E+00	7.77E-02	8.35E-02		
Th-229	8.5691E-11	197.49	212.23	0.00E+00	1.69E-08	1.82E-08		
Th-230	1.4493E-08	197.49	212.23	0.00E+00	2.86E-06	3.08E-06		
Th-232	5.2923E-12	197.49	212.23	0.00E+00	1.05E-09	1.12E-09		
Ti-208	1.9202E-07	197.49	212.23	0.00E+00	3.79E-05	4.08E-05		
U-232	5.2083E-07	197.49	212.23	0.00E+00	1.03E-04	1.11E-04		
U-233	2.4386E-08	197.49	212.23	0.00E+00	4.82E-06	5.18E-06		
U-234	4.7012E-05	197.49	212.23	0.00E+00	9.28E-03	9.98E-03		
U-235	-1.4492E-06	197.49	0.00	4.34E-04	1.48E-04	4.34E-04		
U-236	7.5759E-06	197.49	212.23	0.00E+00	1.50E-03	1.61E-03		
U-238	-2.6129E-07	197.49	0.00	2.19E-03	2.14E-03	2.19E-03		
Y-90	1.1631E+00	197.49	212.23	0.00E+00	2.30E+02	2.47E+02		
Other Radionuclides					3.34E+02	3.59E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	2.986165227	0 to 5	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	197.49	159.19	Nominal burnup taken directly from SFD (converted to MWd)
Bounding	212.23	318.38	Bounding burnup taken directly from SFD (converted to MWd)
Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.84	0.81	0.99
Bounding	0.90	1.50	

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ANLJ
SNF ID #: 5
Fuel Units & Descr: 19 - ELEMENT
Heavy Metal Mass: BOL=2 793kg, EOL=2 789kg
ROD Storage Site: SRS

¹Fuel decay start date: 1966
Estimates as of: 2010
Template: ATR (Light Water, Alum 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 35 years

Estimated
Canister usage:
18"x10"
0 79

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2 0068E-09	3 60	7 20	0 00E+00	7 22E-09	1 44E-08	Avg. MeV	
Am-241	2 5251E-03	3 60	7 20	0 00E+00	9 09E-03	1 82E-02	0 0150	5 302E+11
Am-242m	3 9624E-07	3 60	7 20	0 00E+00	1 43E-06	2 85E-06	0 0250	1 101E+11
Am-243	1 4880E-09	3 60	7 20	0 00E+00	5 35E-06	1 07E-05	0 0375	9 568E+10
C-14	5 7053E-09	3 60	7 20	0 00E+00	2 05E-08	4 11E-08	0 0575	1 030E+11
Cl-36	1 3124E-32	3 60	7 20	0 00E+00	4 72E-32	9 45E-32	0 0850	6 207E+10
Cm-243	1 1419E-07	3 60	7 20	0 00E+00	4 11E-07	8 22E-07	0 1250	4 102E+10
Cm-244	1 6522E-05	3 60	7 20	0 00E+00	5 95E-05	1 19E-04	0 2250	5 368E+10
Co-60	7 4047E-07	3 60	7 20	0 00E+00	2 66E-06	5 33E-06	0 3750	2 331E+10
Cs-134	2 0455E-05	3 60	7 20	0 00E+00	7 36E-05	1 47E-04	0 5750	3 852E+11
Cs-135	3 4477E-06	3 60	7 20	0 00E+00	1 24E-05	2 48E-05	0 8500	4 705E+09
Cs-137	1 4365E+00	3 60	7 20	0 00E+00	5 17E+00	1 03E+01	1 2500	2 275E+09
Eu-154	7 3230E-03	3 60	7 20	0 00E+00	2 64E-02	5 27E-02	1 7500	1 281E+08
Eu-155	5 9259E-04	3 60	7 20	0 00E+00	2 13E-03	4 27E-03	2 2500	1 071E+04
Fe-55	2 2791E-06	3 60	7 20	0 00E+00	8 20E-06	1 64E-05	2 7500	1 022E+04
H-3	1 9698E-03	3 60	7 20	0 00E+00	7 09E-03	1 42E-02	3 5000	6 449E+00
I-129	7 5300E-07	3 60	7 20	0 00E+00	2 71E-06	5 42E-06	5 0000	2 641E+00
Kr-85	4 1176E-02	3 60	7 20	0 00E+00	1 48E-01	2 96E-01	7 0000	2 898E-01
Np-237	9 5752E-06	3 60	7 20	0 00E+00	3 45E-05	6 89E-05	11 0000	3 236E-02
Pa-231	3 9379E-09	3 60	7 20	0 00E+00	1 42E-08	2 83E-08		
Pb-210	3 3115E-10	3 60	7 20	0 00E+00	1 19E-09	2 38E-09		
Pm-147	9 2402E-04	3 60	7 20	0 00E+00	3 33E-03	6 65E-03		
Pu-238	1 6217E-02	3 60	7 20	0 00E+00	5 84E-02	1 17E-01		
Pu-239	4 2810E-04	3 60	7 20	0 00E+00	1 54E-03	3 08E-03		
Pu-240	2 4333E-04	3 60	7 20	0 00E+00	8 76E-04	1 75E-03		
Pu-241	1 6242E-02	3 60	7 20	0 00E+00	5 84E-02	1 17E-01		
Pu-242	3 6329E-07	3 60	7 20	0 00E+00	1 31E-06	2 61E-06		
Ra-226	9 0114E-10	3 60	7 20	0 00E+00	3 24E-09	6 49E-09		
Ra-228	3 1019E-14	3 60	7 20	0 00E+00	1 12E-13	2 23E-13		
Ru-106	2 1225E-10	3 60	7 20	0 00E+00	7 64E-10	1 53E-09		
Se-79	1 2930E-05	3 60	7 20	0 00E+00	4 65E-05	9 31E-05		
Sn-126	1 1571E-05	3 60	7 20	0 00E+00	4 16E-05	8 33E-05		
Sr-90	1 3472E+00	3 60	7 20	0 00E+00	4 85E+00	9 70E+00		
Tc-99	4 2239E-04	3 60	7 20	0 00E+00	1 52E-03	3 04E-03		
Th-229	1 2407E-11	3 60	7 20	0 00E+00	4 47E-11	8 93E-11		
Th-230	8 3497E-08	3 60	7 20	0 00E+00	3 00E-07	6 01E-07		
Th-232	3 8371E-14	3 60	7 20	0 00E+00	1 38E-13	2 76E-13		
Th-208	4 0414E-08	3 60	7 20	0 00E+00	1 45E-07	2 91E-07		
U-232	1 0948E-07	3 60	7 20	0 00E+00	3 94E-07	7 88E-07		
U-233	3 6275E-09	3 60	7 20	0 00E+00	1 31E-08	2 61E-08		
U-234	1 8562E-04	3 60	7 20	0 00E+00	6 68E-04	1 34E-03		
U-235	2 7235E-06	3 60	0 00	5 63E-03	5 62E-03	5 63E-03		
U-236	1 5493E-05	3 60	7 20	0 00E+00	5 58E-05	1 12E-04		
U-238	4 2851E-09	3 60	0 00	6 39E-05	6 38E-05	6 39E-05		
Y-90	1 3475E+00	3 60	7 20	0 00E+00	4 85E+00	9 70E+00		
Other Radionuclides					4 92E+00	9 85E+00		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93 197	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal		3 60
Bounding		7 20

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 00	
Bounding	0 01	

Estimated EOL HM/Given EOL HM

1 00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name ASTRA-(AUSTRIA)(LEU U308)
SNF ID # 1058
Fuel Units & Descr 3 - 19 FLAT PLATES
Heavy Metal Mass BOL=5.379kg EOL=4 818kg
ROD Storage Site SRS

¹Fuel decay start date 1985
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 25 years

Estimated
Canister usage
18"x10"
0.08

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	1.1465E-09	530.99	1,061.99	0.00E+00	6.09E-07	1.22E-06	0.0150	9.937E+13
Am-241	2.3056E-03	530.99	1,061.99	0.00E+00	1.22E+00	2.45E+00	0.0250	2.064E+13
Am-242m	4.1476E-07	530.99	1,061.99	0.00E+00	2.20E-04	4.40E-04	0.0375	1.798E+13
Am-243	1.4894E-06	530.99	1,061.99	0.00E+00	7.91E-04	1.58E-03	0.0575	1.931E+13
C-14	5.7108E-09	530.99	1,061.99	0.00E+00	3.03E-06	6.06E-06	0.0850	1.165E+13
Cl-36	1.3124E-32	530.99	1,061.99	0.00E+00	6.97E-30	1.39E-29	0.1250	7.803E+12
Cm-243	1.4562E-07	530.99	1,061.99	0.00E+00	7.73E-05	1.55E-04	0.2250	1.006E+13
Cm-244	2.4221E-05	530.99	1,061.99	0.00E+00	1.29E-02	2.57E-02	0.3750	4.372E+12
Co-60	2.7560E-06	530.99	1,061.99	0.00E+00	1.46E-03	2.93E-03	0.5750	7.168E+13
Cs-134	5.8851E-04	530.99	1,061.99	0.00E+00	3.12E-01	6.25E-01	0.8500	1.033E+12
Cs-135	3.4477E-06	530.99	1,061.99	0.00E+00	1.83E-03	3.66E-03	1.2500	5.744E+11
Cs-137	1.8099E+00	530.99	1,061.99	0.00E+00	9.61E+02	1.92E+03	1.7500	2.838E+10
Eu-154	1.6386E-02	530.99	1,061.99	0.00E+00	8.70E+00	1.74E+01	2.2500	2.023E+06
Eu-155	2.3957E-03	530.99	1,061.99	0.00E+00	1.27E+00	2.54E+00	2.7500	1.656E+06
Fe-55	3.2707E-05	530.99	1,061.99	0.00E+00	1.74E-02	3.47E-02	3.5000	1.257E+03
H-3	3.4504E-03	530.99	1,061.99	0.00E+00	1.83E+00	3.66E+00	5.0000	4.236E+02
I-129	7.5300E-07	530.99	1,061.99	0.00E+00	4.00E-04	8.00E-04	7.0000	4.663E+01
Kr-85	7.8540E-02	530.99	1,061.99	0.00E+00	4.17E+01	8.34E+01	11.0000	5.217E+00
Np-237	9.5615E-06	530.99	1,061.99	0.00E+00	5.08E-03	1.02E-02		
Pa-231	2.7968E-09	530.99	1,061.99	0.00E+00	1.49E-06	2.97E-06		
Pb-210	1.2612E-10	530.99	1,061.99	0.00E+00	6.70E-08	1.34E-07		
Pm-147	1.2952E-02	530.99	1,061.99	0.00E+00	6.88E+00	1.38E+01		
Pu-238	1.7549E-02	530.99	1,061.99	0.00E+00	9.32E+00	1.86E+01		
Pu-239	4.2810E-04	530.99	1,061.99	0.00E+00	2.27E-01	4.55E-01		
Pu-240	2.4357E-04	530.99	1,061.99	0.00E+00	1.29E-01	2.59E-01		
Pu-241	2.6277E-02	530.99	1,061.99	0.00E+00	1.40E+01	2.79E+01		
Pu-242	3.6329E-07	530.99	1,061.99	0.00E+00	1.93E-04	3.86E-04		
Ra-226	4.4444E-10	530.99	1,061.99	0.00E+00	2.36E-07	4.72E-07		
Ra-228	1.9714E-14	530.99	1,061.99	0.00E+00	1.05E-11	2.09E-11		
Ru-106	2.0477E-07	530.99	1,061.99	0.00E+00	1.09E-04	2.17E-04		
Se-79	1.2933E-05	530.99	1,061.99	0.00E+00	6.87E-03	1.37E-02		
Sn-126	1.1574E-05	530.99	1,061.99	0.00E+00	6.15E-03	1.23E-02		
Sr-90	1.7092E+00	530.99	1,061.99	0.00E+00	9.08E+02	1.82E+03		
Tc-99	4.2239E-04	530.99	1,061.99	0.00E+00	2.24E-01	4.49E-01		
Th-229	7.7260E-12	530.99	1,061.99	0.00E+00	4.10E-09	8.20E-09		
Th-230	5.8497E-08	530.99	1,061.99	0.00E+00	3.11E-05	6.21E-05		
Th-232	2.6906E-14	530.99	1,061.99	0.00E+00	1.43E-11	2.86E-11		
Ti-208	4.4336E-08	530.99	1,061.99	0.00E+00	2.35E-05	4.71E-05		
U-232	1.2037E-07	530.99	1,061.99	0.00E+00	6.39E-05	1.28E-04		
U-233	3.0011E-09	530.99	1,061.99	0.00E+00	1.59E-06	3.19E-06		
U-234	1.8497E-04	530.99	1,061.99	0.00E+00	9.82E-02	1.96E-01		
U-235	-2.7235E-06	530.99	0.00	2.27E-03	8.21E-04	2.27E-03		
U-236	1.5493E-05	530.99	1,061.99	0.00E+00	8.23E-03	1.65E-02		
U-238	-4.2851E-09	530.99	0.00	1.46E-03	1.45E-03	1.46E-03		
Y-90	1.7094E+00	530.99	1,061.99	0.00E+00	9.08E+02	1.82E+03		
Other Radionuclides					9.15E+02	1.83E+03		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*	
Reactor Moderator: Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.	
	LIGHT WATER	LIGHT WATER		
	ALUM	ALUM		
	U	U		
Burnup Summary (MWd) ²			Basis for burnup used in estimate:	
Nominal: Bounding	From SFD	Estimated	Nominal burnup calculated from the heavy metal mass destroyed 1,061.99 Bounding burnup assumed to be twice nominal burnup	
		530.99 1,061.99		
Checks			Estimated EOL HM/Given EOL HM	
Nominal: Bounding	Burnup Multiplier	Estimated Burnup/ Given Burnup	1.01	
	0.31 0.63			

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ASTRA-(AUSTRIA)(LEU U3S2)
SNF ID #: 712
Fuel Units & Descr: 39 - 19 FLAT PLATES
Heavy Metal Mass: BOL=72.236kg, EOL=66 183kg
ROD Storage Site: SRS

¹Fuel decay start date: 1985
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 25 years

Estimated
Canister usage
18"x10"
1.08

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-09	5,732.12	11,464.24	0.00E+00	6.57E-06	1.31E-05	Avg. MeV	
Am-241	2.3056E-03	5,732.12	11,464.24	0.00E+00	1.32E+01	2.64E+01	0.0150	1.073E+15
Am-242m	4.1476E-07	5,732.12	11,464.24	0.00E+00	2.38E-03	4.75E-03	0.0250	2.229E+14
Am-243	1.4894E-06	5,732.12	11,464.24	0.00E+00	8.54E-03	1.71E-02	0.0375	1.941E+14
C-14	5.7108E-09	5,732.12	11,464.24	0.00E+00	3.27E-05	6.55E-05	0.0575	2.084E+14
Cl-36	1.3124E-32	5,732.12	11,464.24	0.00E+00	7.52E-29	1.50E-28	0.0850	1.258E+14
Cm-243	1.4562E-07	5,732.12	11,464.24	0.00E+00	8.35E-04	1.67E-03	0.1250	8.423E+13
Cm-244	2.4221E-05	5,732.12	11,464.24	0.00E+00	1.39E-01	2.78E-01	0.2250	1.086E+14
Co-60	2.7560E-06	5,732.12	11,464.24	0.00E+00	1.58E-02	3.16E-02	0.3750	4.720E+13
Cs-134	5.8851E-04	5,732.12	11,464.24	0.00E+00	3.37E+00	6.75E+00	0.5750	7.738E+14
Cs-135	3.4477E-06	5,732.12	11,464.24	0.00E+00	1.98E-02	3.95E-02	0.8500	1.115E+13
Cs-137	1.8099E+00	5,732.12	11,464.24	0.00E+00	1.04E+04	2.07E+04	1.2500	6.201E+12
Eu-154	1.6386E-02	5,732.12	11,464.24	0.00E+00	9.39E+01	1.88E+02	1.7500	3.063E+11
Eu-155	2.3957E-03	5,732.12	11,464.24	0.00E+00	1.37E+01	2.75E+01	2.2500	2.183E+07
Fe-55	3.2707E-05	5,732.12	11,464.24	0.00E+00	1.87E-01	3.75E-01	2.7500	1.788E+07
H-3	3.4504E-03	5,732.12	11,464.24	0.00E+00	1.98E+01	3.96E+01	3.5000	1.359E+04
I-129	7.5300E-07	5,732.12	11,464.24	0.00E+00	4.32E-03	8.63E-03	5.0000	4.581E+03
Kr-85	7.8540E-02	5,732.12	11,464.24	0.00E+00	4.50E+02	9.00E+02	7.0000	5.043E+02
Np-237	9.5615E-06	5,732.12	11,464.24	0.00E+00	5.48E-02	1.10E-01	11.0000	5.643E+01
Pa-231	2.7968E-09	5,732.12	11,464.24	0.00E+00	1.60E-05	3.21E-05		
Pb-210	1.2612E-10	5,732.12	11,464.24	0.00E+00	7.23E-07	1.45E-06		
Pm-147	1.2952E-02	5,732.12	11,464.24	0.00E+00	7.42E+01	1.48E+02		
Pu-238	1.7549E-02	5,732.12	11,464.24	0.00E+00	1.01E+02	2.01E+02		
Pu-239	4.2810E-04	5,732.12	11,464.24	0.00E+00	2.45E+00	4.91E+00		
Pu-240	2.4357E-04	5,732.12	11,464.24	0.00E+00	1.40E+00	2.79E+00		
Pu-241	2.6277E-02	5,732.12	11,464.24	0.00E+00	1.51E+02	3.01E+02		
Pu-242	3.6329E-07	5,732.12	11,464.24	0.00E+00	2.08E-03	4.16E-03		
Ra-226	4.4444E-10	5,732.12	11,464.24	0.00E+00	2.55E-06	5.10E-06		
Ra-228	1.9714E-14	5,732.12	11,464.24	0.00E+00	1.13E-10	2.26E-10		
Ru-106	2.0477E-07	5,732.12	11,464.24	0.00E+00	1.17E-03	2.35E-03		
Se-79	1.2933E-05	5,732.12	11,464.24	0.00E+00	7.41E-02	1.48E-01		
Sn-126	1.1574E-05	5,732.12	11,464.24	0.00E+00	6.63E-02	1.33E-01		
Sr-90	1.7092E+00	5,732.12	11,464.24	0.00E+00	9.80E+03	1.96E+04		
Tc-99	4.2239E-04	5,732.12	11,464.24	0.00E+00	2.42E+00	4.84E+00		
Th-229	7.7260E-12	5,732.12	11,464.24	0.00E+00	4.43E-08	8.86E-08		
Th-230	5.8497E-08	5,732.12	11,464.24	0.00E+00	3.35E-04	6.71E-04		
Th-232	2.6906E-14	5,732.12	11,464.24	0.00E+00	1.54E-10	3.08E-10		
Ti-208	4.4336E-08	5,732.12	11,464.24	0.00E+00	2.54E-04	5.08E-04		
U-232	1.2037E-07	5,732.12	11,464.24	0.00E+00	6.90E-04	1.38E-03		
U-233	3.0011E-09	5,732.12	11,464.24	0.00E+00	1.72E-05	3.44E-05		
U-234	1.8497E-04	5,732.12	11,464.24	0.00E+00	1.06E+00	2.12E+00		
U-235	-2.7235E-06	5,732.12	0.00	3.10E-02	1.54E-02	3.10E-02		
U-236	1.5493E-05	5,732.12	11,464.24	0.00E+00	8.88E-02	1.78E-01		
U-238	-4.2851E-09	5,732.12	0.00	1.95E-02	1.94E-02	1.95E-02		
Y-90	1.7094E+00	5,732.12	11,464.24	0.00E+00	9.80E+03	1.96E+04		
Other Radionuclides					9.88E+03	1.98E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons.
Fuel Cladding	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents	U	U	
BOL Enrichment %	19.83800556	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		5,732.12	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		11,464.24	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.25		1.01
Bounding	0.50		

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name ASTRA-AUSTRIA (UALX-HEU)
SNF ID # 646
Fuel Units & Descr 33 - MTR TYPE
Heavy Metal Mass BOL=9 026kg, EOL=4 359kg
ROD Storage Site SRS

¹Fuel decay start date 1985
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0 00116689
Template Decay Time 25 years

Estimated
Canister usage
18"x10"
0 92

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	1 1465E-09	4,418 98	8,547.32	0 00E+00	5 07E-06	9 80E-06	0 0150	7.998E+14
Am-241	2 3056E-03	4,418 98	8,547.32	0 00E+00	1 02E+01	1 97E+01	0 0250	1 662E+14
Am-242m	4 1476E-07	4,418 98	8,547.32	0 00E+00	1 83E-03	3.55E-03	0 0375	1 447E+14
Am-243	1 4894E-06	4,418 98	8,547.32	0 00E+00	6 58E-03	1.27E-02	0 0575	1.554E+14
C-14	5 7108E-09	4,418 98	8,547.32	0 00E+00	2 52E-05	4 88E-05	0 0850	9 376E+13
Cl-36	1.3124E-32	4,418 98	8,547.32	0 00E+00	5 80E-29	1 12E-28	0 1250	6.280E+13
Cm-243	1.4562E-07	4,418 98	8,547.32	0 00E+00	6.43E-04	1 24E-03	0 2250	8 094E+13
Cm-244	2 4221E-05	4,418 98	8,547.32	0 00E+00	1.07E-01	2 07E-01	0 3750	3 519E+13
Co-60	2 7560E-06	4,418 98	8,547.32	0 00E+00	1.22E-02	2 36E-02	0 5750	5 769E+14
Cs-134	5 8851E-04	4,418 98	8,547.32	0 00E+00	2 60E+00	5 03E+00	0 8500	8 313E+12
Cs-135	3 4477E-06	4,418 98	8,547.32	0 00E+00	1 52E-02	2 95E-02	1.2500	4 623E+12
Cs-137	1 8099E+00	4,418 98	8,547.32	0 00E+00	8 00E+03	1 55E+04	1 7500	2.284E+11
Eu-154	1 6386E-02	4,418 98	8,547.32	0 00E+00	7 24E+01	1.40E+02	2.2500	1 628E+07
Eu-155	2.3957E-03	4,418 98	8,547.32	0 00E+00	1 06E+01	2 05E+01	2 7500	1.333E+07
Fe-55	3.2707E-05	4,418 98	8,547.32	0 00E+00	1.45E-01	2 80E-01	3 5000	1 006E+04
H-3	3 4504E-03	4,418 98	8,547.32	0 00E+00	1.52E+01	2 95E+01	5 0000	3 383E+03
I-129	7 5300E-07	4,418 98	8,547.32	0 00E+00	3 33E-03	6 44E-03	7 0000	3 722E+02
Kr-85	7 8540E-02	4,418 98	8,547.32	0 00E+00	3 47E+02	6 71E+02	11 0000	4 164E+01
Np-237	9 5615E-06	4,418 98	8,547.32	0 00E+00	4 23E-02	8 17E-02		
Pa-231	2 7968E-09	4,418 98	8,547.32	0 00E+00	1 24E-05	2.39E-05		
Pb-210	1.2612E-10	4,418 98	8,547.32	0 00E+00	5 57E-07	1 08E-06		
Pm-147	1.2952E-02	4,418 98	8,547.32	0 00E+00	5 72E+01	1.11E+02		
Pu-238	1.7549E-02	4,418 98	8,547.32	0 00E+00	7 75E+01	1.50E+02		
Pu-239	4.2810E-04	4,418 98	8,547.32	0 00E+00	1 89E+00	3 66E+00		
Pu-240	2 4357E-04	4,418 98	8 547.32	0 00E+00	1.08E+00	2 08E+00		
Pu-241	2 6277E-02	4,418 98	8,547.32	0 00E+00	1.16E+02	2 25E+02		
Pu-242	3 6329E-07	4,418 98	8,547.32	0 00E+00	1 61E-03	3 11E-03		
Ra-226	4 4444E-10	4,418 98	8,547.32	0 00E+00	1 96E-06	3.80E-06		
Ra-228	1 9714E-14	4,418 98	8,547.32	0 00E+00	8 71E-11	1 69E-10		
Ru-106	2 0477E-07	4,418 98	8,547.32	0 00E+00	9 05E-04	1 75E-03		
Se-79	1.2933E-05	4,418 98	8,547.32	0 00E+00	5 72E-02	1.11E-01		
Sn-126	1.1574E-05	4,418 98	8,547.32	0 00E+00	5.11E-02	9 89E-02		
Sr-90	1.7092E+00	4,418 98	8,547.32	0 00E+00	7.55E+03	1 46E+04		
Tc-99	4.2239E-04	4,418 98	8,547.32	0 00E+00	1 87E+00	3 61E+00		
Th-229	7.7260E-12	4,418 98	8,547.32	0 00E+00	3 41E-08	6 60E-08		
Th-230	5 8497E-08	4,418 98	8,547.32	0 00E+00	2 58E-04	5 00E-04		
Th-232	2 6906E-14	4,418 98	8,547.32	0 00E+00	1 19E-10	2.30E-10		
Ti-208	4 4336E-08	4,418 98	8,547.32	0 00E+00	1 96E-04	3 79E-04		
U-232	1.2037E-07	4,418 98	8,547.32	0 00E+00	5 32E-04	1 03E-03		
U-233	3 0011E-09	4,418 98	8,547.32	0 00E+00	1.33E-05	2 57E-05		
U-234	1.8497E-04	4,418 98	8,547.32	0 00E+00	8 17E-01	1 58E+00		
U-235	-2 7235E-06	4,418 98	0 00	1.82E-02	6 12E-03	1 82E-02		
U-236	1.5493E-05	4,418 98	8,547.32	0 00E+00	6 85E-02	1.32E-01		
U-238	-4 2851E-09	4,418 98	0 00	2 10E-04	1 91E-04	2 10E-04		
Y-90	1 7094E+00	4,418 98	8,547.32	0 00E+00	7.55E+03	1.46E+04		
Other Radionuclides					7 61E+03	1.47E+04		

Thermal Power		
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
9.35E+01	1 81E+02	
Total	Total	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	93 07350223	60 to 100	
Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal		4 418 98	
Bounding		8 547.32	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup calculated assuming all BOL heavy metal burned.
Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	1 56		1 06
Bounding	3 01		

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ASTRA-AUSTRIA (UALX-MEU)
SNF ID #: 566
Fuel Units & Descr: 5 - MTR TYPE
Heavy Metal Mass: BOL=3 62kg; EOL=2.766kg
ROD Storage Site: SRS

¹Fuel decay start date: 1985
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup (MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated
Canister usage:
18"x10"
0.14

II. Estimates	m	X _n	X _b	b	Y _n	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-09	807.81	1,615.62	0.00E+00	9.26E-07	1.85E-06	Avg MeV	
Am-241	2.3056E-03	807.81	1,615.62	0.00E+00	1.86E+00	3.72E+00	0.0150	1.512E+14
Am-242m	4.1476E-07	807.81	1,615.62	0.00E+00	3.35E-04	6.70E-04	0.0250	3.141E+13
Am-243	1.4894E-06	807.81	1,615.62	0.00E+00	1.20E-03	2.41E-03	0.0375	2.735E+13
C-14	5.7108E-09	807.81	1,615.62	0.00E+00	4.61E-06	9.23E-06	0.0575	2.937E+13
Cl-36	1.3124E-32	807.81	1,615.62	0.00E+00	1.06E-29	2.12E-29	0.0850	1.772E+13
Cm-243	1.4562E-07	807.81	1,615.62	0.00E+00	1.18E-04	2.35E-04	0.1250	1.187E+13
Cm-244	2.4221E-05	807.81	1,615.62	0.00E+00	1.96E-02	3.91E-02	0.2250	1.530E+13
Co-60	2.7560E-06	807.81	1,615.62	0.00E+00	2.23E-03	4.45E-03	0.3750	6.652E+12
Cs-134	5.8851E-04	807.81	1,615.62	0.00E+00	4.75E-01	9.51E-01	0.5750	1.091E+14
Cs-135	3.4477E-06	807.81	1,615.62	0.00E+00	2.79E-03	5.57E-03	0.8500	1.571E+12
Cs-137	1.8099E+00	807.81	1,615.62	0.00E+00	1.46E+03	2.92E+03	1.2500	8.739E+11
Eu-154	1.6386E-02	807.81	1,615.62	0.00E+00	1.32E+01	2.65E+01	1.7500	4.317E+10
Eu-155	2.3957E-03	807.81	1,615.62	0.00E+00	1.94E+00	3.87E+00	2.2500	3.077E+06
Fe-55	3.2707E-05	807.81	1,615.62	0.00E+00	2.64E-02	5.28E-02	2.7500	2.520E+06
H-3	3.4504E-03	807.81	1,615.62	0.00E+00	2.79E+00	5.57E+00	3.5000	1.905E+03
I-129	7.5300E-07	807.81	1,615.62	0.00E+00	6.08E-04	1.22E-03	5.0000	6.409E+02
Kr-85	7.8540E-02	807.81	1,615.62	0.00E+00	6.34E+01	1.27E+02	7.0000	7.053E+01
Np-237	9.5615E-06	807.81	1,615.62	0.00E+00	7.72E-03	1.54E-02	11.0000	7.890E+00
Pa-231	2.7968E-09	807.81	1,615.62	0.00E+00	2.26E-06	4.52E-06		
Pb-210	1.2612E-10	807.81	1,615.62	0.00E+00	1.02E-07	2.04E-07		
Pm-147	1.2952E-02	807.81	1,615.62	0.00E+00	1.05E+01	2.09E+01		
Pu-238	1.7549E-02	807.81	1,615.62	0.00E+00	1.42E+01	2.84E+01		
Pu-239	4.2810E-04	807.81	1,615.62	0.00E+00	3.46E-01	6.92E-01		
Pu-240	2.4357E-04	807.81	1,615.62	0.00E+00	1.97E-01	3.94E-01		
Pu-241	2.6277E-02	807.81	1,615.62	0.00E+00	2.12E+01	4.25E+01		
Pu-242	3.6329E-07	807.81	1,615.62	0.00E+00	2.93E-04	5.87E-04		
Ra-226	4.4444E-10	807.81	1,615.62	0.00E+00	3.59E-07	7.18E-07		
Ra-228	1.9714E-14	807.81	1,615.62	0.00E+00	1.59E-11	3.19E-11		
Ru-106	2.0477E-07	807.81	1,615.62	0.00E+00	1.65E-04	3.31E-04		
Se-79	1.2933E-05	807.81	1,615.62	0.00E+00	1.04E-02	2.09E-02		
Sn-126	1.1574E-05	807.81	1,615.62	0.00E+00	9.35E-03	1.87E-02		
Sr-90	1.7092E+00	807.81	1,615.62	0.00E+00	1.38E+03	2.76E+03		
Tc-99	4.2239E-04	807.81	1,615.62	0.00E+00	3.41E-01	6.82E-01		
Th-229	7.7260E-12	807.81	1,615.62	0.00E+00	6.24E-09	1.25E-08		
Th-230	5.8497E-08	807.81	1,615.62	0.00E+00	4.73E-05	9.45E-05		
Th-232	2.6906E-14	807.81	1,615.62	0.00E+00	2.17E-11	4.35E-11		
Ti-208	4.4336E-08	807.81	1,615.62	0.00E+00	3.58E-05	7.16E-05		
U-232	1.2037E-07	807.81	1,615.62	0.00E+00	9.72E-05	1.94E-04		
U-233	3.0011E-09	807.81	1,615.62	0.00E+00	2.42E-06	4.85E-06		
U-234	1.8497E-04	807.81	1,615.62	0.00E+00	1.49E-01	2.99E-01		
U-235	-2.7235E-06	807.81	0.00	3.48E-03	1.28E-03	3.48E-03		
U-236	1.5493E-05	807.81	1,615.62	0.00E+00	1.25E-02	2.50E-02		
U-238	-4.2851E-09	807.81	0.00	6.76E-04	6.72E-04	6.76E-04		
Y-90	1.7094E+00	807.81	1,615.62	0.00E+00	1.38E+03	2.76E+03		
Other Radionuclides					1.39E+03	2.78E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LIGHT WATER	LIGHT WATER
Fuel Cladding	ALUM	ALUM
BOL HM Constituents	U	U
BOL Enrichment %:	44.43904151	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		807.81
Bounding		1,615.62

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.71	
Bounding	1.42	

Estimated EOL HM/Given EOL HM

1.02

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name ATSR
SNF ID # 17
Fuel Units & Descr: 20 - 19 FLAT PLATES
Heavy Metal Mass: BOL = ; EOL=321kg
ROD Storage Site SRS

¹Fuel decay start date 1988
Estimates as of: 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 20 years

Estimated
Canister usage
18"x10"
0.56

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	6.6313E-10	3,039.93	3,039.93	0.00E+00	2.02E-06	2.02E-06	0.0150	3.209E+14
Am-241	2.0060E-03	3,039.93	3,039.93	0.00E+00	6.10E+00	6.10E+00	0.0250	6.673E+13
Am-242m	4.2429E-07	3,039.93	3,039.93	0.00E+00	1.29E-03	1.29E-03	0.0375	5.820E+13
Am-243	1.4899E-06	3,039.93	3,039.93	0.00E+00	4.53E-03	4.53E-03	0.0575	6.234E+13
C-14	5.7135E-09	3,039.93	3,039.93	0.00E+00	1.74E-05	1.74E-05	0.0850	3.767E+13
Cl-36	1.3124E-32	3,039.93	3,039.93	0.00E+00	3.99E-29	3.99E-29	0.1250	2.549E+13
Cm-243	1.6443E-07	3,039.93	3,039.93	0.00E+00	5.00E-04	5.00E-04	0.2250	3.250E+13
Cm-244	2.9330E-05	3,039.93	3,039.93	0.00E+00	8.92E-02	8.92E-02	0.3750	1.415E+13
Co-60	5.3186E-06	3,039.93	3,039.93	0.00E+00	1.62E-02	1.62E-02	0.5750	2.308E+14
Cs-134	3.1563E-03	3,039.93	3,039.93	0.00E+00	9.59E+00	9.59E+00	0.8500	3.902E+12
Cs-135	3.4477E-06	3,039.93	3,039.93	0.00E+00	1.05E-02	1.05E-02	1.2500	2.228E+12
Cs-137	2.0313E+00	3,039.93	3,039.93	0.00E+00	6.18E+03	6.18E+03	1.7500	1.023E+11
Eu-154	2.4513E-02	3,039.93	3,039.93	0.00E+00	7.45E+01	7.45E+01	2.2500	8.970E+06
Eu-155	4.8175E-03	3,039.93	3,039.93	0.00E+00	1.46E+01	1.46E+01	2.7500	5.071E+06
Fe-55	1.2397E-04	3,039.93	3,039.93	0.00E+00	3.77E-01	3.77E-01	3.5000	2.330E+04
H-3	4.5697E-03	3,039.93	3,039.93	0.00E+00	1.39E+01	1.39E+01	5.0000	1.317E+03
I-129	7.5300E-07	3,039.93	3,039.93	0.00E+00	2.29E-03	2.29E-03	7.0000	1.454E+02
Kr-85	1.0850E-01	3,039.93	3,039.93	0.00E+00	3.30E+02	3.30E+02	11.0000	1.630E+01
Np-237	9.5561E-06	3,039.93	3,039.93	0.00E+00	2.90E-02	2.90E-02		
Pa-231	2.0359E-09	3,039.93	3,039.93	0.00E+00	6.19E-06	6.19E-06		
Pb-210	4.9728E-11	3,039.93	3,039.93	0.00E+00	1.51E-07	1.51E-07		
Pm-147	4.8502E-02	3,039.93	3,039.93	0.00E+00	1.47E+02	1.47E+02		
Pu-238	1.8254E-02	3,039.93	3,039.93	0.00E+00	5.55E+01	5.55E+01		
Pu-239	4.2810E-04	3,039.93	3,039.93	0.00E+00	1.30E+00	1.30E+00		
Pu-240	2.4368E-04	3,039.93	3,039.93	0.00E+00	7.41E-01	7.41E-01		
Pu-241	3.3415E-02	3,039.93	3,039.93	0.00E+00	1.02E+02	1.02E+02		
Pu-242	3.6329E-07	3,039.93	3,039.93	0.00E+00	1.10E-03	1.10E-03		
Ra-226	2.2854E-10	3,039.93	3,039.93	0.00E+00	6.95E-07	6.95E-07		
Ra-228	1.2426E-14	3,039.93	3,039.93	0.00E+00	3.78E-11	3.78E-11		
Ru-106	6.3589E-06	3,039.93	3,039.93	0.00E+00	1.93E-02	1.93E-02		
Se-79	1.2933E-05	3,039.93	3,039.93	0.00E+00	3.93E-02	3.93E-02		
Sn-126	1.1574E-05	3,039.93	3,039.93	0.00E+00	3.52E-02	3.52E-02		
Sr-90	1.9248E+00	3,039.93	3,039.93	0.00E+00	5.85E+03	5.85E+03		
Tc-99	4.2239E-04	3,039.93	3,039.93	0.00E+00	1.28E+00	1.28E+00		
Th-229	5.0953E-12	3,039.93	3,039.93	0.00E+00	1.55E-08	1.55E-08		
Th-230	4.1885E-08	3,039.93	3,039.93	0.00E+00	1.27E-04	1.27E-04		
Th-232	1.9270E-14	3,039.93	3,039.93	0.00E+00	5.86E-11	5.86E-11		
Ti-208	4.6024E-08	3,039.93	3,039.93	0.00E+00	1.40E-04	1.40E-04		
U-232	1.2582E-07	3,039.93	3,039.93	0.00E+00	3.82E-04	3.82E-04		
U-233	2.5825E-09	3,039.93	3,039.93	0.00E+00	7.85E-06	7.85E-06		
U-234	1.8450E-04	3,039.93	3,039.93	0.00E+00	5.61E-01	5.61E-01		
U-235	-2.7235E-06	3,039.93	0.00	1.28E-02	4.50E-03	1.28E-02		
U-236	1.5493E-05	3,039.93	3,039.93	0.00E+00	4.71E-02	4.71E-02		
U-238	-4.2851E-09	3,039.93	0.00	1.29E-04	1.16E-04	1.29E-04		
Y-90	1.9254E+00	3,039.93	3,039.93	0.00E+00	5.85E+03	5.85E+03		
Other Radionuclides					5.88E+03	5.88E+03		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches on all parameters except enrichment (unknown)
BOL HM Constituents:	U	U	
BOL Enrichment %:		60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		3,039.93	Nominal burnup set equal to bounding burnup
Bounding		3,039.93	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	1.50		1.02
Bounding	1.50		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BABCOCK & WILCOX SCRAP

SNF ID #: 18

Fuel Units & Descr: 1 - CANISTER OF SCRAP

Heavy Metal Mass: BOL= , EOL=0.07kg

ROD Storage Site: INEEL

¹Fuel decay start date: 1969

Estimates as of: 2010

Template: (Worst Case)

²Template Burnup(MWd): 62.5

Template BOL Heavy Metal Mass (MT): 0.00186965

Template Decay Time: 35 years

Estimated
Canister usage,
HIC
1.00

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	66.52	66.52	0.00E+00	1.53E-04	1.53E-04	Avg MeV	
Am-241	8.4448E+00	66.52	66.52	0.00E+00	5.62E+02	5.62E+02	0.0150	8.152E+13
Am-242m	1.6848E-02	66.52	66.52	0.00E+00	1.12E+00	1.12E+00	0.0250	1.622E+13
Am-243	1.6320E-02	66.52	66.52	0.00E+00	1.09E+00	1.09E+00	0.0375	1.417E+13
C-14	1.2090E-01	66.52	66.52	0.00E+00	8.04E+00	8.04E+00	0.0575	2.230E+13
Cl-36	2.2849E-03	66.52	66.52	0.00E+00	1.52E-01	1.52E-01	0.0850	8.703E+12
Cm-243	8.6624E-04	66.52	66.52	0.00E+00	5.76E-02	5.76E-02	0.1250	6.821E+12
Cm-244	1.6848E-01	66.52	66.52	0.00E+00	1.12E+01	1.12E+01	0.2250	7.539E+12
Co-60	2.8086E+01	66.52	66.52	0.00E+00	1.87E+03	1.87E+03	0.3750	3.225E+12
Cs-134	3.4148E-04	66.52	66.52	0.00E+00	2.27E-02	2.27E-02	0.5750	5.244E+13
Cs-135	4.3976E-04	66.52	66.52	0.00E+00	2.93E-02	2.93E-02	0.8500	2.004E+12
Cs-137	2.1049E+01	66.52	66.52	0.00E+00	1.40E+03	1.40E+03	1.2500	1.401E+14
Eu-154	1.2500E+00	66.52	66.52	0.00E+00	8.32E+01	8.32E+01	1.7500	6.196E+10
Eu-155	6.8986E-02	66.52	66.52	0.00E+00	4.59E+00	4.59E+00	2.2500	7.346E+08
Fe-55	2.9308E-01	66.52	66.52	0.00E+00	1.95E+01	1.95E+01	2.7500	2.070E+08
H-3	2.4311E-01	66.52	66.52	0.00E+00	1.62E+01	1.62E+01	3.5000	1.657E+05
I-129	1.0618E-05	66.52	66.52	0.00E+00	7.06E-04	7.06E-04	5.0000	7.036E+04
Kr-85	5.9882E-01	66.52	66.52	0.00E+00	3.98E+01	3.98E+01	7.0000	8.057E+03
Np-237	1.5668E-04	66.52	66.52	0.00E+00	1.04E-02	1.04E-02	11.0000	9.219E+02
Pa-231	2.8656E-06	66.52	66.52	0.00E+00	1.91E-04	1.91E-04		
Pb-210	2.3918E-08	66.52	66.52	0.00E+00	1.59E-06	1.59E-06		
Pm-147	1.6900E-02	66.52	66.52	0.00E+00	1.12E+00	1.12E+00		
Pu-238	-8.6120E-01	66.52	0.00	1.80E+01	0.00E+00	1.80E+01		
Pu-239	-4.8440E-02	66.52	0.00	2.18E+00	0.00E+00	2.18E+00		
Pu-240	-3.0095E-01	66.52	0.00	2.78E+00	0.00E+00	2.78E+00		
Pu-241	-1.0411E+02	66.52	0.00	7.16E+02	0.00E+00	7.16E+02		
Pu-242	-1.1381E-04	66.52	0.00	1.20E-02	4.46E-03	1.20E-02		
Ra-226	6.4400E-08	66.52	66.52	0.00E+00	4.28E-06	4.28E-06		
Ra-228	5.9952E-07	66.52	66.52	0.00E+00	3.99E-05	3.99E-05		
Ru-106	8.5526E-07	66.52	66.52	0.00E+00	5.69E-05	5.69E-05		
Se-79	1.9181E-04	66.52	66.52	0.00E+00	1.28E-02	1.28E-02		
Sn-126	1.6671E-04	66.52	66.52	0.00E+00	1.11E-02	1.11E-02		
Sr-90	1.9799E+01	66.52	66.52	0.00E+00	1.32E+03	1.32E+03		
Tc-99	6.7678E-03	66.52	66.52	0.00E+00	4.50E-01	4.50E-01		
Th-229	1.7488E-06	66.52	66.52	0.00E+00	1.16E-04	1.16E-04		
Th-230	5.8704E-06	66.52	66.52	0.00E+00	3.91E-04	3.91E-04		
Th-232	6.0208E-07	66.52	66.52	0.00E+00	4.01E-05	4.01E-05		
Ti-208	8.7573E-05	66.52	66.52	0.00E+00	5.83E-03	5.83E-03		
U-232	2.3706E-04	66.52	66.52	0.00E+00	1.58E-02	1.58E-02		
U-233	3.6128E-04	66.52	66.52	0.00E+00	2.40E-02	2.40E-02		
U-234	1.2788E-02	66.52	66.52	0.00E+00	8.51E-01	8.51E-01		
U-235	5.7486E-04	66.52	66.52	6.02E-05	3.83E-02	3.83E-02		
U-236	2.3485E-04	66.52	66.52	0.00E+00	1.56E-02	1.56E-02		
U-238	1.1581E-04	66.52	66.52	7.49E-06	7.71E-03	7.71E-03		
Y-90	1.9804E+01	66.52	66.52	0.00E+00	1.32E+03	1.32E+03		
Other Radionuclides					4.10E+03	4.10E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	(Worst Case)	
Fuel Cladding	SST	SST/Inconel	
BOL HM Constituents	Pu and U	U, Th, & Pu	
BOL Enrichment %		0 to 100	This fuel didn't closely match any existing templates, therefore the worst case template was used

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		66.52	Nominal burnup set equal to bounding burnup.
Bounding		66.52	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	14.21		591.64
Bounding	14.21		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BER-II (HMI) (END BOXES) GERMANY
SNF ID #: 892
Fuel Units & Descr: 6 - MTR TYPE
Heavy Metal Mass BOL=0kg EOL=0kg
ROD Storage Site SRS

Fuel decay start date 1996
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 10 years

Estimated
Canister usage
HIC
1.00

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Cl/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	2.8404E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0150	0.000E+00
Am-241	1.4935E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0250	0.000E+00
Am-242m	4.4390E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0375	0.000E+00
Am-243	1.4913E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0575	0.000E+00
C-14	5.7217E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0850	0.000E+00
Cl-36	1.3124E-32	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.1250	0.000E+00
Cm-243	2.0967E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.2250	0.000E+00
Cm-244	4.3001E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.3750	0.000E+00
Co-60	1.9798E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.5750	0.000E+00
Cs-134	9.0795E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.8500	0.000E+00
Cs-135	3.4477E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.2500	0.000E+00
Cs-137	2.5588E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.7500	0.000E+00
Eu-154	5.4847E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.2500	0.000E+00
Eu-155	1.9469E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.7500	0.000E+00
Fe-55	1.7797E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	3.5000	0.000E+00
H-3	8.0065E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	5.0000	0.000E+00
I-129	7.5300E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	7.0000	0.000E+00
Kr-85	2.0705E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	11.0000	0.000E+00
Np-237	9.5507E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pa-231	1.2740E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pb-210	1.1838E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pm-147	6.7974E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-238	1.9755E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-239	4.2838E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-240	2.4390E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-241	5.4058E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-242	3.6329E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-226	8.3742E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-228	5.7734E-15	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ru-106	6.1356E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Se-79	1.2936E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sn-126	1.1574E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sr-90	2.4417E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Tc-99	4.2239E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-229	2.8568E-12	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-230	2.5310E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-232	1.1631E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ti-208	4.6705E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-232	1.3151E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-233	2.1650E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-234	1.8399E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-235	-2.7235E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-236	1.5493E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-238	-4.2851E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Y-90	2.4423E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Other Radionuclides								

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences*
	LIGHT WATER	LIGHT WATER	
Reactor Moderator			
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	100	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate*
Nominal.			
Bounding			

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal			
Bounding			

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BER-II (HM) (UALX HEU) GERMANY
SNF ID #: 758
Fuel Units & Descr: 112 - 17 FLAT PLATES
Heavy Metal Mass: BOL=20 653kg, EOL=12 074kg
ROD Storage Site, SRS

¹Fuel decay start date: 1996
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 10 years

Estimated
Canister usage
18"x10"
4 67

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2 8404E-10	8,124 67	16,249 34	0 00E+00	2 31E-06	4 62E-06	Avg MeV	
Am-241	1 4935E-03	8,124 67	16,249 34	0 00E+00	1 21E+01	2 43E+01	0 0150	2 210E+15
Am-242m	4 4390E-07	8,124 67	16,249 34	0 00E+00	3 61E-03	7 21E-03	0 0250	4 651E+14
Am-243	1 4913E-06	8,124 67	16,249 34	0 00E+00	1 21E-02	2 42E-02	0 0375	4 055E+14
C-14	5 7217E-09	8,124 67	16,249 34	0 00E+00	4 65E-05	9 30E-05	0 0575	4 284E+14
Cl-36	1 3124E-32	8,124 67	16,249 34	0 00E+00	1 07E-28	2 13E-28	0 0850	2 606E+14
Cm-243	2 0967E-07	8,124 67	16,249 34	0 00E+00	1 70E-03	3 41E-03	0 1250	1 823E+14
Cm-244	4 3001E-05	8,124 67	16,249 34	0 00E+00	3 49E-01	6 99E-01	0 2250	2 238E+14
Co-60	1 9798E-05	8,124 67	16,249 34	0 00E+00	1 61E-01	3 22E-01	0 3750	1 003E+14
Cs-134	9 0795E-02	8,124 67	16,249 34	0 00E+00	7 38E+02	1 48E+03	0 5750	1 628E+15
Cs-135	3 4477E-06	8,124 67	16,249 34	0 00E+00	2 80E-02	5 60E-02	0 8500	7 944E+13
Cs-137	2 5588E+00	8,124 67	16,249 34	0 00E+00	2 08E+04	4 16E+04	1 2500	2 585E+13
Eu-154	5 4847E-02	8,124 67	16,249 34	0 00E+00	4 46E+02	8 91E+02	1 7500	9 440E+11
Eu-155	1 9469E-02	8,124 67	16,249 34	0 00E+00	1 58E+02	3 16E+02	2 2500	6 241E+10
Fe-55	1 7797E-03	8,124 67	16,249 34	0 00E+00	1 45E+01	2 89E+01	2 7500	8 708E+08
H-3	8 0065E-03	8,124 67	16,249 34	0 00E+00	6 51E+01	1 30E+02	3 5000	1 037E+08
I-129	7 5300E-07	8,124 67	16,249 34	0 00E+00	6 12E-03	1 22E-02	5 0000	8 613E+03
Kr-85	2 0705E-01	8,124 67	16,249 34	0 00E+00	1 68E+03	3 36E+03	7 0000	9 570E+02
Np-237	9 5507E-06	8,124 67	16,249 34	0 00E+00	7 76E-02	1 55E-01	11 0000	1 077E+02
Pa-231	1 2740E-09	8,124 67	16,249 34	0 00E+00	1 04E-05	2 07E-05		
Pb-210	1 1838E-11	8,124 67	16,249 34	0 00E+00	9 62E-08	1 92E-07		
Pm-147	6 7974E-01	8,124 67	16,249 34	0 00E+00	5 52E+03	1 10E+04		
Pu-238	1 9755E-02	8,124 67	16,249 34	0 00E+00	1 61E+02	3 21E+02		
Pu-239	4 2838E-04	8,124 67	16,249 34	0 00E+00	3 48E+00	6 96E+00		
Pu-240	2 4390E-04	8,124 67	16,249 34	0 00E+00	1 98E+00	3 96E+00		
Pu-241	5 4058E-02	8,124 67	16,249 34	0 00E+00	4 39E+02	8 78E+02		
Pu-242	3 6329E-07	8,124 67	16,249 34	0 00E+00	2 95E-03	5 90E-03		
Ra-226	8 3742E-11	8,124 67	16,249 34	0 00E+00	6 80E-07	1 36E-06		
Ra-228	5 7734E-15	8,124 67	16,249 34	0 00E+00	4 69E-11	9 38E-11		
Ru-106	6 1356E-03	8,124 67	16,249 34	0 00E+00	4 98E+01	9 97E+01		
Se-79	1 2936E-05	8,124 67	16,249 34	0 00E+00	1 05E-01	2 10E-01		
Sn-126	1 1574E-05	8,124 67	16,249 34	0 00E+00	9 40E-02	1 88E-01		
Sr-90	2 4417E+00	8,124 67	16,249 34	0 00E+00	1 98E+04	3 97E+04		
Tc-99	4 2239E-04	8,124 67	16,249 34	0 00E+00	3 43E+00	6 86E+00		
Th-229	2 8568E-12	8,124 67	16,249 34	0 00E+00	2 32E-08	4 64E-08		
Th-230	2 5310E-08	8,124 67	16,249 34	0 00E+00	2 06E-04	4 11E-04		
Th-232	1 1631E-14	8,124 67	16,249 34	0 00E+00	9 45E-11	1 89E-10		
Th-208	4 6705E-08	8,124 67	16,249 34	0 00E+00	3 79E-04	7 59E-04		
U-232	1 3151E-07	8,124 67	16,249 34	0 00E+00	1 07E-03	2 14E-03		
U-233	2 1650E-09	8,124 67	16,249 34	0 00E+00	1 76E-05	3 52E-05		
U-234	1 8399E-04	8,124 67	16,249 34	0 00E+00	1 49E+00	2 99E+00		
U-235	-2 7235E-06	8,124 67	0 00	4 15E-02	1 94E-02	4 15E-02		
U-236	1 5493E-05	8,124 67	16,249 34	0 00E+00	1 26E-01	2 52E-01		
U-238	-4 2851E-09	8,124 67	0 00	4 84E-04	4 49E-04	4 84E-04		
Y-90	2 4423E+00	8,124 67	16,249 34	0 00E+00	1 98E+04	3 97E+04		
Other Radionuclides					2 02E+04	4 04E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93 03245367	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		8 124 67	
Bounding		16,249 34	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	1.25		
Bounding	2.50		1 04

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name BNL MEDICAL RX (BMRR)
 SNF ID # 21
 Fuel Units & Descr. 40 - CYLINDRICAL SECTIONS
 Heavy Metal Mass BOL=6 188kg EOL=5 124kg
 ROD Storage Site SRS

¹Fuel decay start date 1989
 Estimates as of 2010
 Template ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd) 367.2
 Template BOL Heavy Metal Mass (MT) 0.00116689
 Template Decay Time 20 years

Estimated
 Canister usage
 18"x10"
 1 11

II. Estimates							Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	1,007.63	2,015.26	0.00E+00	6.68E-07	1.34E-06	Avg MeV	
Am-241	2.0060E-03	1,007.63	2,015.26	0.00E+00	2.02E+00	4.04E+00	0.0150	2.127E+14
Am-242m	4.2429E-07	1,007.63	2,015.26	0.00E+00	4.28E-04	8.55E-04	0.0250	4.424E+13
Am-243	1.4899E-06	1,007.63	2,015.26	0.00E+00	1.50E-03	3.00E-03	0.0375	3.858E+13
C-14	5.7135E-09	1,007.63	2,015.26	0.00E+00	5.76E-06	1.15E-05	0.0575	4.132E+13
Cl-36	1.3124E-32	1,007.63	2,015.26	0.00E+00	1.32E-29	2.64E-29	0.0850	2.497E+13
Cm-243	1.6443E-07	1,007.63	2,015.26	0.00E+00	1.66E-04	3.31E-04	0.1250	1.690E+13
Cm-244	2.9330E-05	1,007.63	2,015.26	0.00E+00	2.96E-02	5.91E-02	0.2250	2.155E+13
Co-60	5.3186E-06	1,007.63	2,015.26	0.00E+00	5.36E-03	1.07E-02	0.3750	9.380E+12
Cs-134	3.1563E-03	1,007.63	2,015.26	0.00E+00	3.18E+00	6.36E+00	0.5750	1.530E+14
Cs-135	3.4477E-06	1,007.63	2,015.26	0.00E+00	3.47E-03	6.95E-03	0.8500	2.587E+12
Cs-137	2.0313E+00	1,007.63	2,015.26	0.00E+00	2.05E+03	4.09E+03	1.2500	1.477E+12
Eu-154	2.4513E-02	1,007.63	2,015.26	0.00E+00	2.47E+01	4.94E+01	1.7500	6.779E+10
Eu-155	4.8175E-03	1,007.63	2,015.26	0.00E+00	4.85E+00	9.71E+00	2.2500	5.947E+06
Fe-55	1.2397E-04	1,007.63	2,015.26	0.00E+00	1.25E-01	2.50E-01	2.7500	3.362E+06
H-3	4.5697E-03	1,007.63	2,015.26	0.00E+00	4.60E+00	9.21E+00	3.5000	1.544E+04
I-129	7.5300E-07	1,007.63	2,015.26	0.00E+00	7.59E-04	1.52E-03	5.0000	8.734E+02
Kr-85	1.0850E-01	1,007.63	2,015.26	0.00E+00	1.09E+02	2.19E+02	7.0000	9.642E+01
Np-237	9.5561E-06	1,007.63	2,015.26	0.00E+00	9.63E-03	1.93E-02	11.0000	1.081E+01
Pa-231	2.0359E-09	1,007.63	2,015.26	0.00E+00	2.05E-06	4.10E-06		
Pb-210	4.9728E-11	1,007.63	2,015.26	0.00E+00	5.01E-08	1.00E-07		
Pm-147	4.8502E-02	1,007.63	2,015.26	0.00E+00	4.89E+01	9.77E+01		
Pu-238	1.8254E-02	1,007.63	2,015.26	0.00E+00	1.84E+01	3.68E+01		
Pu-239	4.2810E-04	1,007.63	2,015.26	0.00E+00	4.31E-01	8.63E-01		
Pu-240	2.4368E-04	1,007.63	2,015.26	0.00E+00	2.46E-01	4.91E-01		
Pu-241	3.3415E-02	1,007.63	2,015.26	0.00E+00	3.37E+01	6.73E+01		
Pu-242	3.6329E-07	1,007.63	2,015.26	0.00E+00	3.66E-04	7.32E-04		
Ra-226	2.2854E-10	1,007.63	2,015.26	0.00E+00	2.30E-07	4.61E-07		
Ra-228	1.2426E-14	1,007.63	2,015.26	0.00E+00	1.25E-11	2.50E-11		
Ru-106	6.3589E-06	1,007.63	2,015.26	0.00E+00	6.41E-03	1.28E-02		
Se-79	1.2933E-05	1,007.63	2,015.26	0.00E+00	1.30E-02	2.61E-02		
Sn-126	1.1574E-05	1,007.63	2,015.26	0.00E+00	1.17E-02	2.33E-02		
Sr-90	1.9248E+00	1,007.63	2,015.26	0.00E+00	1.94E+03	3.88E+03		
Tc-99	4.2239E-04	1,007.63	2,015.26	0.00E+00	4.26E-01	8.51E-01		
Th-229	5.0953E-12	1,007.63	2,015.26	0.00E+00	5.13E-09	1.03E-08		
Th-230	4.1885E-08	1,007.63	2,015.26	0.00E+00	4.22E-05	8.44E-05		
Th-232	1.9270E-14	1,007.63	2,015.26	0.00E+00	1.94E-11	3.88E-11		
Ti-208	4.6024E-08	1,007.63	2,015.26	0.00E+00	4.64E-05	9.28E-05		
U-232	1.2582E-07	1,007.63	2,015.26	0.00E+00	1.27E-04	2.54E-04		
U-233	2.5825E-09	1,007.63	2,015.26	0.00E+00	2.60E-06	5.20E-06		
U-234	1.8450E-04	1,007.63	2,015.26	0.00E+00	1.86E-01	3.72E-01		
U-235	-2.7235E-06	1,007.63	0.00	1.24E-02	9.65E-03	1.24E-02		
U-236	1.5493E-05	1,007.63	2,015.26	0.00E+00	1.56E-02	3.12E-02		
U-238	-4.2851E-09	1,007.63	0.00	1.53E-04	1.49E-04	1.53E-04		
Y-90	1.9254E+00	1,007.63	2,015.26	0.00E+00	1.94E+03	3.88E+03		
Other Radionuclides					1.95E+03	3.90E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents:	ALUM	ALUM	
BOL Enrichment %:	92.65152255	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		1,007.63	
Bounding		2,015.26	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.52	
Bounding	1.03	
		Estimated EOL HM/Given EOL HM
		1.01

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BSR
 SNF ID #: 31
 Fuel Units & Descr: 41 - 19 PLATE MTR ASSY
 Heavy Metal Mass: BOL=7 856kg EOL=6 941kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1991
 Estimates as of: 2010
 Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0 00116689
 Template Decay Time: 15 years

Estimated
 Canister usage
 18"x10"
 1 71

II. Estimates

	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4 5861E-10	865 86	1,731 72	0 00E+00	3 97E-07	7 94E-07	Avg. MeV	
Am-241	1 7832E-03	865 86	1,731 72	0 00E+00	1 54E+00	3 09E+00	0 0150	2 066E+14
Am-242m	4 3410E-07	865 86	1,731 72	0 00E+00	3 76E-04	7 52E-04	0 0250	4 308E+13
Am-243	1 4907E-06	865 86	1,731 72	0 00E+00	1 29E-03	2 58E-03	0 0375	3 762E+13
C-14	5 7162E-09	865 86	1,731 72	0 00E+00	4 95E-06	9 90E-06	0 0575	4 011E+13
Cl-36	1 3124E-32	865 86	1,731 72	0 00E+00	1 14E-29	2 27E-29	0 0850	2 430E+13
Cm-243	1 8568E-07	865 86	1,731 72	0 00E+00	1 61E-04	3 22E-04	0 1250	1 666E+13
Cm-244	3 5512E-05	865 86	1,731 72	0 00E+00	3 07E-02	6 15E-02	0 2250	2 093E+13
Co-60	1 0261E-05	865 86	1,731 72	0 00E+00	8 88E-03	1 78E-02	0 3750	9 171E+12
Cs-134	1 6931E-02	865 86	1,731 72	0 00E+00	1 47E+01	2 93E+01	0 5750	1 489E+14
Cs-135	3 4477E-06	865 86	1,731 72	0 00E+00	2 99E-03	5 97E-03	0 8500	3 536E+12
Cs-137	2 2800E+00	865 86	1,731 72	0 00E+00	1 97E+03	3 95E+03	1 2500	1 786E+12
Eu-154	3 6656E-02	865 86	1,731 72	0 00E+00	3 17E+01	6 35E+01	1 7500	7 484E+10
Eu-155	9 6841E-03	865 86	1,731 72	0 00E+00	8 39E+00	1 68E+01	2 2500	9 363E+07
Fe-55	4 6977E-04	865 86	1,731 72	0 00E+00	4 07E-01	8 14E-01	2 7500	5 627E+06
H-3	6 0485E-03	865 86	1,731 72	0 00E+00	5 24E+00	1 05E+01	3 5000	3 576E+05
I-129	7 5300E-07	865 86	1,731 72	0 00E+00	6 52E-04	1 30E-03	5 0000	8 276E+02
Kr-85	1 4989E-01	865 86	1,731 72	0 00E+00	1 30E+02	2 60E+02	7 0000	9 165E+01
Np-237	9 5534E-06	865 86	1,731 72	0 00E+00	8 27E-03	1 65E-02	11 0000	1 029E+01
Pa-231	1 6550E-09	865 86	1,731 72	0 00E+00	1 43E-06	2 87E-06		
Pb-210	2 6631E-11	865 86	1,731 72	0 00E+00	2 31E-08	4 61E-08		
Pm-147	1 8156E-01	865 86	1,731 72	0 00E+00	1 57E+02	3 14E+02		
Pu-238	1 8990E-02	865 86	1,731 72	0 00E+00	1 64E+01	3 29E+01		
Pu-239	4 2838E-04	865 86	1,731 72	0 00E+00	3 71E-01	7 42E-01		
Pu-240	2 4379E-04	865 86	1,731 72	0 00E+00	2 11E-01	4 22E-01		
Pu-241	4 2511E-02	865 86	1,731 72	0 00E+00	3 68E+01	7 36E+01		
Pu-242	3 6329E-07	865 86	1,731 72	0 00E+00	3 15E-04	6 29E-04		
Ra-226	1 4725E-10	865 86	1,731 72	0 00E+00	1 27E-07	2 55E-07		
Ra-228	8 9760E-15	865 86	1,731 72	0 00E+00	7 77E-12	1 55E-11		
Ru-106	1 9752E-04	865 86	1,731 72	0 00E+00	1 71E-01	3 42E-01		
Se-79	1 2933E-05	865 86	1,731 72	0 00E+00	1 12E-02	2 24E-02		
Sn-126	1 1574E-05	865 86	1,731 72	0 00E+00	1 00E-02	2 00E-02		
Sr-90	2 1680E+00	865 86	1,731 72	0 00E+00	1 88E+03	3 75E+03		
Tc-99	4 2239E-04	865 86	1,731 72	0 00E+00	3 66E-01	7 31E-01		
Th-229	3 9270E-12	865 86	1,731 72	0 00E+00	3 40E-09	6 80E-09		
Th-230	3 3578E-08	865 86	1,731 72	0 00E+00	2 91E-05	5 81E-05		
Th-232	1 5452E-14	865 86	1,731 72	0 00E+00	1 34E-11	2 68E-11		
Ti-208	4 6705E-08	865 86	1,731 72	0 00E+00	4 04E-05	8 09E-05		
U-232	1 3045E-07	865 86	1,731 72	0 00E+00	1 13E-04	2 26E-04		
U-233	2 3739E-09	865 86	1,731 72	0 00E+00	2 06E-06	4 11E-06		
U-234	1 8423E-04	865 86	1,731 72	0 00E+00	1 60E-01	3 19E-01		
U-235	-2 7235E-06	865 86	0 00	1 58E-02	1 35E-02	1 58E-02		
U-236	1 5493E-05	865 86	1,731 72	0 00E+00	1 34E-02	2 68E-02		
U-238	-4 2851E-09	865 86	0 00	1 79E-04	1 75E-04	1 79E-04		
Y-90	2 1686E+00	865 86	1,731 72	0 00E+00	1 88E+03	3 76E+03		
Other Radionuclides					1 88E+03	3 77E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LIGHT WATER	LIGHT WATER
Fuel Cladding	ALUM	ALUM
BOL HM Constituents	U	U
BOL Enrichment %	93 23369049	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		865.86
Bounding		1,731.72

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
 Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.35	
Bounding	0.70	

Estimated EOL HM/Given EOL HM

1 01

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: CANDU
SNF ID #: 979
Fuel Units & Descr: 4 - ROD
Heavy Metal Mass BOL= ; EOL=49.32kg
ROD Storage Site INEEL

Fuel decay start date 1964
Estimates as of 2010
Template HFBR (Heavy Water, Zirc., 0 to 5%, U)
Template Burnup (MWd) 5
Template BOL Heavy Metal Mass (MT) 0.00034251
Template Decay Time 35 years

Estimated
Canister usage
18"x15"
0.14

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.6920E-09	47,275.85	47,275.85	0.00E+00	2.22E-04	2.22E-04	Avg MeV	
Am-241	2.2880E-02	47,275.85	47,275.85	0.00E+00	1.08E+03	1.08E+03	0.0150	3.298E+15
Am-242m	3.5400E-06	47,275.85	47,275.85	0.00E+00	1.67E-01	1.67E-01	0.0250	6.832E+14
Am-243	2.0580E-06	47,275.85	47,275.85	0.00E+00	9.73E-02	9.73E-02	0.0375	6.010E+14
C-14	1.1264E-03	47,275.85	47,275.85	0.00E+00	5.33E+01	5.33E+01	0.0575	6.508E+14
Cl-36	8.3760E-11	47,275.85	47,275.85	0.00E+00	3.96E-06	3.96E-06	0.0850	3.837E+14
Cm-243	5.0340E-07	47,275.85	47,275.85	0.00E+00	2.38E-02	2.38E-02	0.1250	2.532E+14
Cm-244	1.0450E-05	47,275.85	47,275.85	0.00E+00	4.94E-01	4.94E-01	0.2250	3.306E+14
Co-60	6.4420E-02	47,275.85	47,275.85	0.00E+00	3.05E+03	3.05E+03	0.3750	1.438E+14
Cs-134	7.9240E-06	47,275.85	47,275.85	0.00E+00	3.75E-01	3.75E-01	0.5750	2.516E+15
Cs-135	7.9140E-06	47,275.85	47,275.85	0.00E+00	3.74E-01	3.74E-01	0.8500	2.904E+13
Cs-137	1.4316E+00	47,275.85	47,275.85	0.00E+00	6.77E+04	6.77E+04	1.2500	2.393E+14
Eu-154	6.7900E-03	47,275.85	47,275.85	0.00E+00	3.21E+02	3.21E+02	1.7500	7.871E+11
Eu-155	6.2800E-04	47,275.85	47,275.85	0.00E+00	2.97E+01	2.97E+01	2.2500	1.261E+09
Fe-55	5.7480E-05	47,275.85	47,275.85	0.00E+00	2.72E+00	2.72E+00	2.7500	8.066E+07
H-3	2.3800E-02	47,275.85	47,275.85	0.00E+00	1.13E+03	1.13E+03	3.5000	2.433E+05
I-129	7.5020E-07	47,275.85	47,275.85	0.00E+00	3.55E-02	3.55E-02	5.0000	1.021E+05
Kr-85	3.8220E-02	47,275.85	47,275.85	0.00E+00	1.81E+03	1.81E+03	7.0000	1.149E+04
Np-237	5.5780E-06	47,275.85	47,275.85	0.00E+00	2.64E-01	2.64E-01	11.0000	1.303E+03
Pa-231	7.8820E-09	47,275.85	47,275.85	0.00E+00	3.73E-04	3.73E-04		
Pb-210	4.3840E-09	47,275.85	47,275.85	0.00E+00	2.07E-04	2.07E-04		
Pm-147	9.9500E-04	47,275.85	47,275.85	0.00E+00	4.70E+01	4.70E+01		
Pu-238	6.4240E-03	47,275.85	47,275.85	0.00E+00	3.04E+02	3.04E+02		
Pu-239	1.8744E-02	47,275.85	47,275.85	0.00E+00	8.86E+02	8.86E+02		
Pu-240	8.3540E-03	47,275.85	47,275.85	0.00E+00	3.95E+02	3.95E+02		
Pu-241	1.4606E-01	47,275.85	47,275.85	0.00E+00	6.91E+03	6.91E+03		
Pu-242	2.0400E-06	47,275.85	47,275.85	0.00E+00	9.64E-02	9.64E-02		
Ra-226	1.1804E-08	47,275.85	47,275.85	0.00E+00	5.58E-04	5.58E-04		
Ra-228	1.1864E-09	47,275.85	47,275.85	0.00E+00	5.61E-05	5.61E-05		
Ru-106	3.2580E-10	47,275.85	47,275.85	0.00E+00	1.54E-05	1.54E-05		
Se-79	1.2524E-05	47,275.85	47,275.85	0.00E+00	5.92E-01	5.92E-01		
Sn-126	1.2052E-05	47,275.85	47,275.85	0.00E+00	5.70E-01	5.70E-01		
Sr-90	1.2638E+00	47,275.85	47,275.85	0.00E+00	5.97E+04	5.97E+04		
Tc-99	4.4140E-04	47,275.85	47,275.85	0.00E+00	2.09E+01	2.09E+01		
Th-229	4.3480E-09	47,275.85	47,275.85	0.00E+00	2.06E-04	2.06E-04		
Th-230	1.0760E-06	47,275.85	47,275.85	0.00E+00	5.09E-02	5.09E-02		
Th-232	1.1926E-09	47,275.85	47,275.85	0.00E+00	5.64E-05	5.64E-05		
Ti-208	4.6200E-08	47,275.85	47,275.85	0.00E+00	2.18E-03	2.18E-03		
U-232	1.2406E-07	47,275.85	47,275.85	0.00E+00	5.87E-03	5.87E-03		
U-233	9.1620E-07	47,275.85	47,275.85	0.00E+00	4.33E-02	4.33E-02	Thermal Power	
U-234	2.3440E-03	47,275.85	47,275.85	0.00E+00	1.11E+02	1.11E+02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2.3296E-06	47,275.85	0.00	1.07E-02	0.00E+00	1.07E-02	8.69E+02	8.89E+02
U-236	2.6620E-05	47,275.85	47,275.85	0.00E+00	1.26E+00	1.26E+00	Total	Total
U-238	-1.3291E-07	47,275.85	0.00	3.12E-02	2.49E-02	3.12E-02		
Y-90	1.2642E+00	47,275.85	47,275.85	0.00E+00	5.98E+04	5.98E+04		
Other Radionuclides					6.45E+04	6.45E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown)
Reactor Moderator	HEAVY WATER	HEAVY WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %		0 to 5	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL
Nominal		47,275.85	
Bounding		47,275.85	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 2.59
Nominal	32.83		
Bounding	32.83		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: CVTR FUEL
SNF ID #: 37
Fuel Units & Descr: 34 - ROD
Heavy Metal Mass: BOL=68 656kg, EOL=67 47kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1967
Estimates as of: 2010
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
²Template Burnup(MWd): 5
Template BOL Heavy Metal Mass (MT): 0 00034251
Template Decay Time: 35 years

Estimated
Canister usage
18"x15"
0.45

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4 6920E-09	1,137 42	2,274 84	0 00E+00	5 34E-06	1 07E-05	Avg. MeV	
Am-241	2 2880E-02	1,137 42	2,274 84	0 00E+00	2 60E+01	5 20E+01	0 0150	1 587E+14
Am-242m	3 5400E-06	1,137 42	2,274 84	0 00E+00	4 03E-03	8 05E-03	0 0250	3 287E+13
Am-243	2 0580E-06	1,137 42	2,274 84	0 00E+00	2 34E-03	4 68E-03	0 0375	2 892E+13
C-14	1 1264E-03	1,137 42	2,274 84	0 00E+00	1 28E+00	2 56E+00	0 0575	3 131E+13
Cl-36	8 3760E-11	1,137 42	2,274 84	0 00E+00	9 53E-08	1 91E-07	0 0850	1 847E+13
Cm-243	5 0340E-07	1,137 42	2,274 84	0 00E+00	5 73E-04	1 15E-03	0 1250	1 218E+13
Cm-244	1 0450E-05	1,137 42	2,274 84	0 00E+00	1 19E-02	2 38E-02	0 2250	1 591E+13
Co-60	6 4420E-02	1,137 42	2,274 84	0 00E+00	7 33E+01	1 47E+02	0 3750	6 919E+12
Cs-134	7 9240E-06	1,137 42	2,274 84	0 00E+00	9 01E-03	1 80E-02	0 5750	1 211E+14
Cs-135	7 9140E-06	1,137 42	2,274 84	0 00E+00	9 00E-03	1 80E-02	0 8500	1 398E+12
Cs-137	1 4316E+00	1,137 42	2,274 84	0 00E+00	1 63E+03	3 26E+03	1 2500	1 152E+13
Eu-154	6 7900E-03	1,137 42	2,274 84	0 00E+00	7 72E+00	1 54E+01	1 7500	3 787E+10
Eu-155	6 2800E-04	1,137 42	2,274 84	0 00E+00	7 14E-01	1 43E+00	2 2500	6 067E+07
Fe-55	5 7480E-05	1,137 42	2,274 84	0 00E+00	6 54E-02	1 31E-01	2 7500	3 882E+06
H-3	2 3800E-02	1,137 42	2,274 84	0 00E+00	2 71E+01	5 41E+01	3 5000	1 182E+04
I-129	7 5020E-07	1,137 42	2,274 84	0 00E+00	8 53E-04	1 71E-03	5 0000	4 962E+03
Kr-85	3 8220E-02	1,137 42	2,274 84	0 00E+00	4 35E+01	8 69E+01	7 0000	5 583E+02
Np-237	5 5780E-06	1,137 42	2,274 84	0 00E+00	6 34E-03	1 27E-02	11.0000	6 336E+01
Pa-231	7 8820E-09	1,137 42	2,274 84	0 00E+00	8 97E-06	1 79E-05		
Pb-210	4 3840E-09	1,137 42	2,274 84	0 00E+00	4 99E-06	9 97E-06		
Pm-147	9 9500E-04	1,137 42	2,274 84	0 00E+00	1 13E+00	2 26E+00		
Pu-238	6 4240E-03	1,137 42	2,274 84	0 00E+00	7 31E+00	1 46E+01		
Pu-239	1 8744E-02	1,137 42	2,274 84	0 00E+00	2 13E+01	4 26E+01		
Pu-240	8 3540E-03	1,137 42	2,274 84	0 00E+00	9 50E+00	1 90E+01		
Pu-241	1 4606E-01	1,137 42	2,274 84	0 00E+00	1 66E+02	3 32E+02		
Pu-242	2 0400E-06	1,137 42	2,274 84	0 00E+00	2 32E-03	4 64E-03		
Ra-226	1 1804E-08	1,137 42	2,274 84	0 00E+00	1 34E-05	2 69E-05		
Ra-228	1 1864E-09	1,137 42	2,274 84	0 00E+00	1 35E-06	2 70E-06		
Ru-106	3 2580E-10	1,137 42	2,274 84	0 00E+00	3 71E-07	7 41E-07		
Se-79	1 2524E-05	1,137 42	2,274 84	0 00E+00	1 42E-02	2 85E-02		
Sn-126	1 2052E-05	1,137 42	2,274 84	0 00E+00	1 37E-02	2 74E-02		
Sr-90	1 2638E+00	1,137 42	2,274 84	0 00E+00	1 44E+03	2 87E+03		
Tc-99	4 4140E-04	1,137 42	2,274 84	0 00E+00	5 02E-01	1 00E+00		
Th-229	4 3480E-09	1,137 42	2,274 84	0 00E+00	4 95E-06	9 89E-06		
Th-230	1 0760E-06	1,137 42	2,274 84	0 00E+00	1 22E-03	2 45E-03		
Th-232	1 1926E-09	1,137 42	2,274 84	0 00E+00	1 36E-06	2 71E-06		
Ti-208	4 6200E-08	1,137 42	2,274 84	0 00E+00	5 25E-05	1 05E-04		
U-232	1 2406E-07	1,137 42	2,274 84	0 00E+00	1 41E-04	2 82E-04		
U-233	9 1620E-07	1,137 42	2,274 84	0 00E+00	1 04E-03	2 08E-03		
U-234	2 3440E-03	1,137 42	2,274 84	0 00E+00	2 67E+00	5 33E+00		
U-235	-2 3296E-06	1,137 42	0 00	2 67E-03	2 09E-05	2 67E-03		
U-236	2 6620E-05	1,137 42	2,274 84	0 00E+00	3 03E-02	6 06E-02		
U-238	-1 3291E-07	1,137 42	0 00	2 27E-02	2 25E-02	2 27E-02		
Y-90	1 2642E+00	1,137 42	2,274 84	0 00E+00	1 44E+03	2 88E+03		
Other Radionuclides					1 55E+03	3 10E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding	HEAVY WATER	HEAVY WATER	This Template was used for the following reasons: This fuel matches on all parameters except possibly cladding.
BOL HM Constituents	ZIRC OR SST	ZIRC	
BOL Enrichment %	U	U	
	1 8	0 to 5	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		1,137 42	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding		2,274 84	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	1 13		1 01
Bounding	2 27		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: DR-3 (U308 LEU)(DENMARK)
 SNF ID #: 1059
 Fuel Units & Descr: 3 - 4 CONCENTRIC TUBES
 Heavy Metal Mass BOL=2.752kg EOL=2.517kg
 ROD Storage Site SRS
 Fuel decay start date 1997
 Estimates as of: 2010
 Template: HFBR (Heavy Water, Alum, 10 to 20%, U)
 Template Burnup(MWd) 15
 Template BOL Heavy Metal Mass (MT) 0.00034251
 Template Decay Time 10 years

Estimated
 Canister usage
 18"x10"
 0.08

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	3.5433E-10	224.12	448.24	0.00E+00	7.94E-08	1.59E-07	0.0150	5.845E+13
Am-241	1.6993E-02	224.12	448.24	0.00E+00	3.81E+00	7.62E+00	0.0250	1.229E+13
Am-242m	9.3333E-06	224.12	448.24	0.00E+00	2.09E-03	4.18E-03	0.0375	1.077E+13
Am-243	6.4067E-06	224.12	448.24	0.00E+00	1.44E-03	2.87E-03	0.0575	1.140E+13
C-14	2.9653E-08	224.12	448.24	0.00E+00	6.65E-06	1.33E-05	0.0850	6.869E+12
Cl-36	5.9513E-35	224.12	448.24	0.00E+00	1.33E-32	2.67E-32	0.1250	4.764E+12
Cm-243	2.8167E-06	224.12	448.24	0.00E+00	6.31E-04	1.26E-03	0.2250	5.898E+12
Cm-244	1.6140E-04	224.12	448.24	0.00E+00	3.62E-02	7.23E-02	0.3750	2.644E+12
Co-60	6.0893E-05	224.12	448.24	0.00E+00	1.36E-02	2.73E-02	0.5750	4.406E+13
Cs-134	6.1567E-02	224.12	448.24	0.00E+00	1.38E+01	2.76E+01	0.8500	1.681E+12
Cs-135	4.8607E-06	224.12	448.24	0.00E+00	1.09E-03	2.18E-03	1.2500	6.099E+11
Cs-137	2.5487E+00	224.12	448.24	0.00E+00	5.71E+02	1.14E+03	1.7500	2.355E+10
Eu-154	4.6760E-02	224.12	448.24	0.00E+00	1.05E+01	2.10E+01	2.2500	1.424E+09
Eu-155	1.6533E-02	224.12	448.24	0.00E+00	3.71E+00	7.41E+00	2.7500	3.051E+07
Fe-55	2.0373E-02	224.12	448.24	0.00E+00	4.57E+00	9.13E+00	3.5000	3.830E+06
H-3	8.1800E-03	224.12	448.24	0.00E+00	1.83E+00	3.67E+00	5.0000	1.075E+03
I-129	7.1600E-07	224.12	448.24	0.00E+00	1.60E-04	3.21E-04	7.0000	1.222E+02
Kr-85	1.9547E-01	224.12	448.24	0.00E+00	4.38E+01	8.76E+01	11.0000	1.394E+01
Np-237	3.6573E-06	224.12	448.24	0.00E+00	8.20E-04	1.64E-03		
Pa-231	1.6420E-09	224.12	448.24	0.00E+00	3.68E-07	7.36E-07		
Pb-210	7.4600E-15	224.12	448.24	0.00E+00	1.67E-12	3.34E-12		
Pm-147	6.5033E-01	224.12	448.24	0.00E+00	1.46E+02	2.92E+02		
Pu-238	5.9807E-03	224.12	448.24	0.00E+00	1.34E+00	2.68E+00		
Pu-239	1.0320E-02	224.12	448.24	0.00E+00	2.31E+00	4.63E+00		
Pu-240	5.4233E-03	224.12	448.24	0.00E+00	1.22E+00	2.43E+00		
Pu-241	6.0807E-01	224.12	448.24	0.00E+00	1.36E+02	2.73E+02		
Pu-242	3.0713E-06	224.12	448.24	0.00E+00	6.88E-04	1.38E-03		
Ra-226	6.1580E-14	224.12	448.24	0.00E+00	1.38E-11	2.76E-11		
Ra-228	4.9953E-15	224.12	448.24	0.00E+00	1.12E-12	2.24E-12		
Ru-106	8.2133E-03	224.12	448.24	0.00E+00	1.84E+00	3.68E+00		
Se-79	1.2540E-05	224.12	448.24	0.00E+00	2.81E-03	5.62E-03		
Sn-126	1.1393E-05	224.12	448.24	0.00E+00	2.55E-03	5.11E-03		
Sr-90	2.3340E+00	224.12	448.24	0.00E+00	5.23E+02	1.05E+03		
Tc-99	4.3540E-04	224.12	448.24	0.00E+00	9.76E-02	1.95E-01		
Th-229	2.4973E-13	224.12	448.24	0.00E+00	5.60E-11	1.12E-10		
Th-230	2.4613E-11	224.12	448.24	0.00E+00	5.52E-09	1.10E-08		
Th-232	9.9467E-15	224.12	448.24	0.00E+00	2.23E-12	4.46E-12		
Th-208	7.7667E-09	224.12	448.24	0.00E+00	1.74E-06	3.48E-06		
U-232	2.1927E-08	224.12	448.24	0.00E+00	4.91E-06	9.83E-06		
U-233	2.7887E-10	224.12	448.24	0.00E+00	6.25E-08	1.25E-07		
U-234	3.0807E-07	224.12	448.24	0.00E+00	6.90E-05	1.38E-04		
U-235	-2.5341E-06	224.12	0.00	1.16E-03	5.97E-04	1.16E-03		
U-236	1.3000E-05	224.12	448.24	0.00E+00	2.91E-03	5.83E-03		
U-238	-1.4207E-08	224.12	0.00	7.44E-04	7.41E-04	7.44E-04		
Y-90	2.3347E+00	224.12	448.24	0.00E+00	5.23E+02	1.05E+03		
Other Radionuclides					5.53E+02	1.11E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	HEAVY WATER	HEAVY WATER
Fuel Cladding	ALUM	ALUM
BOL HM Constituents	U	U
BOL Enrichment %	19.58291238	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		224.12
Bounding		448.24

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
 Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	1.86	
Bounding	3.72	

Estimated EOL HM/Given EOL HM

1.02

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: DR-3 (U3Si2 LEU)(DENMARK)
SNF ID #: 759
Fuel Units & Descr: 375 - 4 CONCENTRIC TUBES
Heavy Metal Mass: BOL=341 662kg; EOL=309 112kg
ROD Storage Site: SRS

¹Fuel decay start date: 1997
Estimates as of: 2010
Template: HFBR (Heavy Water, Alum, 10 to 20%, U)
²Template Burnup(MWd): 15
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 10 years

Estimated
Canister usage
18"x10"
10 42

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.5433E-10	30,937 63	61,875 26	0.00E+00	1.10E-05	2.19E-05	Avg. MeV	
Am-241	1.6993E-02	30,937 63	61,875 26	0.00E+00	5.26E+02	1.05E+03	0.0150	8.068E+15
Am-242m	9.3333E-06	30,937 63	61,875 26	0.00E+00	2.89E-01	5.78E-01	0.0250	1.697E+15
Am-243	6.4067E-06	30,937 63	61,875 26	0.00E+00	1.98E-01	3.96E-01	0.0375	1.487E+15
C-14	2.9653E-08	30,937 63	61,875 26	0.00E+00	9.17E-04	1.83E-03	0.0575	1.574E+15
Cl-36	5.9513E-35	30,937 63	61,875 26	0.00E+00	1.84E-30	3.68E-30	0.0850	9.482E+14
Cm-243	2.8167E-06	30,937 63	61,875 26	0.00E+00	8.71E-02	1.74E-01	0.1250	6.576E+14
Cm-244	1.6140E-04	30,937 63	61,875 26	0.00E+00	4.99E+00	9.99E+00	0.2250	8.142E+14
Co-60	6.0893E-05	30,937 63	61,875 26	0.00E+00	1.88E+00	3.77E+00	0.3750	3.650E+14
Cs-134	6.1567E-02	30,937 63	61,875 26	0.00E+00	1.90E+03	3.81E+03	0.5750	6.082E+15
Cs-135	4.8607E-06	30,937 63	61,875 26	0.00E+00	1.50E-01	3.01E-01	0.8500	2.321E+14
Cs-137	2.5487E+00	30,937 63	61,875 26	0.00E+00	7.88E+04	1.58E+05	1.2500	8.419E+13
Eu-154	4.6760E-02	30,937 63	61,875 26	0.00E+00	1.45E+03	2.89E+03	1.7500	3.252E+12
Eu-155	1.6533E-02	30,937 63	61,875 26	0.00E+00	5.12E+02	1.02E+03	2.2500	1.966E+11
Fe-55	2.0373E-02	30,937 63	61,875 26	0.00E+00	6.30E+02	1.26E+03	2.7500	4.211E+09
H-3	8.1800E-03	30,937 63	61,875 26	0.00E+00	2.53E+02	5.06E+02	3.5000	5.287E+08
I-129	7.1600E-07	30,937 63	61,875 26	0.00E+00	2.22E-02	4.43E-02	5.0000	1.484E+05
Kr-85	1.9547E-01	30,937 63	61,875 26	0.00E+00	6.05E+03	1.21E+04	7.0000	1.687E+04
Np-237	3.6573E-06	30,937 63	61,875 26	0.00E+00	1.13E-01	2.26E-01	11.0000	1.924E+03
Pa-231	1.6420E-09	30,937 63	61,875 26	0.00E+00	5.08E-05	1.02E-04		
Pb-210	7.4600E-15	30,937 63	61,875 26	0.00E+00	2.31E-10	4.62E-10		
Pm-147	6.5033E-01	30,937 63	61,875 26	0.00E+00	2.01E+04	4.02E+04		
Pu-238	5.9807E-03	30,937 63	61,875 26	0.00E+00	1.85E+02	3.70E+02		
Pu-239	1.0320E-02	30,937 63	61,875 26	0.00E+00	3.19E+02	6.39E+02		
Pu-240	5.4233E-03	30,937 63	61,875 26	0.00E+00	1.68E+02	3.36E+02		
Pu-241	6.0807E-01	30,937 63	61,875 26	0.00E+00	1.88E+04	3.76E+04		
Pu-242	3.0713E-06	30,937 63	61,875 26	0.00E+00	9.50E-02	1.90E-01		
Ra-226	6.1580E-14	30,937 63	61,875 26	0.00E+00	1.91E-09	3.81E-09		
Ra-228	4.9953E-15	30,937 63	61,875 26	0.00E+00	1.55E-10	3.09E-10		
Ru-106	8.2133E-03	30,937 63	61,875 26	0.00E+00	2.54E+02	5.08E+02		
Se-79	1.2540E-05	30,937 63	61,875 26	0.00E+00	3.88E-01	7.76E-01		
Sn-126	1.1393E-05	30,937 63	61,875 26	0.00E+00	3.52E-01	7.05E-01		
Sr-90	2.3340E+00	30,937 63	61,875 26	0.00E+00	7.22E+04	1.44E+05		
Tc-99	4.3540E-04	30,937 63	61,875 26	0.00E+00	1.35E+01	2.69E+01		
Th-229	2.4973E-13	30,937 63	61,875 26	0.00E+00	7.73E-09	1.55E-08		
Th-230	2.4613E-11	30,937 63	61,875 26	0.00E+00	7.61E-07	1.52E-06		
Th-232	9.9467E-15	30,937 63	61,875 26	0.00E+00	3.08E-10	6.15E-10		
Ti-208	7.7667E-09	30,937 63	61,875 26	0.00E+00	2.40E-04	4.81E-04		
U-232	2.1927E-08	30,937 63	61,875 26	0.00E+00	6.78E-04	1.36E-03		
U-233	2.7887E-10	30,937 63	61,875 26	0.00E+00	8.63E-06	1.73E-05		
U-234	3.0807E-07	30,937 63	61,875 26	0.00E+00	9.53E-03	1.91E-02		
U-235	-2.5341E-06	30,937 63	0.00	1.46E-01	6.75E-02	1.46E-01		
U-236	1.3000E-05	30,937 63	61,875 26	0.00E+00	4.02E-01	8.04E-01		
U-238	-1.4207E-08	30,937 63	0.00	9.21E-02	9.17E-02	9.21E-02		
Y-90	2.3347E+00	30,937 63	61,875 26	0.00E+00	7.22E+04	1.44E+05		
Other Radionuclides					7.63E+04	1.53E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	HEAVY WATER	HEAVY WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19.7578539	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		30.937.63	
Bounding		61.875.26	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	2.07		
Bounding	4.14		1.02

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name DR-3 (JALX HEU)(DENMARK)
SNF ID # 714
Fuel Units & Descr: 88 - 4 CONCENTRIC TUBES
Heavy Metal Mass BOL=14.529kg EOL=8 kg
ROD Storage Site SRS

¹Fuel decay start date 1997
Estimates as of 2010
Template HFBR (Heavy Water, Alum, 40 to 100%, U)
²Template Burnup(MWd) 164.6
Template BOL Heavy Metal Mass (MT) 0.000377
Template Decay Time 10 years

Estimated
Canister usage
18"x10"
2.44

II. Estimates							Gamma Sources	
	m	x _n	x _b	b	y _n	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	1.3262E-10	5,276.81	10,553.63	0.00E+00	7.00E-07	1.40E-06	0.0150	1.442E+15
Am-241	5.9611E-03	5,276.81	10,553.63	0.00E+00	3.15E+01	6.29E+01	0.0250	3.006E+14
Am-242m	1.4332E-06	5,276.81	10,553.63	0.00E+00	7.56E-03	1.51E-02	0.0375	2.720E+14
Am-243	3.7132E-05	5,276.81	10,553.63	0.00E+00	1.96E-01	3.92E-01	0.0575	2.799E+14
C-14	2.6501E-08	5,276.81	10,553.63	0.00E+00	1.40E-04	2.80E-04	0.0850	1.734E+14
Cl-36	4.4441E-31	5,276.81	10,553.63	0.00E+00	2.35E-27	4.69E-27	0.1250	1.302E+14
Cm-243	7.2722E-06	5,276.81	10,553.63	0.00E+00	3.84E-02	7.67E-02	0.2250	1.464E+14
Cm-244	6.8226E-03	5,276.81	10,553.63	0.00E+00	3.60E+01	7.20E+01	0.3750	6.467E+13
Co-60	1.8117E-04	5,276.81	10,553.63	0.00E+00	9.56E-01	1.91E+00	0.5750	1.168E+15
Cs-134	3.0595E-01	5,276.81	10,553.63	0.00E+00	1.61E+03	3.23E+03	0.8500	1.370E+14
Cs-135	4.2564E-06	5,276.81	10,553.63	0.00E+00	2.25E-02	4.49E-02	1.2500	3.443E+13
Cs-137	2.5650E+00	5,276.81	10,553.63	0.00E+00	1.35E+04	2.71E+04	1.7500	9.917E+11
Eu-154	1.1628E-01	5,276.81	10,553.63	0.00E+00	6.14E+02	1.23E+03	2.2500	4.341E+10
Eu-155	5.7776E-02	5,276.81	10,553.63	0.00E+00	3.05E+02	6.10E+02	2.7500	6.487E+08
Fe-55	1.9465E-02	5,276.81	10,553.63	0.00E+00	1.03E+02	2.05E+02	3.5000	7.873E+07
H-3	8.1045E-03	5,276.81	10,553.63	0.00E+00	4.28E+01	8.55E+01	5.0000	4.568E+05
I-129	6.6403E-07	5,276.81	10,553.63	0.00E+00	3.50E-03	7.01E-03	7.0000	5.250E+04
Kr-85	2.0620E-01	5,276.81	10,553.63	0.00E+00	1.09E+03	2.18E+03	11.0000	6.020E+03
Np-237	3.1513E-05	5,276.81	10,553.63	0.00E+00	1.66E-01	3.33E-01		
Pa-231	6.0304E-10	5,276.81	10,553.63	0.00E+00	3.18E-06	6.36E-06		
Pb-210	2.7017E-12	5,276.81	10,553.63	0.00E+00	1.43E-08	2.85E-08		
Pm-147	3.4210E-01	5,276.81	10,553.63	0.00E+00	1.81E+03	3.61E+03		
Pu-238	1.6622E-01	5,276.81	10,553.63	0.00E+00	8.77E+02	1.75E+03		
Pu-239	6.9563E-04	5,276.81	10,553.63	0.00E+00	3.67E+00	7.34E+00		
Pu-240	3.7169E-04	5,276.81	10,553.63	0.00E+00	1.96E+00	3.92E+00		
Pu-241	2.1731E-01	5,276.81	10,553.63	0.00E+00	1.15E+03	2.29E+03		
Pu-242	3.0911E-06	5,276.81	10,553.63	0.00E+00	1.63E-02	3.26E-02		
Ra-226	1.9435E-11	5,276.81	10,553.63	0.00E+00	1.03E-07	2.05E-07		
Ra-228	6.1725E-15	5,276.81	10,553.63	0.00E+00	3.26E-11	6.51E-11		
Ru-106	7.0778E-03	5,276.81	10,553.63	0.00E+00	3.73E+01	7.47E+01		
Se-79	1.2339E-05	5,276.81	10,553.63	0.00E+00	6.51E-02	1.30E-01		
Sn-126	1.0194E-05	5,276.81	10,553.63	0.00E+00	5.38E-02	1.08E-01		
Sr-90	2.4186E+00	5,276.81	10,553.63	0.00E+00	1.28E+04	2.55E+04		
Tc-99	3.8056E-04	5,276.81	10,553.63	0.00E+00	2.01E+00	4.02E+00		
Th-229	2.0097E-12	5,276.81	10,553.63	0.00E+00	1.06E-08	2.12E-08		
Th-230	6.0577E-09	5,276.81	10,553.63	0.00E+00	3.20E-05	6.39E-05		
Th-232	1.2473E-14	5,276.81	10,553.63	0.00E+00	6.58E-11	1.32E-10		
Ti-208	4.8791E-08	5,276.81	10,553.63	0.00E+00	2.57E-04	5.15E-04		
U-232	1.3821E-07	5,276.81	10,553.63	0.00E+00	7.29E-04	1.46E-03		
U-233	2.3906E-09	5,276.81	10,553.63	0.00E+00	1.26E-05	2.52E-05		
U-234	4.7697E-05	5,276.81	10,553.63	0.00E+00	2.52E-01	5.03E-01		
U-235	-2.8661E-06	5,276.81	0.00	2.79E-02	1.28E-02	2.79E-02		
U-236	1.6701E-05	5,276.81	10,553.63	0.00E+00	8.81E-02	1.76E-01		
U-238	-9.4194E-09	5,276.81	0.00	5.43E-04	4.94E-04	5.43E-04		
Y-90	2.4192E+00	5,276.81	10,553.63	0.00E+00	1.28E+04	2.55E+04		
Other Radionuclides					1.32E+04	2.64E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	HEAVY WATER	HEAVY WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	88.87461392	40 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		5,276.81	
Bounding		10,553.63	

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.83		
Bounding	1.66		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: DRESDEN I THO2/UO2 (LEU)
 SNF ID #: 44
 Fuel Units & Descr: 1000 - ROD
 Heavy Metal Mass: BOL= , EOL=2382 5kg
 ROD Storage Site: INEEL

¹Fuel decay start date 1966
 Estimates as of: 2010
 Template: LWBR (Light Water, Zirc 60 to 100%, Th and U)
²Template Burnup(MWd), 10269 14
 Template BOL Heavy Metal Mass (MT), 0 45991251
 Template Decay Time³ 35 years

Estimated
 Canister usage
 18"x15"
 5 00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9 7360E-05	2,318,560 61	2,318,560 61	0 00E+00	2 26E+02	2 26E+02	Avg MeV	
Am-241	2 4345E-04	2,318,560 61	2,318,560 61	0 00E+00	5 64E+02	5 64E+02	0 0150	1 911E+17
Am-242m	1 4821E-06	2,318,560 61	2,318,560 61	0 00E+00	3 44E+00	3 44E+00	0 0250	3 939E+16
Am-243	3 1152E-07	2,318,560 61	2,318,560 61	0 00E+00	7 22E-01	7 22E-01	0 0375	3 366E+16
C-14	2 2432E-05	2,318,560 61	2,318,560 61	0 00E+00	2 14E+02	2 14E+02	0 0575	3 680E+16
Cl-36	1 8103E-06	2,318,560 61	2,318,560 61	0 00E+00	4 20E+00	4 20E+00	0 0850	2 350E+16
Cm-243	3 0597E-07	2,318,560 61	2,318,560 61	0 00E+00	7 09E-01	7 09E-01	0 1250	1 473E+16
Cm-244	1 4149E-05	2,318,560 61	2,318,560 61	0 00E+00	3 28E+01	3 28E+01	0 2250	2 108E+16
Co-60	8 7369E-04	2,318,560 61	2,318,560 61	0 00E+00	2 03E+03	2 03E+03	0 3750	8 463E+15
Cs-134	2 5601E-05	2,318,560 61	2,318,560 61	0 00E+00	5 94E+01	5 94E+01	0 5750	1 292E+17
Cs-135	2 8639E-05	2,318,560 61	2,318,560 61	0 00E+00	6 64E+01	6 64E+01	0 8500	2 309E+15
Cs-137	1 4772E+00	2,318,560 61	2,318,560 61	0 00E+00	3 43E+06	3 43E+06	1 2500	1 020E+15
Eu-154	8 6025E-03	2,318,560 61	2,318,560 61	0 00E+00	1 99E+04	1 99E+04	1 7500	1 591E+14
Eu-155	6 6062E-04	2,318,560 61	2,318,560 61	0 00E+00	1 53E+03	1 53E+03	2 2500	4 622E+09
Fe-55	2 3011E-06	2,318,560 61	2,318,560 61	0 00E+00	5 34E+00	5 34E+00	2 7500	1 137E+15
H-3	2 1277E-03	2,318,560 61	2,318,560 61	0 00E+00	4 93E+03	4 93E+03	3 5000	4 061E+06
I-129	1 5853E-06	2,318,560 61	2,318,560 61	0 00E+00	3 68E+00	3 68E+00	5 0000	1 276E+06
Kr-85	6 2625E-02	2,318,560 61	2,318,560 61	0 00E+00	1 45E+05	1 45E+05	7 0000	9 385E+04
Np-237	1 2620E-07	2,318,560 61	2,318,560 61	0 00E+00	2 93E-01	2 93E-01	11 0000	7 240E+03
Pa-231	1 2017E-04	2,318,560 61	2,318,560 61	0 00E+00	2 79E+02	2 79E+02		
Pb-210	1 4247E-08	2,318,560 61	2,318,560 61	0 00E+00	3 30E-02	3 30E-02		
Pm-147	2 6224E-04	2,318,560 61	2,318,560 61	0 00E+00	6 08E+02	6 08E+02		
Pu-238	4 2477E-04	2,318,560 61	2,318,560 61	0 00E+00	9 85E+02	9 85E+02		
Pu-239	2 7519E-05	2,318,560 61	2,318,560 61	0 00E+00	6 38E+01	6 38E+01		
Pu-240	1 6184E-05	2,318,560 61	2,318,560 61	0 00E+00	3 75E+01	3 75E+01		
Pu-241	1 4695E-03	2,318,560 61	2,318,560 61	0 00E+00	3 41E+03	3 41E+03		
Pu-242	4 0831E-08	2,318,560 61	2,318,560 61	0 00E+00	9 47E-02	9 47E-02		
Ra-226	2 1423E-08	2,318,560 61	2,318,560 61	0 00E+00	4 97E-02	4 97E-02		
Ra-228	4 6236E-06	2,318,560 61	2,318,560 61	0 00E+00	1 07E+01	1 07E+01		
Ru-106	4 0208E-11	2,318,560 61	2,318,560 61	0 00E+00	9 32E-05	9 32E-05		
Se-79	3 5417E-05	2,318,560 61	2,318,560 61	0 00E+00	8 21E+01	8 21E+01		
Sn-126	3 9848E-05	2,318,560 61	2,318,560 61	0 00E+00	9 24E+01	9 24E+01		
Sr-90	1 4928E+00	2,318,560 61	2,318,560 61	0 00E+00	3 46E+06	3 46E+06		
Tc-99	3 2525E-04	2,318,560 61	2,318,560 61	0 00E+00	7 54E+02	7 54E+02		
Th-229	6 4582E-05	2,318,560 61	2,318,560 61	0 00E+00	1 50E+02	1 50E+02		
Th-230	1 1432E-06	2,318,560 61	2,318,560 61	0 00E+00	2 65E+00	2 65E+00		
Th-232	-9 0328E-08	2,318,560 61	0 00	5 03E-01	2 94E-01	5 03E-01		
Ti-208	1 3964E-02	2,318,560 61	2,318,560 61	0 00E+00	3 24E+04	3 24E+04		
U-232	3 7822E-02	2,318,560 61	2,318,560 61	0 00E+00	8 77E+04	8 77E+04		
U-233	-3 3244E-03	2,318 560 61	0 00	1 69E+03	0 00E+00	1 69E+03	Thermal Power	
U-234	8 1769E-04	2,318,560 61	2,318,560 61	0 00E+00	1 90E+03	1 90E+03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	5 7813E-08	2,318,560 61	2,318,560 61	3 46E-04	1 34E-01	1 34E-01	6 18E+04	6 19E+04
U-236	1 3273E-07	2,318,560 61	2,318,560 61	0 00E+00	3 08E-01	3 08E-01	Total	Total
U-238	-3 1121E-10	2,318,560 61	0 00	2 21E-04	0 00E+00	2 21E-04		
Y-90	1 4928E+00	2,318,560 61	2,318,560 61	0 00E+00	3 46E+06	3 46E+06		
Other Radionuclides					3 87E+06	3 87E+06		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons.
Fuel Cladding:	SST	ZIRC	This fuel matches on all parameters except cladding and enrichment (unknown)
BOL HM Constituents:	Th and U	Th and U	
BOL Enrichment %:		60 to 100	

Burnup Summary (MWd)⁴

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		2,318 560 61	Nominal burnup set equal to bounding burnup.
Bounding		2,318 560 61	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal	21 79		1 28
Bounding	21 79		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name DRESDEN UO2 (LEU)
 SNF ID # 49
 Fuel Units & Descr 72 - ROD
 Heavy Metal Mass BOL= , EOL=162.382kg
 ROD Storage Site INEEL

Fuel decay start date: 1966
 Estimates as of 2010
 Template Pathfinder (Light Water, SST, 60 to 100%, U)
 Template Burnup(MWd) 6 01
 Template BOL Heavy Metal Mass (MT) 0 00012882
 Template Decay Time 35 years

Estimated
 Canister usage
 18"x15"
 0 36

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2 3344E-08	153,393 39	153,393 39	0 00E+00	3 58E-03	3 58E-03	Avg MeV	
Am-241	1 1135E-04	153,393 39	153,393 39	0 00E+00	1 71E+01	1 71E+01	0 0150	1 145E+16
Am-242m	8 5075E-09	153,393 39	153,393 39	0 00E+00	1 30E-03	1 30E-03	0 0250	2 379E+15
Am-243	9 8519E-10	153,393 39	153,393 39	0 00E+00	1 51E-04	1 51E-04	0 0375	2 058E+15
C-14	2 3012E-04	153,393 39	153,393 39	0 00E+00	3 53E+01	3 53E+01	0 0575	2 218E+15
Cl-36	1 2261E-06	153,393 39	153,393 39	0 00E+00	1 88E-01	1 88E-01	0 0850	1 340E+15
Cm-243	2 4875E-10	153,393 39	153,393 39	0 00E+00	3 82E-05	3 82E-05	0 1250	8 702E+14
Cm-244	2 3178E-09	153,393 39	153,393 39	0 00E+00	3 56E-04	3 56E-04	0 2250	1 154E+15
Co-60	7 0849E-02	153,393 39	153,393 39	0 00E+00	1 09E+04	1 09E+04	0 3750	5 032E+14
Cs-134	3 0266E-06	153,393 39	153,393 39	0 00E+00	4 64E-01	4 64E-01	0 5750	8 289E+15
Cs-135	3 0316E-05	153,393 39	153,393 39	0 00E+00	4 65E+00	4 65E+00	0 8500	8 390E+13
Cs-137	1 4511E+00	153,393 39	153,393 39	0 00E+00	2 23E+05	2 23E+05	1 2500	8 339E+14
Eu-154	6 6955E-04	153,393 39	153,393 39	0 00E+00	1 03E+02	1 03E+02	1 7500	2 164E+12
Eu-155	6 9850E-04	153,393 39	153,393 39	0 00E+00	1 07E+02	1 07E+02	2 2500	4 493E+09
Fe-55	1 2318E-03	153,393 39	153,393 39	0 00E+00	1 89E+02	1 89E+02	2 7500	1 299E+08
H-3	2 5141E-03	153,393 39	153,393 39	0 00E+00	3 86E+02	3 86E+02	3 5000	9 159E+03
I-129	7 3195E-07	153,393 39	153,393 39	0 00E+00	1 12E-01	1 12E-01	5 0000	3 767E+03
Kr-85	4 1281E-02	153,393 39	153,393 39	0 00E+00	6 33E+03	6 33E+03	7 0000	4 159E+02
Np-237	1 1489E-06	153,393 39	153,393 39	0 00E+00	1 76E-01	1 76E-01	11 0000	4 667E+01
Pa-231	4 5241E-08	153,393 39	153,393 39	0 00E+00	6 94E-03	6 94E-03		
Pb-210	6 4476E-13	153,393 39	153,393 39	0 00E+00	9 89E-08	9 89E-08		
Pm-147	1 1651E-03	153,393 39	153,393 39	0 00E+00	1 79E+02	1 79E+02		
Pu-238	2 9517E-04	153,393 39	153,393 39	0 00E+00	4 53E+01	4 53E+01		
Pu-239	6 6772E-04	153,393 39	153,393 39	0 00E+00	1 02E+02	1 02E+02		
Pu-240	8 6839E-05	153,393 39	153,393 39	0 00E+00	1 33E+01	1 33E+01		
Pu-241	7 1514E-04	153,393 39	153,393 39	0 00E+00	1 10E+02	1 10E+02		
Pu-242	1 9717E-09	153,393 39	153,393 39	0 00E+00	3 02E-04	3 02E-04		
Ra-226	1 7654E-12	153,393 39	153,393 39	0 00E+00	2 71E-07	2 71E-07		
Ra-228	8 2928E-12	153,393 39	153,393 39	0 00E+00	1 27E-06	1 27E-06		
Ru-106	1 8419E-10	153,393 39	153,393 39	0 00E+00	2 83E-05	2 83E-05		
Se-79	1 3223E-05	153,393 39	153,393 39	0 00E+00	2 03E+00	2 03E+00		
Sn-126	1 1493E-05	153,393 39	153,393 39	0 00E+00	1 76E+00	1 76E+00		
Sr-90	1 3649E+00	153,393 39	153,393 39	0 00E+00	2 09E+05	2 09E+05		
Tc-99	4 6656E-04	153,393 39	153,393 39	0 00E+00	7 16E+01	7 16E+01		
Th-229	1 4547E-11	153,393 39	153,393 39	0 00E+00	2 23E-06	2 23E-06		
Th-230	1 6617E-10	153,393 39	153,393 39	0 00E+00	2 55E-05	2 55E-05		
Th-232	8 3361E-12	153,393 39	153,393 39	0 00E+00	1 28E-06	1 28E-06		
Tl-208	2 1664E-08	153,393 39	153,393 39	0 00E+00	3 32E-03	3 32E-03		
U-232	5 8669E-08	153,393 39	153,393 39	0 00E+00	9 00E-03	9 00E-03		
U-233	3 1847E-09	153,393 39	153,393 39	0 00E+00	4 89E-04	4 89E-04		
U-234	3 8769E-07	153,393 39	153,393 39	0 00E+00	5 95E-02	5 95E-02		
U-235	-2 7761E-06	153,393 39	0 00	6 56E-01	2 30E-01	6 56E-01		
U-236	1 6190E-05	153,393 39	153,393 39	0 00E+00	2 48E+00	2 48E+00		
U-238	-2 8547E-09	153,393 39	0 00	7 09E-03	6 65E-03	7 09E-03		
Y-90	1 3652E+00	153,393 39	153,393 39	0 00E+00	2 09E+05	2 09E+05		
Other Radionuclides					2 53E+05	2 53E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	This Template was used for the following reasons This fuel matches on all parameters except enrichment (unknown)
BOL Enrichment %		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal		153,393.39	
Bounding		153 393.39	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	10 12		
Bounding	10 12		

*Reactor shutdown, core removal storage shipping or other date confirming that irradiation ceased for fuel

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (6% UO₂) LEU
 SNF ID #: 65
 Fuel Units & Descr: 61 - 6 FLAT PLATES
 Heavy Metal Mass BOL=1636 02kg EOL=1603 519kg
 ROD Storage Site INEEL

¹Fuel decay start date: 1966
 Estimates as of: 2010
 Template: PWR (Light Water, Zirc, 0 to 5%, U)
²Template Burnup(MWd): 61 92
 Template BOL Heavy Metal Mass (MT) 0 00176911
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x10"
 5 08

II. Estimates							Gamma Sources	
Radionuclide	m	X _a	X _b	b	Y _a	Y _b	Photon Energy Group	Total Photons/sec (bounding)
	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	8 7758E-10	30,906 72	61,813 45	0 00E+00	2 71E-05	5 42E-05	0 0150	3 326E+15
Am-241	1 4352E-01	30,906 72	61,813 45	0 00E+00	4 44E+03	8 87E+03	0 0250	6 707E+14
Am-242m	2 8698E-04	30,906 72	61,813 45	0 00E+00	1 77E+01	3 87E+01	0 0375	6 397E+14
Am-243	6 2565E-04	30,906 72	61,813 45	0 00E+00	1 93E+01	3 87E+01	0 0575	7 391E+14
C-14	4 7901E-05	30,906 72	61,813 45	0 00E+00	1 48E+00	2 96E+00	0 0850	3 722E+14
Cl-36	8 0297E-07	30,906 72	61,813 45	0 00E+00	2 48E-02	4 96E-02	0 1250	2 582E+14
Cm-243	2 5081E-04	30,906 72	61,813 45	0 00E+00	7 75E+00	1 55E+01	0 2250	3 191E+14
Cm-244	4 9015E-02	30,906 72	61,813 45	0 00E+00	1 51E+03	3 03E+03	0 3750	1 372E+14
Co-60	2 5581E-03	30,906 72	61,813 45	0 00E+00	7 91E+01	1 58E+02	0 5750	3 192E+15
Cs-134	4 0536E-05	30,906 72	61,813 45	0 00E+00	1 25E+00	2 51E+00	0 8500	4 415E+13
Cs-135	1 4433E-05	30,906 72	61,813 45	0 00E+00	4 46E-01	8 92E-01	1 2500	4 337E+13
Cs-137	1 3979E+00	30,906 72	61,813 45	0 00E+00	4 32E+04	8 64E+04	1 7500	1 299E+12
Eu-154	2 0203E-02	30,906 72	61,813 45	0 00E+00	6 24E+02	1 25E+03	2 7500	2 091E+08
Eu-155	1 7684E-03	30,906 72	61,813 45	0 00E+00	5 47E+01	1 09E+02	2 7500	4 285E+08
Fe-55	4 3136E-05	30,906 72	61,813 45	0 00E+00	1 33E+00	2 67E+00	3 5000	4 412E+07
H-3	2 0769E-02	30,906 72	61,813 45	0 00E+00	6 42E+02	1 28E+03	5 0000	1 866E+07
I-129	9 8288E-07	30,906 72	61,813 45	0 00E+00	3 04E-02	6 08E-02	7 0000	2 174E+06
Kr-85	2 8214E-02	30,906 72	61,813 45	0 00E+00	8 72E+02	1 74E+03	11 0000	2 497E+05
Np-237	1 1218E-05	30,906 72	61,813 45	0 00E+00	3 47E-01	6 93E-01		
Pa-231	1 3036E-09	30,906 72	61,813 45	0 00E+00	4 03E-05	8 06E-05		
Pb-210	8 5078E-11	30,906 72	61,813 45	0 00E+00	2 63E-06	5 26E-06		
Pm-147	3 6531E-04	30,906 72	61,813 45	0 00E+00	1 13E+01	2 26E+01		
Pu-238	7 4564E-02	30,906 72	61,813 45	0 00E+00	2 30E+03	4 61E+03		
Pu-239	1 1623E-02	30,906 72	61,813 45	0 00E+00	3 59E+02	7 18E+02		
Pu-240	1 5132E-02	30,906 72	61,813 45	0 00E+00	4 68E+02	9 35E+02		
Pu-241	9 0036E-01	30,906 72	61,813 45	0 00E+00	2 78E+04	5 57E+04		
Pu-242	6 4260E-05	30,906 72	61,813 45	0 00E+00	1 99E+00	3 97E+00		
Ra-226	2 2804E-10	30,906 72	61,813 45	0 00E+00	7 05E-06	1 41E-05		
Ra-228	5 2713E-12	30,906 72	61,813 45	0 00E+00	1 63E-07	3 26E-07		
Ru-106	6 1160E-10	30,906 72	61,813 45	0 00E+00	1 89E-05	3 78E-05		
Se-79	1 2377E-05	30,906 72	61,813 45	0 00E+00	3 83E-01	7 65E-01		
Sn-126	2 5210E-05	30,906 72	61,813 45	0 00E+00	7 79E-01	1 56E+00		
Sr-90	9 1667E-01	30,906 72	61,813 45	0 00E+00	2 83E+04	5 67E+04		
Tc-99	3 9357E-04	30,906 72	61,813 45	0 00E+00	1 22E+01	2 43E+01		
Th-229	1 2057E-10	30,906 72	61,813 45	0 00E+00	3 73E-06	7 45E-06		
Th-230	2 1043E-08	30,906 72	61,813 45	0 00E+00	6 50E-04	1 30E-03		
Th-232	5 2972E-12	30,906 72	61,813 45	0 00E+00	1 64E-07	3 27E-07		
Th-208	1 7474E-07	30,906 72	61,813 45	0 00E+00	5 40E-03	1 08E-02		
U-232	4 7368E-07	30,906 72	61,813 45	0 00E+00	1 46E-02	2 93E-02		
U-233	2 5097E-08	30,906 72	61,813 45	0 00E+00	7 76E-04	1 55E-03		
U-234	5 0000E-05	30,906 72	61,813 45	0 00E+00	1 55E+00	3 09E+00		
U-235	-1.4489E-06	30,906 72	0 00	2 11E-01	1 66E-01	2 11E-01		
U-236	7 5824E-06	30,906 72	61,813 45	0 00E+00	2 34E-01	4 69E-01		
U-238	-2 6129E-07	30,906 72	0 00	5 17E-01	5 09E-01	5 17E-01		
Y-90	9 1699E-01	30,906 72	61,813 45	0 00E+00	2 83E+04	5 67E+04		
Other Radionuclides					4 15E+04	8 30E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

From SFD		Used	Basis for Parameter Differences: This Template was used for the following reasons. This fuel matches PWR Template on all but one parameter (enrichment) making PWR a reasonable match
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	5.973154429	0 to 5	

Burnup Summary (MWd)¹

From SFD		Estimated	Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Nominal		30 906 72	
Bounding	2 617 63	61,813 45	

Checks

Burnup Multiplier		Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 1 00
Nominal	0.54		
Bounding	1 08	23 61	

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name EBWR (FUEL FOLLOWER) HEU
 SNF ID # 740
 Fuel Units & Descr 4 - CANISTER OF SCRAP
 Heavy Metal Mass BOL=1 76kg EOL=1 728kg
 ROD Storage Site INEEL
 Fuel decay start date 1966
 Estimates as of 2010
 Template Pathfinder (Light Water, SST, 60 to 100% U)
 Template Burnup(MWd) 6 01
 Template BOL Heavy Metal Mass (MT) 0 00012882
 Template Decay Time 35 years

Estimated
 Canister usage
 HIC
 1.00

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2 3344E-08	29 85	59 70	0 00E+00	6 97E-07	1 39E-06	Avg. MeV	
Am-241	1 1135E-04	29 85	59 70	0 00E+00	3 32E-03	6 65E-03	0 0150	4 456E+12
Am-242m	8 5075E-09	29 85	59 70	0 00E+00	2 54E-07	5 08E-07	0 0250	9 260E+11
Am-243	9 8519E-10	29 85	59 70	0 00E+00	2 94E-08	5 88E-08	0 0375	8 009E+11
C-14	2 3012E-04	29 85	59 70	0 00E+00	6 87E-03	1 37E-02	0 0575	8 633E+11
Cl-36	1 2261E-06	29 85	59 70	0 00E+00	3 66E-05	7 32E-05	0 0850	5 216E+11
Cm-243	2 4875E-10	29 85	59 70	0 00E+00	7 43E-09	1 49E-08	0 1250	3 387E+11
Cm-244	2 3178E-09	29 85	59 70	0 00E+00	6 92E-08	1 38E-07	0 2250	4 491E+11
Co-60	7 0849E-02	29 85	59 70	0 00E+00	2 11E+00	4 23E+00	0 3750	1 959E+11
Cs-134	3 0266E-06	29 85	59 70	0 00E+00	9 03E-05	1 81E-04	0 5750	3 226E+12
Cs-135	3 0316E-05	29 85	59 70	0 00E+00	9 05E-04	1 81E-03	0 8500	3 266E+10
Cs-137	1 4511E+00	29 85	59 70	0 00E+00	4 33E+01	8 66E+01	1 2500	3 246E+11
Eu-154	6 6955E-04	29 85	59 70	0 00E+00	2 00E-02	4 00E-02	1 7500	8 423E+08
Eu-155	6 9850E-04	29 85	59 70	0 00E+00	2 09E-02	4 17E-02	2 2500	1 749E+06
Fe-55	1 2318E-03	29 85	59 70	0 00E+00	3 68E-02	7 35E-02	2 7500	5 055E+04
H-3	2 5141E-03	29 85	59 70	0 00E+00	7 50E-02	1 50E-01	3 5000	3 862E+00
I-129	7 3195E-07	29 85	59 70	0 00E+00	2 18E-05	4 37E-05	5 0000	1 591E+00
Kr-85	4 1281E-02	29 85	59 70	0 00E+00	1 23E+00	2 46E+00	7 0000	1 759E-01
Np-237	1 1489E-06	29 85	59 70	0 00E+00	3 43E-05	6 86E-05	11 0000	1 976E-02
Pa-231	4 5241E-08	29 85	59 70	0 00E+00	1 35E-06	2 70E-06		
Pb-210	6 4476E-13	29 85	59 70	0 00E+00	1 92E-11	3 85E-11		
Pm-147	1 1651E-03	29 85	59 70	0 00E+00	3 48E-02	6 96E-02		
Pu-238	2 9517E-04	29 85	59 70	0 00E+00	8 81E-03	1 76E-02		
Pu-239	6 6772E-04	29 85	59 70	0 00E+00	1 99E-02	3 99E-02		
Pu-240	8 6839E-05	29 85	59 70	0 00E+00	2 59E-03	5 18E-03		
Pu-241	7 1514E-04	29 85	59 70	0 00E+00	2 13E-02	4 27E-02		
Pu-242	1 9717E-09	29 85	59 70	0 00E+00	5 89E-08	1 18E-07		
Ra-226	1 7654E-12	29 85	59 70	0 00E+00	5 27E-11	1 05E-10		
Ra-228	8 2928E-12	29 85	59 70	0 00E+00	2 48E-10	4 95E-10		
Ru-106	1 8419E-10	29 85	59 70	0 00E+00	5 50E-09	1 10E-08		
Se-79	1 3223E-05	29 85	59 70	0 00E+00	3 95E-04	7 89E-04		
Sn-126	1 1493E-05	29 85	59 70	0 00E+00	3 43E-04	6 86E-04		
Sr-90	1 3649E+00	29 85	59 70	0 00E+00	4 07E+01	8 15E+01		
Tc-99	4 6656E-04	29 85	59 70	0 00E+00	1 39E-02	2 79E-02		
Th-229	1 4547E-11	29 85	59 70	0 00E+00	4 34E-10	8 69E-10		
Th-230	1 6617E-10	29 85	59 70	0 00E+00	4 96E-09	9 92E-09		
Th-232	8 3361E-12	29 85	59 70	0 00E+00	2 49E-10	4 98E-10		
Th-208	2 1664E-08	29 85	59 70	0 00E+00	6 47E-07	1 29E-06		
U-232	5 8669E-08	29 85	59 70	0 00E+00	1 75E-06	3 50E-06	Thermal Power	
U-233	3 1847E-09	29 85	59 70	0 00E+00	9 51E-08	1 90E-07	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	3 8769E-07	29 85	59 70	0 00E+00	1 16E-05	2 31E-05	5 21E-01	1 04E+00
U-235	-2 7761E-06	29 85	0 00	3 56E-03	3 48E-03	3 56E-03	Total	Total
U-236	1 6190E-05	29 85	59 70	0 00E+00	4 83E-04	9 67E-04		
U-238	-2 8547E-09	29 85	0 00	3 76E-05	3 76E-05	3 76E-05		
Y-90	1 3652E+00	29 85	59 70	0 00E+00	4 08E+01	8 15E+01		
Other Radionuclides					4 93E+01	9 86E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences*
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons
Fuel Cladding	ZIRC	SST	This fuel matches Pathfinder Template on all but one parameter (cladding, but substituting Stainless Steel is a good conservative assumption)
BOL HM Constituents	U	U	
BOL Enrichment %	93 636	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		29 85	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		59 70	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal	0 36		1 00
Bounding	0 73		

*Reactor shutdown, core removal storage, shipping or other date confirming that irradiation ceased for fuel

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (MOX)
SNF ID #: 63
Fuel Units & Descr: 25 - 6 FLAT PLATES
Heavy Metal Mass, BOL=986kg, EOL=932.562kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1966
Estimates as of: 2010
Template: (Worst Case)
²Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT) 0.00186865
Template Decay Time: 35 years

Estimated
Canister usage
18"x10"
2.08

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	50,784.46	101,568.92	0.00E+00	1.17E-01	2.34E-01	Avg MeV	
Am-241	8.4448E+00	50,784.46	101,568.92	0.00E+00	4.29E+05	8.58E+05	0.0150	1.253E+17
Am-242m	1.6848E-02	50,784.46	101,568.92	0.00E+00	8.56E+02	1.71E+03	0.0250	2.477E+16
Am-243	1.6320E-02	50,784.46	101,568.92	0.00E+00	8.29E+02	1.66E+03	0.0375	2.164E+16
C-14	1.2090E-01	50,784.46	101,568.92	0.00E+00	6.14E+03	1.23E+04	0.0575	3.404E+16
Cl-36	2.2849E-03	50,784.46	101,568.92	0.00E+00	1.16E+02	2.32E+02	0.0850	1.329E+16
Cm-243	8.6624E-04	50,784.46	101,568.92	0.00E+00	4.40E+01	8.80E+01	0.1250	1.041E+16
Cm-244	1.6848E-01	50,784.46	101,568.92	0.00E+00	8.56E+03	1.71E+04	0.2250	1.151E+16
Co-60	2.8086E+01	50,784.46	101,568.92	0.00E+00	1.43E+06	2.85E+06	0.3750	4.924E+15
Cs-134	3.4148E-04	50,784.46	101,568.92	0.00E+00	1.73E+01	3.47E+01	0.5750	8.006E+16
Cs-135	4.3976E-04	50,784.46	101,568.92	0.00E+00	2.23E+01	4.47E+01	0.8500	3.060E+15
Cs-137	2.1049E+01	50,784.46	101,568.92	0.00E+00	1.07E+06	2.14E+06	1.2500	2.139E+17
Eu-154	1.2500E+00	50,784.46	101,568.92	0.00E+00	6.35E+04	1.27E+05	1.7500	9.460E+13
Eu-155	6.8986E-02	50,784.46	101,568.92	0.00E+00	3.50E+03	7.01E+03	2.2500	1.122E+12
Fe-55	2.9308E-01	50,784.46	101,568.92	0.00E+00	1.49E+04	2.98E+04	2.7500	3.161E+11
H-3	2.4311E-01	50,784.46	101,568.92	0.00E+00	1.23E+04	2.47E+04	3.5000	2.675E+08
I-129	1.0618E-05	50,784.46	101,568.92	0.00E+00	5.39E-01	1.08E+00	5.0000	1.136E+08
Kr-85	5.9882E-01	50,784.46	101,568.92	0.00E+00	3.04E+04	6.08E+04	7.0000	1.300E+07
Np-237	1.5668E-04	50,784.46	101,568.92	0.00E+00	7.96E+00	1.59E+01	11.0000	1.487E+06
Pa-231	2.8656E-06	50,784.46	101,568.92	0.00E+00	1.46E-01	2.91E-01		
Pb-210	2.3918E-08	50,784.46	101,568.92	0.00E+00	1.21E-03	2.43E-03		
Pm-147	1.6900E-02	50,784.46	101,568.92	0.00E+00	8.58E+02	1.72E+03		
Pu-238	-8.6120E-01	50,784.46	0.00	1.27E+05	8.30E+04	1.27E+05		
Pu-239	-4.8440E-02	50,784.46	0.00	1.53E+04	1.29E+04	1.53E+04		
Pu-240	-3.0095E-01	50,784.46	0.00	1.96E+04	4.29E+03	1.96E+04		
Pu-241	-1.0411E+02	50,784.46	0.00	5.04E+06	0.00E+00	5.04E+06		
Pu-242	-1.1381E-04	50,784.46	0.00	8.47E+01	7.90E+01	8.47E+01		
Ra-226	6.4400E-08	50,784.46	101,568.92	0.00E+00	3.27E-03	6.54E-03		
Ra-228	5.9952E-07	50,784.46	101,568.92	0.00E+00	3.04E-02	6.09E-02		
Ru-106	8.5526E-07	50,784.46	101,568.92	0.00E+00	4.34E-02	8.69E-02		
Se-79	1.9181E-04	50,784.46	101,568.92	0.00E+00	9.74E+00	1.95E+01		
Sn-126	1.6671E-04	50,784.46	101,568.92	0.00E+00	8.47E+00	1.69E+01		
Sr-90	1.9799E+01	50,784.46	101,568.92	0.00E+00	1.01E+06	2.01E+06		
Tc-99	6.7678E-03	50,784.46	101,568.92	0.00E+00	3.44E+02	6.87E+02		
Th-229	1.7488E-06	50,784.46	101,568.92	0.00E+00	8.88E-02	1.78E-01		
Th-230	5.8704E-06	50,784.46	101,568.92	0.00E+00	2.98E-01	5.96E-01		
Th-232	6.0208E-07	50,784.46	101,568.92	0.00E+00	3.06E-02	6.12E-02		
Th-208	8.7573E-05	50,784.46	101,568.92	0.00E+00	4.45E+00	8.89E+00		
U-232	2.3706E-04	50,784.46	101,568.92	0.00E+00	1.20E+01	2.41E+01		
U-233	3.6128E-04	50,784.46	101,568.92	0.00E+00	1.83E+01	3.67E+01		
U-234	1.2788E-02	50,784.46	101,568.92	0.00E+00	6.49E+02	1.30E+03		
U-235	5.7486E-04	50,784.46	101,568.92	4.24E-01	2.96E+01	5.88E+01		
U-236	2.3485E-04	50,784.46	101,568.92	0.00E+00	1.19E+01	2.39E+01		
U-238	1.1581E-04	50,784.46	101,568.92	5.28E-02	5.93E+00	1.18E+01		
Y-90	1.9804E+01	50,784.46	101,568.92	0.00E+00	1.01E+06	2.01E+06		
Other Radionuclides					3.13E+06	6.26E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.33E+04	1.06E+05
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding	LIGHT WATER	(Worst Case)	This fuel didn't closely match any existing templates, therefore the worst case template was used.
BOL HM Constituents	ZIRC	SST/Inconel	
BOL Enrichment %	Pu and U	U, Th, & Pu	
	0.22222216	0 to 100	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		50,784.46	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding		101,568.92	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	1.54		34.51
Bounding	3.08		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name EBWR (NORMAL UO2)
SNF ID # 60
Fuel Units & Descr 51 - 6 FLAT PLATES
Heavy Metal Mass BOL=1358.64kg, EOL=1357.824kg
ROD Storage Site INEEL

¹Fuel decay start date 1966
Estimates as of: 2010
Template PWR (Light Water, Zirc 0 to 5%, U)
²Template Burnup(MWd) 61.92
Template BOL Heavy Metal Mass (MT) 0.00176911
Template Decay Time 35 years

Estimated
Canister usage:
18"x10"
425

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	775.98	1,551.95	0.00E+00	6.81E-07	1.36E-06	Avg MeV	
Am-241	1.4352E-01	775.98	1,551.95	0.00E+00	1.11E+02	2.23E+02	0.0150	8.351E+13
Am-242m	2.8698E-04	775.98	1,551.95	0.00E+00	2.23E-01	4.45E-01	0.0250	1.684E+13
Am-243	6.2565E-04	775.98	1,551.95	0.00E+00	4.85E-01	9.71E-01	0.0375	1.606E+13
C-14	4.7901E-05	775.98	1,551.95	0.00E+00	3.72E-02	7.43E-02	0.0575	1.856E+13
Cl-36	8.0297E-07	775.98	1,551.95	0.00E+00	6.23E-04	1.25E-03	0.0850	9.344E+12
Cm-243	2.5081E-04	775.98	1,551.95	0.00E+00	1.95E-01	3.89E-01	0.1250	6.484E+12
Cm-244	4.9015E-02	775.98	1,551.95	0.00E+00	3.80E+01	7.61E+01	0.2250	8.012E+12
Co-60	2.5581E-03	775.98	1,551.95	0.00E+00	1.99E+00	3.97E+00	0.3750	3.445E+12
Cs-134	4.0536E-05	775.98	1,551.95	0.00E+00	3.15E-02	6.29E-02	0.5750	8.013E+13
Cs-135	1.4433E-05	775.98	1,551.95	0.00E+00	1.12E-02	2.24E-02	0.8500	1.109E+12
Cs-137	1.3979E+00	775.98	1,551.95	0.00E+00	1.08E+03	2.17E+03	1.2500	1.089E+12
Eu-154	2.0203E-02	775.98	1,551.95	0.00E+00	1.57E+01	3.14E+01	1.7500	3.261E+10
Eu-155	1.7684E-03	775.98	1,551.95	0.00E+00	1.37E+00	2.74E+00	2.2500	5.255E+06
Fe-55	4.3136E-05	775.98	1,551.95	0.00E+00	3.35E-02	6.69E-02	2.7500	1.076E+07
H-3	2.0769E-02	775.98	1,551.95	0.00E+00	1.61E+01	3.22E+01	3.5000	1.110E+06
I-129	9.8288E-07	775.98	1,551.95	0.00E+00	7.63E-04	1.53E-03	5.0000	4.746E+05
Kr-85	2.8214E-02	775.98	1,551.95	0.00E+00	2.19E+01	4.38E+01	7.0000	5.470E+04
Np-237	1.1218E-05	775.98	1,551.95	0.00E+00	8.70E-03	1.74E-02	11.0000	6.283E+03
Pa-231	1.3036E-09	775.98	1,551.95	0.00E+00	1.01E-06	2.02E-06		
Pb-210	8.5078E-11	775.98	1,551.95	0.00E+00	6.60E-08	1.32E-07		
Pm-147	3.6531E-04	775.98	1,551.95	0.00E+00	2.83E-01	5.67E-01		
Pu-238	7.4564E-02	775.98	1,551.95	0.00E+00	5.79E+01	1.16E+02		
Pu-239	1.1623E-02	775.98	1,551.95	0.00E+00	9.02E+00	1.80E+01		
Pu-240	1.5132E-02	775.98	1,551.95	0.00E+00	1.17E+01	2.35E+01		
Pu-241	9.0036E-01	775.98	1,551.95	0.00E+00	6.99E+02	1.40E+03		
Pu-242	6.4260E-05	775.98	1,551.95	0.00E+00	4.99E-02	9.97E-02		
Ra-226	2.2804E-10	775.98	1,551.95	0.00E+00	1.77E-07	3.54E-07		
Ra-228	5.2713E-12	775.98	1,551.95	0.00E+00	4.09E-09	8.18E-09		
Ru-106	6.1160E-10	775.98	1,551.95	0.00E+00	4.75E-07	9.49E-07		
Se-79	1.2377E-05	775.98	1,551.95	0.00E+00	9.60E-03	1.92E-02		
Sn-126	2.5210E-05	775.98	1,551.95	0.00E+00	1.96E-02	3.91E-02		
Sr-90	9.1667E-01	775.98	1,551.95	0.00E+00	7.11E+02	1.42E+03		
Tc-99	3.9357E-04	775.98	1,551.95	0.00E+00	3.05E-01	6.11E-01		
Th-229	1.2057E-10	775.98	1,551.95	0.00E+00	9.36E-08	1.87E-07		
Th-230	2.1043E-08	775.98	1,551.95	0.00E+00	1.63E-05	3.27E-05		
Th-232	5.2972E-12	775.98	1,551.95	0.00E+00	4.11E-09	8.22E-09		
Tl-208	1.7474E-07	775.98	1,551.95	0.00E+00	1.36E-04	2.71E-04		
U-232	4.7368E-07	775.98	1,551.95	0.00E+00	3.68E-04	7.35E-04		
U-233	2.5097E-08	775.98	1,551.95	0.00E+00	1.95E-05	3.89E-05		
U-234	5.0000E-05	775.98	1,551.95	0.00E+00	3.88E-02	7.76E-02		
U-235	-1.4489E-06	775.98	0.00	2.09E-02	1.98E-02	2.09E-02		
U-236	7.5824E-06	775.98	1,551.95	0.00E+00	5.88E-03	1.18E-02		
U-238	-2.6129E-07	775.98	0.00	4.53E-01	4.53E-01	4.53E-01		
Y-90	9.1699E-01	775.98	1,551.95	0.00E+00	7.12E+02	1.42E+03		
Other Radionuclides					1.04E+03	2.08E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding:		ZIRC	
BOL HM Constituents:		U	
BOL Enrichment %:	0.711000016	0 to 5	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		775.98	
Bounding		1,551.95	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.02		
Bounding	0.03		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (SPIKES)
 SNF ID #: 891
 Fuel Units & Descr: 31 - 7 X 7 ROD ARRAY
 Heavy Metal Mass: BOL=29 205kg, EOL=26 989kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1966
 Estimates as of: 2010
 Template: Pathfinder (Light Water, SST, 60 to 100%, U)
²Template Burnup(MWd): 6 01
 Template BOL Heavy Metal Mass (MT): 0 00012882
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x10"
 2 58

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3344E-08	2,093 81	4,187 62	0 00E+00	4 89E-05	9 78E-05	Avg MeV	
Am-241	1.1135E-04	2,093 81	4,187 62	0 00E+00	2.33E-01	4 66E-01	0 0150	3 126E+14
Am-242m	8.5075E-09	2,093 81	4,187 62	0 00E+00	1 78E-05	3 56E-05	0 0250	6 495E+13
Am-243	9 8519E-10	2,093 81	4,187 62	0 00E+00	2.06E-06	4 13E-06	0 0375	5 618E+13
C-14	2 3012E-04	2,093 81	4,187 62	0 00E+00	4 82E-01	9 64E-01	0 0575	6 056E+13
Cl-36	1.2261E-06	2,093 81	4,187 62	0 00E+00	2.57E-03	5 13E-03	0 0850	3 659E+13
Cm-243	2 4875E-10	2,093 81	4,187 62	0 00E+00	5.21E-07	1 04E-06	0 1250	2.376E+13
Cm-244	2 3178E-09	2,093 81	4,187 62	0 00E+00	4 85E-06	9 71E-06	0 2250	3 149E+13
Co-60	7 0849E-02	2,093 81	4,187 62	0 00E+00	1 48E+02	2 97E+02	0 3750	1 374E+13
Cs-134	3 0266E-06	2,093 81	4,187 62	0 00E+00	6 34E-03	1.27E-02	0 5750	2.263E+14
Cs-135	3 0316E-05	2,093 81	4,187 62	0 00E+00	6 35E-02	1.27E-01	0 8500	2.291E+12
Cs-137	1 4511E+00	2,093 81	4,187 62	0 00E+00	3 04E+03	6 08E+03	1 2500	2 277E+13
Eu-154	6 6955E-04	2,093 81	4,187 62	0 00E+00	1 40E+00	2.80E+00	1 7500	5 908E+10
Eu-155	6 9850E-04	2,093 81	4,187 62	0 00E+00	1 46E+00	2.93E+00	2.2500	1.227E+08
Fe-55	1 2318E-03	2,093 81	4,187 62	0 00E+00	2 58E+00	5 16E+00	2 7500	3 546E+06
H-3	2 5141E-03	2,093 81	4,187 62	0 00E+00	5.26E+00	1 05E+01	3 5000	2 539E+02
I-129	7 3195E-07	2,093 81	4,187 62	0 00E+00	1 53E-03	3 07E-03	5 0000	1 045E+02
Kr-85	4 1281E-02	2,093 81	4,187 62	0 00E+00	8 64E+01	1 73E+02	7.0000	1 154E+01
Np-237	1 1489E-06	2,093 81	4,187 62	0 00E+00	2 41E-03	4 81E-03	11 0000	1.295E+00
Pa-231	4 5241E-08	2,093 81	4,187 62	0 00E+00	9 47E-05	1 89E-04		
Pb-210	6 4476E-13	2,093 81	4,187 62	0 00E+00	1 35E-09	2.70E-09		
Pm-147	1.1651E-03	2,093 81	4,187 62	0 00E+00	2 44E+00	4 88E+00		
Pu-238	2 9517E-04	2,093 81	4,187 62	0 00E+00	6.18E-01	1 24E+00		
Pu-239	6.6772E-04	2,093 81	4,187 62	0 00E+00	1 40E+00	2 80E+00		
Pu-240	8 6839E-05	2,093 81	4,187 62	0 00E+00	1 82E-01	3 64E-01		
Pu-241	7 1514E-04	2,093 81	4,187 62	0 00E+00	1 50E+00	2 99E+00		
Pu-242	1 9717E-09	2,093 81	4,187 62	0 00E+00	4 13E-06	8 26E-06		
Ra-226	1 7654E-12	2,093 81	4,187 62	0 00E+00	3 70E-09	7 39E-09		
Ra-228	8 2928E-12	2,093 81	4,187 62	0 00E+00	1 74E-08	3 47E-08		
Ru-106	1 8419E-10	2,093 81	4,187 62	0 00E+00	3 86E-07	7 71E-07		
Se-79	1 3223E-05	2,093 81	4,187 62	0 00E+00	2 77E-02	5 54E-02		
Sn-126	1 1493E-05	2,093 81	4,187 62	0 00E+00	2 41E-02	4 81E-02		
Sr-90	1 3649E+00	2,093 81	4,187 62	0 00E+00	2 86E+03	5 72E+03		
Tc-99	4 6656E-04	2,093 81	4,187 62	0 00E+00	9 77E-01	1 95E+00		
Th-229	1 4547E-11	2,093 81	4,187 62	0 00E+00	3 05E-08	6 09E-08		
Th-230	1 6617E-10	2,093 81	4,187 62	0 00E+00	3 48E-07	6 96E-07		
Th-232	8.3361E-12	2,093 81	4,187 62	0 00E+00	1 75E-08	3 49E-08		
Th-208	2 1664E-08	2,093 81	4,187 62	0 00E+00	4 54E-05	9 07E-05		
U-232	5 8669E-08	2,093 81	4,187 62	0 00E+00	1.23E-04	2 46E-04		
U-233	3.1847E-09	2,093 81	4,187 62	0 00E+00	6 67E-06	1 33E-05		
U-234	3 8769E-07	2,093 81	4,187 62	0 00E+00	8.12E-04	1 62E-03		
U-235	-2.7761E-06	2,093 81	0 00	5 88E-02	5.30E-02	5 88E-02		
U-236	1 6190E-05	2,093 81	4,187 62	0 00E+00	3 39E-02	6 78E-02		
U-238	-2.8547E-09	2,093 81	0 00	6 68E-04	6 62E-04	6 68E-04		
Y-90	1 3652E+00	2,093 81	4,187 62	0 00E+00	2 86E+03	5 72E+03		
Other Radionuclides					3 46E+03	6 91E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons.
Fuel Cladding:	ZIRC	SST	This fuel matches Pathfinder Template on all but one parameter (cladding, but substituting Stainless Steel is a good conservative assumption).
BOL HM Constituents:	U	U	
BOL Enrichment %:	93 18999022	60 to 100	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	1,233.24	2,093.81	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding	1 767 05	4 187 62	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	1 54	1 70	1 00
Bounding	3 07	2 37	

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name EBWR (U METAL) ENRICHED HEAVY
SNF ID # 64
Fuel Units & Descr 53 - 6 FLAT PLATES
Heavy Metal Mass, BOL=2989.2kg EOL=2982.962kg
ROD Storage Site INEEL

Fuel decay start date 1966
Estimates as of 2010
Template PWR (Light Water, Zirc, 0 to 5%, U)
Template Burnup (MWd) 61.92
Template BOL Heavy Metal Mass (MT) 0.00176911
Template Decay Time 35 years

Estimated
Canister usage
18"x10"
4 42

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	5,932.14	11,864.28	0.00E+00	5.21E-06	1.04E-05	Avg MeV	
Am-241	1.4352E-01	5,932.14	11,864.28	0.00E+00	8.51E+02	1.70E+03	0.0150	6.384E+14
Am-242m	2.8698E-04	5,932.14	11,864.28	0.00E+00	1.70E+00	3.40E+00	0.0250	1.287E+14
Am-243	6.2565E-04	5,932.14	11,864.28	0.00E+00	3.71E+00	7.42E+00	0.0375	1.228E+14
C-14	4.7901E-05	5,932.14	11,864.28	0.00E+00	2.84E-01	5.68E-01	0.0575	1.419E+14
Cl-36	8.0297E-07	5,932.14	11,864.28	0.00E+00	4.76E-03	9.53E-03	0.0850	7.143E+13
Cm-243	2.5081E-04	5,932.14	11,864.28	0.00E+00	1.49E+00	2.98E+00	0.1250	4.957E+13
Cm-244	4.9015E-02	5,932.14	11,864.28	0.00E+00	2.91E+02	5.82E+02	0.2250	6.125E+13
Co-60	2.5581E-03	5,932.14	11,864.28	0.00E+00	1.52E+01	3.04E+01	0.3750	2.634E+13
Cs-134	4.0536E-05	5,932.14	11,864.28	0.00E+00	2.40E-01	4.81E-01	0.5750	6.126E+14
Cs-135	1.4433E-05	5,932.14	11,864.28	0.00E+00	8.56E-02	1.71E-01	0.8500	8.475E+12
Cs-137	1.3979E+00	5,932.14	11,864.28	0.00E+00	8.29E+03	1.66E+04	1.2500	8.324E+12
Eu-154	2.0203E-02	5,932.14	11,864.28	0.00E+00	1.20E+02	2.40E+02	1.7500	2.493E+11
Eu-155	1.7684E-03	5,932.14	11,864.28	0.00E+00	1.05E+01	2.10E+01	2.2500	4.015E+07
Fe-55	4.3136E-05	5,932.14	11,864.28	0.00E+00	2.56E-01	5.12E-01	2.7500	8.225E+07
H-3	2.0769E-02	5,932.14	11,864.28	0.00E+00	1.23E+02	2.46E+02	3.5000	8.473E+06
I-129	9.8288E-07	5,932.14	11,864.28	0.00E+00	5.83E-03	1.17E-02	5.0000	3.623E+06
Kr-85	2.8214E-02	5,932.14	11,864.28	0.00E+00	1.67E+02	3.35E+02	7.0000	4.175E+05
Np-237	1.1218E-05	5,932.14	11,864.28	0.00E+00	6.65E-02	1.33E-01	11.0000	4.796E+04
Pa-231	1.3036E-09	5,932.14	11,864.28	0.00E+00	7.73E-06	1.55E-05		
Pb-210	8.5078E-11	5,932.14	11,864.28	0.00E+00	5.05E-07	1.01E-06		
Pm-147	3.6531E-04	5,932.14	11,864.28	0.00E+00	2.17E+00	4.33E+00		
Pu-238	7.4564E-02	5,932.14	11,864.28	0.00E+00	4.42E+02	8.85E+02		
Pu-239	1.1623E-02	5,932.14	11,864.28	0.00E+00	6.89E+01	1.38E+02		
Pu-240	1.5132E-02	5,932.14	11,864.28	0.00E+00	8.98E+01	1.80E+02		
Pu-241	9.0036E-01	5,932.14	11,864.28	0.00E+00	5.34E+03	1.07E+04		
Pu-242	6.4260E-05	5,932.14	11,864.28	0.00E+00	3.81E-01	7.62E-01		
Ra-226	2.2804E-10	5,932.14	11,864.28	0.00E+00	1.35E-06	2.71E-06		
Ra-228	5.2713E-12	5,932.14	11,864.28	0.00E+00	3.13E-08	6.25E-08		
Ru-106	6.1160E-10	5,932.14	11,864.28	0.00E+00	3.63E-06	7.26E-06		
Se-79	1.2377E-05	5,932.14	11,864.28	0.00E+00	7.34E-02	1.47E-01		
Sn-126	2.5210E-05	5,932.14	11,864.28	0.00E+00	1.50E-01	2.99E-01		
Sr-90	9.1667E-01	5,932.14	11,864.28	0.00E+00	5.44E+03	1.09E+04		
Tc-99	3.9357E-04	5,932.14	11,864.28	0.00E+00	2.33E+00	4.67E+00		
Th-229	1.2057E-10	5,932.14	11,864.28	0.00E+00	7.15E-07	1.43E-06		
Th-230	2.1043E-08	5,932.14	11,864.28	0.00E+00	1.25E-04	2.50E-04		
Th-232	5.2972E-12	5,932.14	11,864.28	0.00E+00	3.14E-08	6.28E-08		
Tl-208	1.7474E-07	5,932.14	11,864.28	0.00E+00	1.04E-03	2.07E-03		
U-232	4.7368E-07	5,932.14	11,864.28	0.00E+00	2.81E-03	5.62E-03		
U-233	2.5097E-08	5,932.14	11,864.28	0.00E+00	1.49E-04	2.98E-04		
U-234	5.0000E-05	5,932.14	11,864.28	0.00E+00	2.97E-01	5.93E-01		
U-235	-1.4489E-06	5,932.14	0.00	9.28E-02	8.42E-02	9.28E-02		
U-236	7.5824E-06	5,932.14	11,864.28	0.00E+00	4.50E-02	9.00E-02		
U-238	-2.6129E-07	5,932.14	0.00	9.90E-01	9.89E-01	9.90E-01		
Y-90	9.1699E-01	5,932.14	11,864.28	0.00E+00	5.44E+03	1.09E+04		
Other Radionuclides					7.96E+03	1.59E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding		ZIRC	
BOL HM Constituents		U	
BOL Enrichment %	1.436170175	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		5,932.14	
Bounding	4,782.72	11,864.28	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.06		
Bounding	0.11	2.48	1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (U METAL) ENRICHED THIN
 SNF ID #: 887
 Fuel Units & Descr: 54 - 6 FLAT PLATES
 Heavy Metal Mass: BOL= , EOL=2194 101kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1966
 Estimates as of: 2010
 Template: PWR (Light Water, Zirc, 0 to 5%, U)
²Template Burnup(MWd): 61.92
 Template BOL Heavy Metal Mass (MT): 0.00176911
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x10"
 4 50

II. Estimates		m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CuMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)	
Ac-227	8.7758E-10	3,516.48	3,516.48	0.00E+00	3.09E-06	3.09E-06	Avg MeV		
Am-241	1.4352E-01	3,516.48	3,516.48	0.00E+00	5.06E+02	5.05E+02	0.0150	1.892E+14	
Am-242m	2.8698E-04	3,516.48	3,516.48	0.00E+00	1.01E+00	1.01E+00	0.0250	3.815E+13	
Am-243	6.2565E-04	3,516.48	3,516.48	0.00E+00	2.20E+00	2.20E+00	0.0375	3.639E+13	
C-14	4.7901E-05	3,516.48	3,516.48	0.00E+00	1.68E-01	1.68E-01	0.0575	4.205E+13	
Cl-36	8.0297E-07	3,516.48	3,516.48	0.00E+00	2.82E-03	2.82E-03	0.0850	2.117E+13	
Cm-243	2.5081E-04	3,516.48	3,516.48	0.00E+00	8.82E-01	8.82E-01	0.1250	1.469E+13	
Cm-244	4.9015E-02	3,516.48	3,516.48	0.00E+00	1.72E+02	1.72E+02	0.2250	1.816E+13	
Co-60	2.5581E-03	3,516.48	3,516.48	0.00E+00	9.00E+00	9.00E+00	0.3750	7.807E+12	
Cs-134	4.0536E-05	3,516.48	3,516.48	0.00E+00	1.43E-01	1.43E-01	0.5750	1.816E+14	
Cs-135	1.4433E-05	3,516.48	3,516.48	0.00E+00	5.08E-02	5.08E-02	0.8500	2.512E+12	
Cs-137	1.3979E+00	3,516.48	3,516.48	0.00E+00	4.92E+03	4.92E+03	1.2500	2.467E+12	
Eu-154	2.0203E-02	3,516.48	3,516.48	0.00E+00	7.10E+01	7.10E+01	1.7500	7.389E+10	
Eu-155	1.7684E-03	3,516.48	3,516.48	0.00E+00	6.22E+00	6.22E+00	2.2500	1.190E+07	
Fe-55	4.3136E-05	3,516.48	3,516.48	0.00E+00	1.52E-01	1.52E-01	2.7500	2.438E+07	
H-3	2.0769E-02	3,516.48	3,516.48	0.00E+00	7.30E+01	7.30E+01	3.5000	2.514E+06	
I-129	9.8288E-07	3,516.48	3,516.48	0.00E+00	3.46E-03	3.46E-03	5.0000	1.075E+06	
Kr-85	2.8214E-02	3,516.48	3,516.48	0.00E+00	9.92E+01	9.92E+01	7.0000	1.239E+05	
Np-237	1.1218E-05	3,516.48	3,516.48	0.00E+00	3.94E-02	3.94E-02	11.0000	1.423E+04	
Pa-231	1.3036E-09	3,516.48	3,516.48	0.00E+00	4.58E-06	4.58E-06			
Pb-210	8.5078E-11	3,516.48	3,516.48	0.00E+00	2.99E-07	2.99E-07			
Pm-147	3.6531E-04	3,516.48	3,516.48	0.00E+00	1.28E+00	1.28E+00			
Pu-238	7.4564E-02	3,516.48	3,516.48	0.00E+00	2.62E+02	2.62E+02			
Pu-239	1.1623E-02	3,516.48	3,516.48	0.00E+00	4.09E+01	4.09E+01			
Pu-240	1.5132E-02	3,516.48	3,516.48	0.00E+00	5.32E+01	5.32E+01			
Pu-241	9.0036E-01	3,516.48	3,516.48	0.00E+00	3.17E+03	3.17E+03			
Pu-242	6.4260E-05	3,516.48	3,516.48	0.00E+00	2.26E-01	2.26E-01			
Ra-226	2.2804E-10	3,516.48	3,516.48	0.00E+00	8.02E-07	8.02E-07			
Ra-228	5.2713E-12	3,516.48	3,516.48	0.00E+00	1.85E-08	1.85E-08			
Ru-106	6.1160E-10	3,516.48	3,516.48	0.00E+00	2.15E-06	2.15E-06			
Sg-79	1.2377E-05	3,516.48	3,516.48	0.00E+00	4.35E-02	4.35E-02			
Sn-126	2.5210E-05	3,516.48	3,516.48	0.00E+00	8.87E-02	8.87E-02			
Sr-90	9.1667E-01	3,516.48	3,516.48	0.00E+00	3.22E+03	3.22E+03			
Tc-99	3.9357E-04	3,516.48	3,516.48	0.00E+00	1.38E+00	1.38E+00			
Th-229	1.2057E-10	3,516.48	3,516.48	0.00E+00	4.24E-07	4.24E-07			
Th-230	2.1043E-08	3,516.48	3,516.48	0.00E+00	7.40E-05	7.40E-05			
Th-232	5.2972E-12	3,516.48	3,516.48	0.00E+00	1.86E-08	1.86E-08			
Th-208	1.7474E-07	3,516.48	3,516.48	0.00E+00	6.14E-04	6.14E-04			
U-232	4.7368E-07	3,516.48	3,516.48	0.00E+00	1.67E-03	1.67E-03			
U-233	2.5097E-08	3,516.48	3,516.48	0.00E+00	8.83E-05	8.83E-05			
U-234	5.0000E-05	3,516.48	3,516.48	0.00E+00	1.76E-01	1.76E-01			
U-235	-1.4489E-06	3,516.48	0.00	1.52E-01	1.47E-01	1.52E-01			
U-236	7.5824E-06	3,516.48	3,516.48	0.00E+00	2.67E-02	2.67E-02			
U-238	-2.6129E-07	3,516.48	0.00	7.15E-01	7.14E-01	7.15E-01			
Y-90	9.1699E-01	3,516.48	3,516.48	0.00E+00	3.22E+03	3.22E+03			
Other Radionuclides					4.72E+03	4.72E+03			

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

		From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons. This fuel matches on all parameters except enrichment (unknown).
Reactor Moderator		LIGHT WATER	LIGHT WATER	
Fuel Cladding		ZIRC	ZIRC	
BOL HM Constituents		U	U	
BOL Enrichment %			0 to 5	

Burnup Summary (MWd)²

		From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup Bounding burnup assumed to be twice nominal burnup
Nominal			3,516.48	
Bounding			3,516.48	

Checks

		Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 1.00
Nominal		0.05		
Bounding		0.05		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (U METAL) ET-11
 SNF ID #: 888
 Fuel Units & Descr: 1 - 6 FLAT PLATES
 Heavy Metal Mass BOL=40.2kg EOL=38.365kg
 ROD Storage Site INEEL

¹Fuel decay start date 1966
 Estimates as of 2010
 Template: PWR (Light Water, Zirc, 0 to 5% U)
²Template Burnup(MWd) 61.92
 Template BOL Heavy Metal Mass (MT) 0.00176911
 Template Decay Time 35 years

Estimated
 Canister usage:
 18"x10"
 0.08

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CUMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	8.7758E-10	1,745.00	3,490.00	0.00E+00	1.53E-06	3.06E-06	0.0150	1.878E+14
Am-241	1.4352E-01	1,745.00	3,490.00	0.00E+00	2.50E+02	5.01E+02	0.0250	3.787E+13
Am-242m	2.8698E-04	1,745.00	3,490.00	0.00E+00	5.01E-01	1.00E+00	0.0375	3.612E+13
Am-243	6.2565E-04	1,745.00	3,490.00	0.00E+00	1.09E+00	2.18E+00	0.0575	4.173E+13
C-14	4.7901E-05	1,745.00	3,490.00	0.00E+00	8.36E-02	1.67E-01	0.0850	2.101E+13
Cl-36	8.0297E-07	1,745.00	3,490.00	0.00E+00	1.40E-03	2.80E-03	0.1250	1.458E+13
Cm-243	2.5081E-04	1,745.00	3,490.00	0.00E+00	4.38E-01	8.75E-01	0.2250	1.802E+13
Cm-244	4.9015E-02	1,745.00	3,490.00	0.00E+00	8.55E+01	1.71E+02	0.3750	7.748E+12
Co-60	2.5581E-03	1,745.00	3,490.00	0.00E+00	4.46E+00	8.93E+00	0.5750	1.802E+14
Cs-134	4.0536E-05	1,745.00	3,490.00	0.00E+00	7.07E-02	1.41E-01	0.8500	2.493E+12
Cs-135	1.4433E-05	1,745.00	3,490.00	0.00E+00	2.52E-02	5.04E-02	1.2500	2.449E+12
Cs-137	1.3979E+00	1,745.00	3,490.00	0.00E+00	2.44E+03	4.88E+03	1.7500	7.333E+10
Eu-154	2.0203E-02	1,745.00	3,490.00	0.00E+00	3.53E+01	7.05E+01	2.2500	1.181E+07
Eu-155	1.7684E-03	1,745.00	3,490.00	0.00E+00	3.09E+00	6.17E+00	2.7500	2.419E+07
Fe-55	4.3136E-05	1,745.00	3,490.00	0.00E+00	7.53E-02	1.51E-01	3.5000	2.491E+06
H-3	2.0769E-02	1,745.00	3,490.00	0.00E+00	3.62E+01	7.25E+01	5.0000	1.065E+06
I-129	9.8288E-07	1,745.00	3,490.00	0.00E+00	1.72E-03	3.43E-03	7.0000	1.227E+05
Kr-85	2.8214E-02	1,745.00	3,490.00	0.00E+00	4.92E+01	9.85E+01	11.0000	1.410E+04
Np-237	1.1218E-05	1,745.00	3,490.00	0.00E+00	1.96E-02	3.91E-02		
Pa-231	1.3036E-09	1,745.00	3,490.00	0.00E+00	2.27E-06	4.55E-06		
Pb-210	8.5078E-11	1,745.00	3,490.00	0.00E+00	1.48E-07	2.97E-07		
Pm-147	3.6531E-04	1,745.00	3,490.00	0.00E+00	6.37E-01	1.27E+00		
Pu-238	7.4564E-02	1,745.00	3,490.00	0.00E+00	1.30E+02	2.60E+02		
Pu-239	1.1623E-02	1,745.00	3,490.00	0.00E+00	2.03E+01	4.06E+01		
Pu-240	1.5132E-02	1,745.00	3,490.00	0.00E+00	2.64E+01	5.28E+01		
Pu-241	9.0036E-01	1,745.00	3,490.00	0.00E+00	1.57E+03	3.14E+03		
Pu-242	6.4260E-05	1,745.00	3,490.00	0.00E+00	1.12E-01	2.24E-01		
Ra-226	2.2804E-10	1,745.00	3,490.00	0.00E+00	3.98E-07	7.96E-07		
Ra-228	5.2713E-12	1,745.00	3,490.00	0.00E+00	9.20E-09	1.84E-08		
Ru-106	6.1160E-10	1,745.00	3,490.00	0.00E+00	1.07E-06	2.13E-06		
Se-79	1.2377E-05	1,745.00	3,490.00	0.00E+00	2.16E-02	4.32E-02		
Sn-126	2.5210E-05	1,745.00	3,490.00	0.00E+00	4.40E-02	8.80E-02		
Sr-90	9.1667E-01	1,745.00	3,490.00	0.00E+00	1.60E+03	3.20E+03		
Tc-99	3.9357E-04	1,745.00	3,490.00	0.00E+00	6.87E-01	1.37E+00		
Th-229	1.2057E-10	1,745.00	3,490.00	0.00E+00	2.10E-07	4.21E-07		
Th-230	2.1043E-08	1,745.00	3,490.00	0.00E+00	3.67E-05	7.34E-05		
Th-232	5.2972E-12	1,745.00	3,490.00	0.00E+00	9.24E-09	1.85E-08		
Ti-208	1.7474E-07	1,745.00	3,490.00	0.00E+00	3.05E-04	6.10E-04		
U-232	4.7368E-07	1,745.00	3,490.00	0.00E+00	8.27E-04	1.65E-03		
U-233	2.5097E-08	1,745.00	3,490.00	0.00E+00	4.38E-05	8.76E-05		
U-234	5.0000E-05	1,745.00	3,490.00	0.00E+00	8.72E-02	1.74E-01		
U-235	-1.4489E-06	1,745.00	0.00	1.26E-03	0.00E+00	1.26E-03		
U-236	7.5824E-06	1,745.00	3,490.00	0.00E+00	1.32E-02	2.65E-02		
U-238	-2.6129E-07	1,745.00	0.00	1.33E-02	1.29E-02	1.33E-02		
Y-90	9.1699E-01	1,745.00	3,490.00	0.00E+00	1.60E+03	3.20E+03		
Other Radionuclides					2.34E+03	4.68E+03		

Thermal Power
 Nominal Heat Output (Watts)
 Bounding Heat Output (Watts)
 4.01E+01
 8.03E+01
 Total Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	1.447761165	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		1,745.00
Bounding	64.32	3,490.00

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
 Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	1.24	
Bounding	2.48	54.26

Estimated EOL HM/Given EOL HM

1.02

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (U METAL) NORMAL HEAVY
SNF ID #: 889
Fuel Units & Descr: 11 - 6 FLAT PLATES
Heavy Metal Mass: BOL=620 4kg: EOL=566 145kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1966
Estimates as of: 2010
Template: PWR (Light Water, Zirc, 0 to 5%, U)
²Template Burnup(MWd): 61 92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 35 years

Estimated
Canister usage:
18"x10"
0.92

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	51,594.22	103,188.45	0.00E+00	4.53E-05	9.06E-05	Avg MeV	
Am-241	1.4352E-01	51,594.22	103,188.45	0.00E+00	7.41E+03	1.48E+04	0.0150	5.552E+15
Am-242m	2.8698E-04	51,594.22	103,188.45	0.00E+00	1.48E+01	2.96E+01	0.0250	1.120E+15
Am-243	6.2565E-04	51,594.22	103,188.45	0.00E+00	3.23E+01	6.46E+01	0.0375	1.068E+15
C-14	4.7901E-05	51,594.22	103,188.45	0.00E+00	2.47E+00	4.94E+00	0.0575	1.234E+15
Cf-254	8.0297E-07	51,594.22	103,188.45	0.00E+00	4.14E-02	8.29E-02	0.0850	6.213E+14
Cm-243	2.5081E-04	51,594.22	103,188.45	0.00E+00	1.29E+01	2.59E+01	0.1250	4.311E+14
Cm-244	4.9015E-02	51,594.22	103,188.45	0.00E+00	2.53E+03	5.06E+03	0.2250	5.327E+14
Co-60	2.5581E-03	51,594.22	103,188.45	0.00E+00	1.32E+02	2.64E+02	0.3750	2.291E+14
Cs-134	4.0536E-05	51,594.22	103,188.45	0.00E+00	2.09E+00	4.18E+00	0.5750	5.328E+15
Cs-135	1.4433E-05	51,594.22	103,188.45	0.00E+00	7.45E-01	1.49E+00	0.8500	7.371E+13
Cs-137	1.3979E+00	51,594.22	103,188.45	0.00E+00	7.21E+04	1.44E+05	1.2500	7.240E+13
Eu-154	2.0203E-02	51,594.22	103,188.45	0.00E+00	1.04E+03	2.08E+03	1.7500	2.168E+12
Eu-155	1.7684E-03	51,594.22	103,188.45	0.00E+00	9.12E+01	1.82E+02	2.2500	3.491E+08
Fe-55	4.3136E-05	51,594.22	103,188.45	0.00E+00	2.23E+00	4.45E+00	2.7500	7.153E+08
H-3	2.0769E-02	51,594.22	103,188.45	0.00E+00	1.07E+03	2.14E+03	3.5000	7.365E+07
I-129	9.8288E-07	51,594.22	103,188.45	0.00E+00	5.07E-02	1.01E-01	5.0000	3.149E+07
Kr-85	2.8214E-02	51,594.22	103,188.45	0.00E+00	1.46E+03	2.91E+03	7.0000	3.629E+06
Np-237	1.1218E-05	51,594.22	103,188.45	0.00E+00	5.79E-01	1.16E+00	11.0000	4.168E+05
Pa-231	1.3036E-09	51,594.22	103,188.45	0.00E+00	6.73E-05	1.35E-04		
Pb-210	8.5078E-11	51,594.22	103,188.45	0.00E+00	4.39E-06	8.78E-06		
Pm-147	3.6531E-04	51,594.22	103,188.45	0.00E+00	1.88E+01	3.77E+01		
Pu-238	7.4564E-02	51,594.22	103,188.45	0.00E+00	3.85E+03	7.69E+03		
Pu-239	1.1623E-02	51,594.22	103,188.45	0.00E+00	6.00E+02	1.20E+03		
Pu-240	1.5132E-02	51,594.22	103,188.45	0.00E+00	7.81E+02	1.56E+03		
Pu-241	9.0036E-01	51,594.22	103,188.45	0.00E+00	4.65E+04	9.29E+04		
Pu-242	6.4260E-05	51,594.22	103,188.45	0.00E+00	3.32E+00	6.63E+00		
Ra-226	2.2804E-10	51,594.22	103,188.45	0.00E+00	1.18E-05	2.35E-05		
Ra-228	5.2713E-12	51,594.22	103,188.45	0.00E+00	2.72E-07	5.44E-07		
Ru-106	6.1160E-10	51,594.22	103,188.45	0.00E+00	3.16E-05	6.31E-05		
Se-79	1.2377E-05	51,594.22	103,188.45	0.00E+00	6.39E-01	1.28E+00		
Sn-126	2.5210E-05	51,594.22	103,188.45	0.00E+00	1.30E+00	2.60E+00		
Sr-90	9.1667E-01	51,594.22	103,188.45	0.00E+00	4.73E+04	9.46E+04		
Tc-99	3.9357E-04	51,594.22	103,188.45	0.00E+00	2.03E+01	4.06E+01		
Th-229	1.2057E-10	51,594.22	103,188.45	0.00E+00	6.22E-06	1.24E-05		
Th-230	2.1043E-08	51,594.22	103,188.45	0.00E+00	1.09E-03	2.17E-03		
Th-232	5.2972E-12	51,594.22	103,188.45	0.00E+00	2.73E-07	5.47E-07		
Ti-208	1.7474E-07	51,594.22	103,188.45	0.00E+00	9.02E-03	1.80E-02		
U-232	4.7368E-07	51,594.22	103,188.45	0.00E+00	2.44E-02	4.89E-02		
U-233	2.5097E-08	51,594.22	103,188.45	0.00E+00	1.29E-03	2.59E-03		
U-234	5.0000E-05	51,594.22	103,188.45	0.00E+00	2.58E+00	5.16E+00		
U-235	-1.4489E-06	51,594.22	0.00	9.56E-03	0.00E+00	9.56E-03		
U-236	7.5824E-06	51,594.22	103,188.45	0.00E+00	3.91E-01	7.82E-01		
U-238	-2.6129E-07	51,594.22	0.00	2.07E-01	1.94E-01	2.07E-01		
Y-90	9.1699E-01	51,594.22	103,188.45	0.00E+00	4.73E+04	9.46E+04		
Other Radionuclides					6.93E+04	1.39E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %	0.712765938	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		51,594.22
Bounding	992.64	103,188.45

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	2.38	
Bounding	4.75	103.95

Estimated EOL HM/Given EOL HM

1.05

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (U METAL) NORMAL THIN
SNF ID #: 890
Fuel Units & Descr: 7 - 6 FLAT PLATES
Heavy Metal Mass: BOL=2814kg, EOL=279076kg
ROD Storage Site: INEEL

Fuel decay start date: 1966
Estimates as of: 2010
Template: PWR (Light Water, Zirc, 0 to 5% U)
*Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 000176911
Template Decay Time: 35 years

Estimated
Canister usage
18"x10"
0.58

Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventones(Ci)	Bounding Fuel Inventones(Ci)	Gamma Sources
Ac-227	8.7758E-10	2,210.01	4,420.01	0.00E+00	1.94E-06	3.88E-06	Photon Energy Group Avg MeV
Am-241	1.4352E-01	2,210.01	4,420.01	0.00E+00	3.17E+02	6.34E+02	Total Photons/sec (bounding)
Am-242m	2.8698E-04	2,210.01	4,420.01	0.00E+00	6.34E-01	1.27E+00	0.0150 2.378E+14
Am-243	6.2565E-04	2,210.01	4,420.01	0.00E+00	1.38E+00	2.77E+00	0.0250 4.796E+13
C-14	4.7901E-05	2,210.01	4,420.01	0.00E+00	1.06E-01	2.12E-01	0.0375 4.574E+13
Cl-36	8.0297E-07	2,210.01	4,420.01	0.00E+00	1.77E-03	3.55E-03	0.0575 5.285E+13
Cm-243	2.5081E-04	2,210.01	4,420.01	0.00E+00	5.54E-01	1.11E+00	0.0850 2.661E+13
Cm-244	4.9015E-02	2,210.01	4,420.01	0.00E+00	1.08E+02	2.17E+02	0.1250 1.847E+13
Co-60	2.5581E-03	2,210.01	4,420.01	0.00E+00	5.65E+00	1.13E+01	0.2250 2.282E+13
Cs-134	4.0536E-05	2,210.01	4,420.01	0.00E+00	8.96E-02	1.79E-01	0.3750 9.812E+12
Cs-135	1.4433E-05	2,210.01	4,420.01	0.00E+00	3.19E-02	6.38E-02	0.5750 2.282E+14
Cs-137	1.3979E+00	2,210.01	4,420.01	0.00E+00	3.09E+03	6.18E+03	0.8500 3.157E+12
Eu-154	2.0203E-02	2,210.01	4,420.01	0.00E+00	4.46E+01	8.93E+01	1.2500 3.101E+12
Eu-155	1.7684E-03	2,210.01	4,420.01	0.00E+00	3.91E+00	7.82E+00	1.7500 9.287E+10
Fe-55	4.3136E-05	2,210.01	4,420.01	0.00E+00	9.53E-02	1.91E-01	2.2500 1.496E+07
H-3	2.0769E-02	2,210.01	4,420.01	0.00E+00	4.59E+01	9.18E+01	2.7500 3.064E+07
I-129	9.8288E-07	2,210.01	4,420.01	0.00E+00	2.17E-03	4.34E-03	3.5000 3.155E+06
Kr-85	2.8214E-02	2,210.01	4,420.01	0.00E+00	6.24E+01	1.25E+02	5.0000 1.349E+06
Np-237	1.1218E-05	2,210.01	4,420.01	0.00E+00	2.48E-02	4.96E-02	7.0000 1.555E+05
Pa-231	1.3036E-09	2,210.01	4,420.01	0.00E+00	2.88E-06	5.76E-06	11.0000 1.786E+04
Pb-210	8.5078E-11	2,210.01	4,420.01	0.00E+00	1.88E-07	3.76E-07	
Pm-147	3.6531E-04	2,210.01	4,420.01	0.00E+00	8.07E-01	1.61E+00	
Pu-238	7.4564E-02	2,210.01	4,420.01	0.00E+00	1.65E+02	3.30E+02	
Pu-239	1.1623E-02	2,210.01	4,420.01	0.00E+00	2.57E+01	5.14E+01	
Pu-240	1.5132E-02	2,210.01	4,420.01	0.00E+00	3.34E+01	6.69E+01	
Pu-241	9.0036E-01	2,210.01	4,420.01	0.00E+00	1.99E+03	3.98E+03	
Pu-242	6.4260E-05	2,210.01	4,420.01	0.00E+00	1.42E-01	2.84E-01	
Ra-226	2.2804E-10	2,210.01	4,420.01	0.00E+00	5.04E-07	1.01E-06	
Ra-228	5.2713E-12	2,210.01	4,420.01	0.00E+00	1.16E-08	2.33E-08	
Ru-106	6.1160E-10	2,210.01	4,420.01	0.00E+00	1.35E-06	2.70E-06	
Se-79	1.2377E-05	2,210.01	4,420.01	0.00E+00	2.74E-02	5.47E-02	
Sn-126	2.5210E-05	2,210.01	4,420.01	0.00E+00	5.57E-02	1.11E-01	
Sr-90	9.1667E-01	2,210.01	4,420.01	0.00E+00	2.03E+03	4.05E+03	
Tc-99	3.9357E-04	2,210.01	4,420.01	0.00E+00	8.70E-01	1.74E+00	
Th-229	1.2057E-10	2,210.01	4,420.01	0.00E+00	2.66E-07	5.33E-07	
Th-230	2.1043E-08	2,210.01	4,420.01	0.00E+00	4.65E-05	9.30E-05	
Th-232	5.2972E-12	2,210.01	4,420.01	0.00E+00	1.17E-08	2.34E-08	
Ti-208	1.7474E-07	2,210.01	4,420.01	0.00E+00	3.86E-04	7.72E-04	
U-232	4.7368E-07	2,210.01	4,420.01	0.00E+00	1.05E-03	2.09E-03	
U-233	2.5097E-08	2,210.01	4,420.01	0.00E+00	5.55E-05	1.11E-04	
U-234	5.0000E-05	2,210.01	4,420.01	0.00E+00	1.11E-01	2.21E-01	
U-235	-1.4489E-06	2,210.01	0.00	4.36E-03	1.15E-03	4.36E-03	
U-236	7.5824E-06	2,210.01	4,420.01	0.00E+00	1.68E-02	3.35E-02	
U-238	-2.6129E-07	2,210.01	0.00	9.39E-02	9.33E-02	9.39E-02	
Y-90	9.1699E-01	2,210.01	4,420.01	0.00E+00	2.03E+03	4.05E+03	
Other Radionuclides					2.97E+03	5.93E+03	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	0.716417866	0 to 5	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		2,210.01	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding	450.24	4,420.01	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.22		1.00
Bounding	0.45	9.82	

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ENEA (LEU UALX) SALUGGIA ITALY

SNF ID #: 760

Fuel Units & Descr: 32 - MTR TYPE

Heavy Metal Mass: BOL=22 4kg, EOL=21 568kg

ROD Storage Site: SRS

¹Fuel decay start date: 1996

Estimates as of: 2010

Template: ATR (Light Water, Alum, 60 to 100%, U)

²Template Burnup(MWd): 367.2

Template BOL Heavy Metal Mass (MT): 0.00116689

Template Decay Time: 10 years

Estimated
Canister usage:
18"x10"
0.89

II. Estimates	m	X _n	X _b	b	Y _n	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8404E-10	787.92	1,575.84	0.00E+00	2.24E-07	4.48E-07	Avg MeV	
Am-241	1.4935E-03	787.92	1,575.84	0.00E+00	1.18E+00	2.35E+00	0.0150	2.143E+14
Am-242m	4.4390E-07	787.92	1,575.84	0.00E+00	3.50E-04	7.00E-04	0.0250	4.510E+13
Am-243	1.4913E-06	787.92	1,575.84	0.00E+00	1.18E-03	2.35E-03	0.0375	3.932E+13
C-14	5.7217E-09	787.92	1,575.84	0.00E+00	4.51E-06	9.02E-06	0.0575	4.154E+13
Cl-36	1.3124E-32	787.92	1,575.84	0.00E+00	1.03E-29	2.07E-29	0.0850	2.527E+13
Cm-243	2.0967E-07	787.92	1,575.84	0.00E+00	1.65E-04	3.30E-04	0.1250	1.768E+13
Cm-244	4.3001E-05	787.92	1,575.84	0.00E+00	3.39E-02	6.78E-02	0.2250	2.170E+13
Co-60	1.9798E-05	787.92	1,575.84	0.00E+00	1.56E-02	3.12E-02	0.3750	9.728E+12
Cs-134	9.0795E-02	787.92	1,575.84	0.00E+00	7.15E+01	1.43E+02	0.5750	1.579E+14
Cs-135	3.4477E-06	787.92	1,575.84	0.00E+00	2.72E-03	5.43E-03	0.8500	7.704E+12
Cs-137	2.5588E+00	787.92	1,575.84	0.00E+00	2.02E+03	4.03E+03	1.2500	2.507E+12
Eu-154	5.4847E-02	787.92	1,575.84	0.00E+00	4.32E+01	8.64E+01	1.7500	9.154E+10
Eu-155	1.9469E-02	787.92	1,575.84	0.00E+00	1.53E+01	3.07E+01	2.2500	6.052E+09
Fe-55	1.7797E-03	787.92	1,575.84	0.00E+00	1.40E+00	2.80E+00	2.7500	8.445E+07
H-3	8.0065E-03	787.92	1,575.84	0.00E+00	6.31E+00	1.26E+01	3.5000	1.005E+07
I-129	7.5300E-07	787.92	1,575.84	0.00E+00	5.93E-04	1.19E-03	5.0000	8.491E+02
Kr-85	2.0705E-01	787.92	1,575.84	0.00E+00	1.63E+02	3.26E+02	7.0000	9.439E+01
Np-237	9.5507E-06	787.92	1,575.84	0.00E+00	7.53E-03	1.51E-02	11.0000	1.062E+01
Pa-231	1.2740E-09	787.92	1,575.84	0.00E+00	1.00E-06	2.01E-06		
Pb-210	1.1838E-11	787.92	1,575.84	0.00E+00	9.33E-09	1.87E-08		
Pm-147	6.7974E-01	787.92	1,575.84	0.00E+00	5.36E+02	1.07E+03		
Pu-238	1.9755E-02	787.92	1,575.84	0.00E+00	1.56E+01	3.11E+01		
Pu-239	4.2638E-04	787.92	1,575.84	0.00E+00	3.38E-01	6.75E-01		
Pu-240	2.4390E-04	787.92	1,575.84	0.00E+00	1.92E-01	3.84E-01		
Pu-241	5.4058E-02	787.92	1,575.84	0.00E+00	4.26E+01	8.52E+01		
Pu-242	3.6329E-07	787.92	1,575.84	0.00E+00	2.86E-04	5.72E-04		
Ra-226	8.3742E-11	787.92	1,575.84	0.00E+00	6.80E-08	1.32E-07		
Ra-228	5.7734E-15	787.92	1,575.84	0.00E+00	4.55E-12	9.10E-12		
Ru-106	6.1356E-03	787.92	1,575.84	0.00E+00	4.83E+00	9.67E+00		
Se-79	1.2936E-05	787.92	1,575.84	0.00E+00	1.02E-02	2.04E-02		
Sn-126	1.1574E-05	787.92	1,575.84	0.00E+00	9.12E-03	1.82E-02		
Sr-90	2.4417E+00	787.92	1,575.84	0.00E+00	1.92E+03	3.85E+03		
Tc-99	4.2239E-04	787.92	1,575.84	0.00E+00	3.33E-01	6.66E-01		
Th-229	2.8568E-12	787.92	1,575.84	0.00E+00	2.25E-09	4.50E-09		
Th-230	2.5310E-08	787.92	1,575.84	0.00E+00	1.99E-05	3.99E-05		
Th-232	1.1631E-14	787.92	1,575.84	0.00E+00	9.16E-12	1.83E-11		
Ti-208	4.6705E-08	787.92	1,575.84	0.00E+00	3.68E-05	7.36E-05		
U-232	1.3151E-07	787.92	1,575.84	0.00E+00	1.04E-04	2.07E-04		
U-233	2.1650E-09	787.92	1,575.84	0.00E+00	1.71E-06	3.41E-06		
U-234	1.8399E-04	787.92	1,575.84	0.00E+00	1.45E-01	2.90E-01		
U-235	-2.7235E-06	787.92	0.00	9.68E-03	7.54E-03	9.68E-03		
U-236	1.5493E-05	787.92	1,575.84	0.00E+00	1.22E-02	2.44E-02		
U-238	-4.2851E-09	787.92	0.00	6.02E-03	6.02E-03	6.02E-03		
Y-90	2.4423E+00	787.92	1,575.84	0.00E+00	1.92E+03	3.85E+03		
Other Radionuclides					1.96E+03	3.92E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons
Fuel Cladding	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents	U	U	
BOL Enrichment %	20	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		787.92	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		1.575.84	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.11		1.00
Bounding	0.22		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ENEA (UALX HEU) SALUGGIA ITALY
SNF ID #: 574
Fuel Units & Descr: 116 - MTR TYPE
Heavy Metal Mass: BOL=18.56kg EOL=17.226kg
ROD Storage Site: SRS

Fuel decay start date: 1996
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100% U)
Template Burnup (MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 10 years

Estimated
Canister usage
18"x10"
3.22

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group Avg MeV Total Photons/sec (bounding)
Ac-227	2.8404E-10	1.263 32	2,526 65	0.00E+00	3.59E-07	7.18E-07	0.0150 3.436E+14
Am-241	1.4935E-03	1.263 32	2,526 65	0.00E+00	1.89E+00	3.77E+00	0.0250 7.232E+13
Am-242m	4.4390E-07	1.263 32	2,526 65	0.00E+00	5.61E-04	1.12E-03	0.0375 6.305E+13
Am-243	1.4913E-06	1.263 32	2,526 65	0.00E+00	1.88E-03	3.77E-03	0.0575 6.661E+13
C-14	5.7217E-09	1.263 32	2,526 65	0.00E+00	7.23E-06	1.45E-05	0.0850 4.052E+13
Cl-36	1.3124E-32	1.263 32	2,526 65	0.00E+00	1.66E-29	3.32E-29	0.1250 2.835E+13
Cm-243	2.0967E-07	1.263 32	2,526 65	0.00E+00	2.65E-04	5.30E-04	0.2250 3.480E+13
Cm-244	4.3001E-05	1.263 32	2,526 65	0.00E+00	5.43E-02	1.09E-01	0.3750 1.560E+13
Co-60	1.9798E-05	1.263 32	2,526 65	0.00E+00	2.50E-02	5.00E-02	0.5750 2.532E+14
Cs-134	9.0795E-02	1.263 32	2,526 65	0.00E+00	1.15E+02	2.29E+02	0.8500 1.235E+13
Cs-135	3.4477E-06	1.263 32	2,526 65	0.00E+00	4.36E-03	8.71E-03	1.2500 4.020E+12
Cs-137	2.5588E+00	1.263 32	2,526 65	0.00E+00	3.23E+03	6.47E+03	1.7500 1.468E+11
Eu-154	5.4847E-02	1.263 32	2,526 65	0.00E+00	6.93E+01	1.39E+02	2.2500 9.704E+09
Eu-155	1.9469E-02	1.263 32	2,526 65	0.00E+00	2.46E+01	4.92E+01	2.7500 1.354E+08
Fe-55	1.7797E-03	1.263 32	2,526 65	0.00E+00	2.25E+00	4.50E+00	3.5000 1.612E+07
H-3	8.0065E-03	1.263 32	2,526 65	0.00E+00	1.01E+01	2.02E+01	5.0000 1.341E+03
I-129	7.5300E-07	1.263 32	2,526 65	0.00E+00	9.51E-04	1.90E-03	7.0000 1.489E+02
Kr-85	2.0705E-01	1.263 32	2,526 65	0.00E+00	2.62E+02	5.23E+02	11.0000 1.676E+01
Np-237	9.5507E-06	1.263 32	2,526 65	0.00E+00	1.21E-02	2.41E-02	
Pa-231	1.2740E-09	1.263 32	2,526 65	0.00E+00	1.61E-06	3.22E-06	
Pb-210	1.1838E-11	1.263 32	2,526 65	0.00E+00	1.50E-08	2.99E-08	
Pm-147	6.7974E-01	1.263 32	2,526 65	0.00E+00	8.59E+02	1.72E+03	
Pu-238	1.9755E-02	1.263 32	2,526 65	0.00E+00	2.50E+01	4.99E+01	
Pu-239	4.2838E-04	1.263 32	2,526 65	0.00E+00	5.41E-01	1.08E+00	
Pu-240	2.4390E-04	1.263 32	2,526 65	0.00E+00	3.08E-01	6.16E-01	
Pu-241	5.4058E-02	1.263 32	2,526 65	0.00E+00	6.83E+01	1.37E+02	
Pu-242	3.6329E-07	1.263 32	2,526 65	0.00E+00	4.59E-04	9.18E-04	
Ra-226	8.3742E-11	1.263 32	2,526 65	0.00E+00	1.06E-07	2.12E-07	
Ra-228	5.7734E-15	1.263 32	2,526 65	0.00E+00	7.29E-12	1.46E-11	
Ru-106	6.1356E-03	1.263 32	2,526 65	0.00E+00	7.75E+00	1.55E+01	
Se-79	1.2936E-05	1.263 32	2,526 65	0.00E+00	1.63E-02	3.27E-02	
Sn-126	1.1574E-05	1.263 32	2,526 65	0.00E+00	1.46E-02	2.92E-02	
Sr-90	2.4417E+00	1.263 32	2,526 65	0.00E+00	3.08E+03	6.17E+03	
Tc-99	4.2239E-04	1.263 32	2,526 65	0.00E+00	5.34E-01	1.07E+00	
Th-229	2.8568E-12	1.263 32	2,526 65	0.00E+00	3.61E-09	7.22E-09	
Th-230	2.5310E-08	1.263 32	2,526 65	0.00E+00	3.20E-05	6.40E-05	
Th-232	1.1631E-14	1.263 32	2,526 65	0.00E+00	1.47E-11	2.94E-11	
Th-208	4.6705E-08	1.263 32	2,526 65	0.00E+00	5.90E-05	1.18E-04	
U-232	1.3151E-07	1.263 32	2,526 65	0.00E+00	1.66E-04	3.32E-04	
U-233	2.1650E-09	1.263 32	2,526 65	0.00E+00	2.74E-06	5.47E-06	
U-234	1.8399E-04	1.263 32	2,526 65	0.00E+00	2.32E-01	4.65E-01	
U-235	-2.7235E-06	1.263 32	0.00	3.74E-02	3.39E-02	3.74E-02	
U-236	1.5493E-05	1.263 32	2,526.65	0.00E+00	1.96E-02	3.91E-02	
U-238	-4.2851E-09	1.263 32	0.00	4.29E-04	4.23E-04	4.29E-04	
Y-90	2.4423E+00	1.263 32	2,526.65	0.00E+00	3.09E+03	6.17E+03	
Other Radionuclides					3.14E+03	6.28E+03	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	93 125	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal		1,263.32	Nominal burnup calculated from the heavy metal mass destroyed
Bounding		2,526.65	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.22		1.00
Bounding	0.43		

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EPRI
SNF ID #: 67
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= , EOL=0.02kg
ROD Storage Site: INEEL

Fuel decay start date: 1966
Estimates as of: 2010
Template (Worst Case)
Template Burnup (MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 35 years

Estimated
Canister usage:
18"x10"
0.03

II. Estimates:	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	19.01	19.01	0.00E+00	4.39E-05	4.39E-05	Avg MeV	
Am-241	8.4448E+00	19.01	19.01	0.00E+00	1.61E+02	1.61E+02	0.0150	2.329E+13
Am-242m	1.6848E-02	19.01	19.01	0.00E+00	3.20E-01	3.20E-01	0.0250	4.635E+12
Am-243	1.6320E-02	19.01	19.01	0.00E+00	3.10E-01	3.10E-01	0.0375	4.049E+12
C-14	1.2090E-01	19.01	19.01	0.00E+00	2.30E+00	2.30E+00	0.0575	6.371E+12
Cl-36	2.2849E-03	19.01	19.01	0.00E+00	4.34E-02	4.34E-02	0.0850	2.487E+12
Cm-243	8.6624E-04	19.01	19.01	0.00E+00	1.65E-02	1.65E-02	0.1250	1.949E+12
Cm-244	1.6848E-01	19.01	19.01	0.00E+00	3.20E+00	3.20E+00	0.2250	2.154E+12
Co-60	2.8086E+01	19.01	19.01	0.00E+00	5.34E+02	5.34E+02	0.3750	9.214E+11
Cs-134	3.4148E-04	19.01	19.01	0.00E+00	6.49E-03	6.49E-03	0.5750	1.498E+13
Cs-135	4.3976E-04	19.01	19.01	0.00E+00	8.36E-03	8.36E-03	0.8500	5.726E+11
Cs-137	2.1049E+01	19.01	19.01	0.00E+00	4.00E+02	4.00E+02	1.2500	4.002E+13
Eu-154	1.2500E+00	19.01	19.01	0.00E+00	2.38E+01	2.38E+01	1.7500	1.770E+10
Eu-155	6.8986E-02	19.01	19.01	0.00E+00	1.31E+00	1.31E+00	2.2500	2.099E+08
Fe-55	2.9308E-01	19.01	19.01	0.00E+00	5.57E+00	5.57E+00	2.7500	5.915E+07
H-3	2.4311E-01	19.01	19.01	0.00E+00	4.62E+00	4.62E+00	3.5000	4.733E+04
I-129	1.0618E-05	19.01	19.01	0.00E+00	2.02E-04	2.02E-04	5.0000	2.010E+04
Kr-85	5.9882E-01	19.01	19.01	0.00E+00	1.14E+01	1.14E+01	7.0000	2.302E+03
Np-237	1.5668E-04	19.01	19.01	0.00E+00	2.98E-03	2.98E-03	11.0000	2.634E+02
Pa-231	2.8656E-06	19.01	19.01	0.00E+00	5.45E-05	5.45E-05		
Pb-210	2.3918E-08	19.01	19.01	0.00E+00	4.55E-07	4.55E-07		
Pm-147	1.6900E-02	19.01	19.01	0.00E+00	3.21E-01	3.21E-01		
Pu-238	-8.6120E-01	19.01	0.00	5.14E+00	0.00E+00	5.14E+00		
Pu-239	-4.8440E-02	19.01	0.00	6.22E-01	0.00E+00	6.22E-01		
Pu-240	-3.0095E-01	19.01	0.00	7.94E-01	0.00E+00	7.94E-01		
Pu-241	-1.0411E+02	19.01	0.00	2.04E+02	0.00E+00	2.04E+02		
Pu-242	-1.1381E-04	19.01	0.00	3.44E-03	1.27E-03	3.44E-03		
Ra-226	6.4400E-08	19.01	19.01	0.00E+00	1.22E-06	1.22E-06		
Ra-228	5.9952E-07	19.01	19.01	0.00E+00	1.14E-05	1.14E-05		
Ru-106	8.5526E-07	19.01	19.01	0.00E+00	1.63E-05	1.63E-05		
Se-79	1.9181E-04	19.01	19.01	0.00E+00	3.65E-03	3.65E-03		
Sn-126	1.6671E-04	19.01	19.01	0.00E+00	3.17E-03	3.17E-03		
Sr-90	1.9799E+01	19.01	19.01	0.00E+00	3.76E+02	3.76E+02		
Tc-99	6.7678E-03	19.01	19.01	0.00E+00	1.29E-01	1.29E-01		
Th-229	1.7488E-06	19.01	19.01	0.00E+00	3.32E-05	3.32E-05		
Th-230	5.8704E-06	19.01	19.01	0.00E+00	1.12E-04	1.12E-04		
Th-232	6.0208E-07	19.01	19.01	0.00E+00	1.14E-05	1.14E-05		
Ti-208	8.7573E-05	19.01	19.01	0.00E+00	1.66E-03	1.66E-03		
U-232	2.3706E-04	19.01	19.01	0.00E+00	4.51E-03	4.51E-03	Thermal Power	
U-233	3.6128E-04	19.01	19.01	0.00E+00	6.87E-03	6.87E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.2788E-02	19.01	19.01	0.00E+00	2.43E-01	2.43E-01	1.87E+01	1.90E+01
U-235	5.8772E-04	19.01	19.01	0.00E+00	1.12E-02	1.12E-02	Total	Total
U-236	2.3485E-04	19.01	19.01	0.00E+00	4.46E-03	4.46E-03		
U-238	1.1741E-04	19.01	19.01	0.00E+00	2.23E-03	2.23E-03		
Y-90	1.9804E+01	19.01	19.01	0.00E+00	3.76E+02	3.76E+02		
Other Radionuclides					1.17E+03	1.17E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	LIGHT WATER	(Worst Case)	This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding	SST	SST/Inconel	
BOL HM Constituents	Pu	U, Th, & Pu	
BOL Enrichment %		0 to 100	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		19.01	Nominal burnup set equal to bounding burnup.
Bounding		19.01	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	14.21		601.11
Bounding	14.21		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ERR (ASSEMBLIES)
SNF ID # 68
Fuel Units & Descr: 190 - 5 X 5 ROD ARRAY
Heavy Metal Mass BOL=5056 66kg EOL=5041 023kg
ROD Storage Site INEEL

¹Fuel decay start date 1966
Estimates as of 2010
Template LWBR (Light Water, Zirc, 60 to 100%, Th and U)
²Template Burnup(MWd) 10269 14
Template BOL Heavy Metal Mass (MT) 0 45991251
Template Decay Time 35 years

Estimated
Canister usage
18"x10"
10 56

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9 7360E-05	27,366 64	65,736 58	0 00E+00	2 66E+00	6 40E+00	Avg MeV	
Am-241	2 4345E-04	27,366 64	65,736 58	0 00E+00	6 66E+00	1 60E+01	0 0150	5 424E+15
Am-242m	1 4821E-06	27,366 64	65,736 58	0 00E+00	4 06E-02	9 74E-02	0 0250	1 117E+15
Am-243	3 1152E-07	27,366 64	65,736 58	0 00E+00	8 53E-03	2 05E-02	0 0375	9 545E+14
C-14	9 2432E-05	27,366 64	65,736 58	0 00E+00	2 53E+00	6 08E+00	0 0575	1 043E+15
Cl-36	1 8103E-06	27,366 64	65,736 58	0 00E+00	4 95E-02	1 19E-01	0 0850	6 664E+14
Cm-243	3 0597E-07	27,366 64	65,736 58	0 00E+00	8 37E-03	2 01E-02	0 1250	4 176E+14
Cm-244	1 4149E-05	27,366 64	65,736 58	0 00E+00	3 87E-01	9 30E-01	0 2250	5 976E+14
Co-60	8 7369E-04	27,366 64	65,736 58	0 00E+00	2 39E+01	5 74E+01	0 3750	2 400E+14
Cs-134	2 5601E-05	27,366 64	65,736 58	0 00E+00	7 01E-01	1 68E+00	0 5750	3 664E+15
Cs-135	2 8639E-05	27,366 64	65,736 58	0 00E+00	7 84E-01	1 88E+00	0 8500	6 547E+13
Cs-137	1 4772E+00	27,366 64	65,736 58	0 00E+00	4 04E+04	9 71E+04	1 2500	2 892E+13
Eu-154	8 6025E-03	27,366 64	65,736 58	0 00E+00	2 35E+02	5 65E+02	1 7500	4 511E+12
Eu-155	6 6062E-04	27,366 64	65,736 58	0 00E+00	1 81E+01	4 34E+01	2 2500	1 311E+08
Fe-55	2 3011E-06	27,366 64	65,736 58	0 00E+00	6 30E-02	1 51E-01	2 7500	3 223E+13
H-3	2 1277E-03	27,366 64	65,736 58	0 00E+00	5 82E+01	1 40E+02	3 5000	1 265E+05
I-129	1 5853E-06	27,366 64	65,736 58	0 00E+00	4 34E-02	1 04E-01	5 0000	3 959E+04
Kr-85	6 2625E-02	27,366 64	65,736 58	0 00E+00	1 71E+03	4 12E+03	7 0000	2 882E+03
Np-237	1 2620E-07	27,366 64	65,736 58	0 00E+00	3 45E-03	8 30E-03	11 0000	2 193E+02
Pa-231	1 2017E-04	27,366 64	65,736 58	0 00E+00	3 29E+00	7 90E+00		
Pb-210	1 4247E-08	27,366 64	65,736 58	0 00E+00	3 90E-04	9 37E-04		
Pm-147	2 6224E-04	27,366 64	65,736 58	0 00E+00	7 18E+00	1 72E+01		
Pu-238	4 2477E-04	27,366 64	65,736 58	0 00E+00	1 16E+01	2 79E+01		
Pu-239	2 7519E-05	27,366 64	65,736 58	0 00E+00	7 53E-01	1 81E+00		
Pu-240	1 6184E-05	27,366 64	65,736 58	0 00E+00	4 43E-01	1 06E+00		
Pu-241	1 4695E-03	27,366 64	65,736 58	0 00E+00	4 02E+01	9 66E+01		
Pu-242	4 0831E-08	27,366 64	65,736 58	0 00E+00	1 12E-03	2 68E-03		
Ra-226	2 1423E-08	27,366 64	65,736 58	0 00E+00	5 86E-04	1 41E-03		
Ra-228	4 6236E-06	27,366 64	65,736 58	0 00E+00	1 27E-01	3 04E-01		
Ru-106	4 0208E-11	27,366 64	65,736 58	0 00E+00	1 10E-06	2 64E-06		
Se-79	3 5417E-05	27,366 64	65,736 58	0 00E+00	9 69E-01	2 33E+00		
Sn-126	3 9848E-05	27,366 64	65,736 58	0 00E+00	1 09E+00	2 62E+00		
Sr-90	1 4928E+00	27,366 64	65,736 58	0 00E+00	4 09E+04	9 81E+04		
Tc-99	3 2525E-04	27,366 64	65,736 58	0 00E+00	8 90E+00	2 14E+01		
Th-229	6 4582E-05	27,366 64	65,736 58	0 00E+00	1 77E+00	4 25E+00		
Th-230	1 1432E-06	27,366 64	65,736 58	0 00E+00	3 13E-02	7 52E-02		
Th-232	-9 0328E-08	27,366 64	0 00	5 34E-01	5 32E-01	5 34E-01		
Ti-208	1 3964E-02	27,366 64	65,736 58	0 00E+00	3 82E+02	9 18E+02		
U-232	3 7822E-02	27,366 64	65,736 58	0 00E+00	1 04E+03	2 49E+03		
U-233	-3 3244E-03	27,366 64	0 00	1 80E+03	1 70E+03	1 80E+03		
U-234	8 1769E-04	27,366 64	65,736 58	0 00E+00	2 24E+01	5 38E+01		
U-235	5 7813E-08	27,366 64	65,736 58	3 67E-04	1 95E-03	4 17E-03		
U-236	1 3273E-07	27,366 64	65,736 58	0 00E+00	3 63E-03	8 73E-03		
U-238	-3 1121E-10	27,366 64	0 00	2 35E-04	2 26E-04	2 35E-04		
Y-90	1 4928E+00	27,366 64	65,736 58	0 00E+00	4 09E+04	9 81E+04		
Other Radionuclides					4 57E+04	1 10E+05		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Reactor Moderator	From SFD	Used	Basis for Parameter Differences ¹
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	SST	ZIRC	This Template was used for the following reasons
BOL HM Constituents	Th and U	Th and U	This fuel matches LWBR Template on all but one parameter (cladding) making LWBR a reasonable match.
BOL Enrichment %	92 94902719	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	27,366.64	15,217.35	
Bounding	65,736.58	30,434.70	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup taken directly from SFD (converted to MWd)

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.24	0.56	1.00
Bounding	0.58	0.46	

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ERR (RODS)
SNF ID #: 1057
Fuel Units & Descr. 4 - ROD
Heavy Metal Mass: BOL=4.293kg EOL=4.242kg
ROD Storage Site: INEEL

Fuel decay start date: 1966
Estimates as of: 2010
Template: LWBR (Light Water, Zirc, 60 to 100%, Th and U)
Template Burnup(MWd): 10269 14
Template BOL Heavy Metal Mass (MT): 0.45991251
Template Decay Time: 35 years

Estimated
Canister usage:
18"x10"
0 17

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CvMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9.7360E-05	49.83	99.65	0.00E+00	4.85E-03	9.70E-03	Avg. MeV	
Am-241	2.4345E-04	49.83	99.65	0.00E+00	1.21E-02	2.43E-02	0.0150	8.219E+12
Am-242m	1.4821E-06	49.83	99.65	0.00E+00	7.38E-05	1.48E-04	0.0250	1.693E+12
Am-243	3.1152E-07	49.83	99.65	0.00E+00	1.55E-05	3.10E-05	0.0375	1.447E+12
C-14	9.2432E-05	49.83	99.65	0.00E+00	4.61E-03	9.21E-03	0.0575	1.582E+12
Cl-36	1.8103E-06	49.83	99.65	0.00E+00	9.02E-05	1.80E-04	0.0850	1.010E+12
Cm-243	3.0597E-07	49.83	99.65	0.00E+00	1.52E-05	3.05E-05	0.1250	6.330E+11
Cm-244	1.4149E-05	49.83	99.65	0.00E+00	7.05E-04	1.41E-03	0.2250	9.059E+11
Co-60	8.7369E-04	49.83	99.65	0.00E+00	4.35E-02	8.71E-02	0.3750	3.638E+11
Cs-134	2.5601E-05	49.83	99.65	0.00E+00	1.28E-03	2.55E-03	0.5750	5.554E+12
Cs-135	2.8639E-05	49.83	99.65	0.00E+00	1.43E-03	2.85E-03	0.8500	9.925E+10
Cs-137	1.4772E+00	49.83	99.65	0.00E+00	7.36E+01	1.47E+02	1.2500	4.384E+10
Eu-154	8.6025E-03	49.83	99.65	0.00E+00	4.29E-01	8.57E-01	1.7500	6.838E+09
Eu-155	6.6062E-04	49.83	99.65	0.00E+00	3.29E-02	6.58E-02	2.2500	1.987E+05
Fe-55	2.3011E-06	49.83	99.65	0.00E+00	1.15E-04	2.29E-04	2.7500	4.886E+10
H-3	2.1277E-03	49.83	99.65	0.00E+00	1.06E-01	2.12E-01	3.5000	1.840E+02
I-129	1.5853E-06	49.83	99.65	0.00E+00	7.90E-05	1.58E-04	5.0000	5.768E+01
Kr-85	6.2625E-02	49.83	99.65	0.00E+00	3.12E+00	6.24E+00	7.0000	4.217E+00
Np-237	1.2620E-07	49.83	99.65	0.00E+00	6.29E-06	1.26E-05	11.0000	3.229E-01
Pa-231	1.2017E-04	49.83	99.65	0.00E+00	5.99E-03	1.20E-02		
Pb-210	1.4247E-08	49.83	99.65	0.00E+00	7.10E-07	1.42E-06		
Pm-147	2.6224E-04	49.83	99.65	0.00E+00	1.31E-02	2.61E-02		
Pu-238	4.2477E-04	49.83	99.65	0.00E+00	2.12E-02	4.23E-02		
Pu-239	2.7519E-05	49.83	99.65	0.00E+00	1.37E-03	2.74E-03		
Pu-240	1.6184E-05	49.83	99.65	0.00E+00	8.06E-04	1.61E-03		
Pu-241	1.4695E-03	49.83	99.65	0.00E+00	7.32E-02	1.46E-01		
Pu-242	4.0831E-08	49.83	99.65	0.00E+00	2.03E-06	4.07E-06		
Ra-226	2.1423E-08	49.83	99.65	0.00E+00	1.07E-06	2.13E-06		
Ra-228	4.6236E-06	49.83	99.65	0.00E+00	2.30E-04	4.61E-04		
Ru-106	4.0208E-11	49.83	99.65	0.00E+00	2.00E-09	4.01E-09		
Se-79	3.5417E-05	49.83	99.65	0.00E+00	1.76E-03	3.53E-03		
Sr-126	3.9848E-05	49.83	99.65	0.00E+00	1.99E-03	3.97E-03		
Sr-90	1.4928E+00	49.83	99.65	0.00E+00	7.44E+01	1.49E+02		
Tc-99	3.2525E-04	49.83	99.65	0.00E+00	1.62E-02	3.24E-02		
Th-229	6.4582E-05	49.83	99.65	0.00E+00	3.22E-03	6.44E-03		
Th-230	1.1432E-06	49.83	99.65	0.00E+00	5.70E-05	1.14E-04		
Th-232	-9.0328E-08	49.83	0.00	4.53E-04	4.49E-04	4.53E-04		
Ti-208	1.3964E-02	49.83	99.65	0.00E+00	6.96E-01	1.39E+00		
U-232	3.7822E-02	49.83	99.65	0.00E+00	1.88E+00	3.77E+00		
U-233	-3.3244E-03	49.83	0.00	1.52E+00	1.36E+00	1.52E+00		
U-234	8.1769E-04	49.83	99.65	0.00E+00	4.07E-02	8.15E-02		
U-235	5.7813E-08	49.83	99.65	3.12E-07	3.19E-06	6.07E-06		
U-236	1.3273E-07	49.83	99.65	0.00E+00	6.61E-06	1.32E-05		
U-238	-3.1121E-10	49.83	0.00	1.99E-07	1.84E-07	1.99E-07		
Y-90	1.4928E+00	49.83	99.65	0.00E+00	7.44E+01	1.49E+02		
Other Radionuclides					8.31E+01	1.66E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	SST	ZIRC	
BOL HM Constituents:	Th and U	Th and U	
BOL Enrichment %:	93.0868939	60 to 100	

This Template was used for the following reasons:
This fuel matches LWBR Template on all but one parameter (cladding) making LWBR a reasonable match.

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	28.26	49.83	
Bounding	45.49	99.65	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.52	1.76	
Bounding	1.04	2.19	1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name ESSOR (UALX-HEU) ITALY
SNF ID # 762
Fuel Units & Descr 12 - 18 CURVED PLATES
Heavy Metal Mass BOL=7.8kg EOL=5.73kg
ROD Storage Site SRS

¹Fuel decay start date 2006
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 5 years

Estimated
Canister usage:
18"x10"
1.00

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventones(Ci)	Bounding Fuel Inventones(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	1,960.33	3,920.66	0.00E+00	2.85E-07	5.70E-07	Avg MeV	
Am-241	1.1190E-03	1,960.33	3,920.66	0.00E+00	2.19E+00	4.39E+00	0.0150	7.564E+14
Am-242m	4.5425E-07	1,960.33	3,920.66	0.00E+00	8.90E-04	1.78E-03	0.0250	1.630E+14
Am-243	1.4921E-06	1,960.33	3,920.66	0.00E+00	2.93E-03	5.85E-03	0.0375	1.504E+14
C-14	5.7244E-09	1,960.33	3,920.66	0.00E+00	1.12E-05	2.24E-05	0.0575	1.479E+14
Cl-36	1.3124E-32	1,960.33	3,920.66	0.00E+00	2.57E-29	5.15E-29	0.0850	9.426E+13
Cm-243	2.3676E-07	1,960.33	3,920.66	0.00E+00	4.64E-04	9.28E-04	0.1250	8.163E+13
Cm-244	5.2042E-05	1,960.33	3,920.66	0.00E+00	1.02E-01	2.04E-01	0.2250	7.989E+13
Co-60	3.8208E-05	1,960.33	3,920.66	0.00E+00	7.49E-02	1.50E-01	0.3750	3.867E+13
Cs-134	4.8693E-01	1,960.33	3,920.66	0.00E+00	9.55E+02	1.91E+03	0.5750	5.312E+14
Cs-135	3.4477E-06	1,960.33	3,920.66	0.00E+00	6.76E-03	1.35E-02	0.8500	7.439E+13
Cs-137	2.8731E+00	1,960.33	3,920.66	0.00E+00	5.63E+03	1.13E+04	1.2500	1.384E+13
Eu-154	8.2053E-02	1,960.33	3,920.66	0.00E+00	1.61E+02	3.22E+02	1.7500	5.804E+11
Eu-155	3.9134E-02	1,960.33	3,920.66	0.00E+00	7.67E+01	1.53E+02	2.2500	1.217E+12
Fe-55	6.7429E-03	1,960.33	3,920.66	0.00E+00	1.32E+01	2.64E+01	2.7500	7.004E+09
H-3	1.0599E-02	1,960.33	3,920.66	0.00E+00	2.08E+01	4.16E+01	3.5000	7.767E+08
I-129	7.5300E-07	1,960.33	3,920.66	0.00E+00	1.48E-03	2.95E-03	5.0000	2.323E+03
Kr-85	2.8595E-01	1,960.33	3,920.66	0.00E+00	5.61E+02	1.12E+03	7.0000	2.589E+02
Np-237	9.5479E-06	1,960.33	3,920.66	0.00E+00	1.87E-02	3.74E-02	11.0000	2.918E+01
Pa-231	8.9297E-10	1,960.33	3,920.66	0.00E+00	1.75E-06	3.50E-06		
Pb-210	3.7609E-12	1,960.33	3,920.66	0.00E+00	7.37E-09	1.47E-08		
Pm-147	2.5452E+00	1,960.33	3,920.66	0.00E+00	4.99E+03	9.98E+03		
Pu-238	2.0550E-02	1,960.33	3,920.66	0.00E+00	4.03E+01	8.06E+01		
Pu-239	4.2838E-04	1,960.33	3,920.66	0.00E+00	8.40E-01	1.68E+00		
Pu-240	2.4401E-04	1,960.33	3,920.66	0.00E+00	4.78E-01	9.57E-01		
Pu-241	6.8764E-02	1,960.33	3,920.66	0.00E+00	1.35E+02	2.70E+02		
Pu-242	3.6329E-07	1,960.33	3,920.66	0.00E+00	7.12E-04	1.42E-03		
Ra-226	3.8045E-11	1,960.33	3,920.66	0.00E+00	7.46E-08	1.49E-07		
Ra-228	2.9902E-15	1,960.33	3,920.66	0.00E+00	5.86E-12	1.17E-11		
Ru-106	1.9055E-01	1,960.33	3,920.66	0.00E+00	3.74E+02	7.47E+02		
Se-79	1.2936E-05	1,960.33	3,920.66	0.00E+00	2.54E-02	5.07E-02		
Sn-126	1.1574E-05	1,960.33	3,920.66	0.00E+00	2.27E-02	4.54E-02		
Sr-90	2.7505E+00	1,960.33	3,920.66	0.00E+00	5.39E+03	1.08E+04		
Tc-99	4.2239E-04	1,960.33	3,920.66	0.00E+00	8.28E-01	1.66E+00		
Th-229	1.8848E-12	1,960.33	3,920.66	0.00E+00	3.69E-09	7.39E-09		
Th-230	1.7042E-08	1,960.33	3,920.66	0.00E+00	3.34E-05	6.68E-05		
Th-232	7.8132E-15	1,960.33	3,920.66	0.00E+00	1.53E-11	3.06E-11		
Ti-208	4.4063E-08	1,960.33	3,920.66	0.00E+00	8.64E-05	1.73E-04		
U-232	1.3151E-07	1,960.33	3,920.66	0.00E+00	2.58E-04	5.16E-04		
U-233	1.9564E-09	1,960.33	3,920.66	0.00E+00	3.84E-06	7.67E-06		
U-234	1.8371E-04	1,960.33	3,920.66	0.00E+00	3.60E-01	7.20E-01		
U-235	2.7235E-06	1,960.33	0.00	1.56E-02	1.03E-02	1.56E-02		
U-236	1.5493E-05	1,960.33	3,920.66	0.00E+00	3.04E-02	6.07E-02		
U-238	4.2851E-09	1,960.33	0.00	1.96E-04	1.87E-04	1.96E-04		
Y-90	2.7505E+00	1,960.33	3,920.66	0.00E+00	5.39E+03	1.08E+04		
Other Radionuclides					1.01E+04	2.02E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences
	From SFD	Used	
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %:	92.52828863	60 to 100	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		1,960.33	
Bounding		3,920.66	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.80		
Bounding	1.60		
			1.02

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FMRB (GERMANY)
SNF ID #: 577
Fuel Units & Descr: 92 - MTR TYPE
Heavy Metal Mass: BOL=13 138kg EOL=11 666kg
ROD Storage Site: SRS

¹Fuel decay start date: 1994
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 15 years

Estimated
Canister usage
18"x10"
3 83

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	4 5861E-10	1,394 01	2,788 03	0 00E+00	6 39E-07	1 28E-06	Avg. MeV	
Am-241	1 7832E-03	1,394 01	2,788 03	0 00E+00	2 49E+00	4 97E+00	0.0150	3.326E+14
Am-242m	4 3410E-07	1,394 01	2,788 03	0 00E+00	6 05E-04	1 21E-03	0.0250	6.936E+13
Am-243	1 4907E-06	1,394 01	2,788 03	0 00E+00	2 08E-03	4 16E-03	0.0375	6.057E+13
C-14	5 7162E-09	1,394 01	2,788 03	0 00E+00	7 97E-06	1 59E-05	0.0575	6.458E+13
Ct-36	1 3124E-32	1,394 01	2,788 03	0 00E+00	1 83E-29	3 66E-29	0.0850	3.912E+13
Cm-243	1 8568E-07	1,394 01	2,788 03	0 00E+00	2 59E-04	5 18E-04	0.1250	2.682E+13
Cm-244	3 5512E-05	1,394 01	2,788 03	0 00E+00	4 95E-02	9 90E-02	0.2250	3.370E+13
Co-60	1 0261E-05	1,394 01	2,788 03	0 00E+00	1 43E-02	2 86E-02	0.3750	1.476E+13
Cs-134	1 6931E-02	1,394 01	2,788 03	0 00E+00	2 36E+01	4 72E+01	0.5750	2.396E+14
Cs-135	3 4477E-06	1,394 01	2,788 03	0 00E+00	4 81E-03	9 61E-03	0.8500	5.693E+12
Cs-137	2 2800E+00	1,394 01	2,788 03	0 00E+00	3.18E+03	6 36E+03	1.2500	2.876E+12
Eu-154	3 6656E-02	1,394 01	2,788 03	0 00E+00	5 11E+01	1 02E+02	1.7500	1.205E+11
Eu-155	9 6841E-03	1,394 01	2,788 03	0 00E+00	1 35E+01	2 70E+01	2.2500	1.507E+08
Fe-55	4 6977E-04	1,394 01	2,788 03	0 00E+00	6 55E-01	1 31E+00	2.7500	9.059E+06
H-3	6 0485E-03	1,394 01	2,788 03	0 00E+00	8 43E+00	1 69E+01	3.5000	5.758E+05
I-129	7 5300E-07	1,394 01	2,788 03	0 00E+00	1.05E-03	2 10E-03	5.0000	1.333E+03
Kr-85	1 4989E-01	1,394 01	2,788 03	0 00E+00	2 09E+02	4 18E+02	7.0000	1.476E+02
Np-237	9 5534E-06	1,394 01	2,788 03	0 00E+00	1.33E-02	2 66E-02	11.0000	1.657E+01
Pa-231	1 6550E-09	1,394 01	2,788 03	0 00E+00	2 31E-06	4 61E-06		
Pb-210	2 6631E-11	1,394 01	2,788 03	0 00E+00	3 71E-08	7 42E-08		
Pm-147	1 8156E-01	1,394 01	2,788 03	0 00E+00	2 53E+02	5 06E+02		
Pu-238	1 8990E-02	1,394 01	2,788 03	0 00E+00	2 65E+01	5.29E+01		
Pu-239	4 2838E-04	1,394 01	2,788 03	0 00E+00	5 97E-01	1 19E+00		
Pu-240	2 4379E-04	1,394 01	2,788 03	0 00E+00	3 40E-01	6 80E-01		
Pu-241	4 2511E-02	1,394 01	2,788 03	0 00E+00	5 93E+01	1.19E+02		
Pu-242	3 6329E-07	1,394 01	2,788 03	0 00E+00	5 06E-04	1 01E-03		
Ra-226	1 4725E-10	1,394 01	2,788 03	0 00E+00	2 05E-07	4 11E-07		
Ra-228	8 9760E-15	1,394 01	2,788 03	0 00E+00	1.25E-11	2 50E-11		
Ru-106	1 9752E-04	1,394 01	2,788 03	0 00E+00	2.75E-01	5 51E-01		
Se-79	1 2933E-05	1,394 01	2,788 03	0 00E+00	1 80E-02	3 61E-02		
Sn-126	1.1574E-05	1,394 01	2,788 03	0 00E+00	1 61E-02	3.23E-02		
Sr-90	2.1680E+00	1,394 01	2,788 03	0 00E+00	3 02E+03	6 04E+03		
Tc-99	4.2239E-04	1,394 01	2,788 03	0 00E+00	5 89E-01	1 18E+00		
Th-229	3.9270E-12	1,394 01	2,788 03	0 00E+00	5 47E-09	1 09E-08		
Th-230	3 3578E-08	1,394 01	2,788 03	0 00E+00	4 68E-05	9 36E-05		
Th-232	1 5452E-14	1,394 01	2,788 03	0 00E+00	2.15E-11	4 31E-11		
Th-208	4 6705E-08	1,394 01	2,788 03	0 00E+00	6 51E-05	1 30E-04		
U-232	1 3045E-07	1,394 01	2,788 03	0 00E+00	1 82E-04	3 64E-04		
U-233	2 2739E-09	1,394 01	2,788 03	0 00E+00	3 31E-06	6 62E-06		
U-234	1 8423E-04	1,394 01	2,788 03	0 00E+00	2 57E-01	5 14E-01		
U-235	-2.7235E-06	1,394 01	0 00	2.59E-02	2 21E-02	2 59E-02		
U-236	1 5493E-05	1,394 01	2,788 03	0 00E+00	2 16E-02	4 32E-02		
U-238	-4 2851E-09	1,394 01	0 00	3 86E-04	3 80E-04	3 86E-04		
Y-90	2.1686E+00	1,394 01	2,788 03	0 00E+00	3 02E+03	6 05E+03		
Other Radionuclides					3 03E+03	6 06E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	91.25787542	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		1 394 01	
Bounding		2 788 03	

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.34		
Bounding	0.67		

1.01

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRG-1 (U308 LEU) GERMANY
SNF ID # 581
Fuel Units & Descr 7 - MTR TYPE
Heavy Metal Mass BOL=9 566kg EOL=8 635kg
ROD Storage Site SRS

¹Fuel decay start date 1994
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup (MWd) 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 15 years

Estimated
Canister usage
18"x10"
0 29

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Avg MeV	
Ac-227	4 5861E-10	881.01	1,762.02	0 00E+00	4 04E-07	8.08E-07	0 0150	2 102E+14
Am-241	1 7832E-03	881.01	1,762.02	0 00E+00	1 57E+00	3 14E+00	0 0250	4.384E+13
Am-242m	4.3410E-07	881.01	1,762.02	0 00E+00	3 82E-04	7.65E-04	0 0375	3.828E+13
Am-243	1.4907E-06	881.01	1,762.02	0 00E+00	1 31E-03	2 63E-03	0 0575	4 082E+13
C-14	5 7162E-09	881.01	1,762.02	0 00E+00	5 04E-06	1 01E-05	0 0850	2 472E+13
Cl-36	1.3124E-32	881.01	1,762.02	0 00E+00	1 16E-29	2 31E-29	0 1250	1 695E+13
Cm-243	1 8568E-07	881.01	1,762.02	0 00E+00	1 64E-04	3 27E-04	0.2250	2.130E+13
Cm-244	3 5512E-05	881.01	1,762.02	0 00E+00	3 13E-02	6 26E-02	0.3750	9 331E+12
Co-60	1 0261E-05	881.01	1,762.02	0 00E+00	9 04E-03	1 81E-02	0.5750	1.515E+14
Cs-134	1 6931E-02	881.01	1,762.02	0 00E+00	1 49E+01	2 98E+01	0.8500	3.598E+12
Cs-135	3 4477E-06	881.01	1,762.02	0 00E+00	3 04E-03	6 07E-03	1.2500	1.817E+12
Cs-137	2 2800E+00	881.01	1,762.02	0 00E+00	2 01E+03	4 02E+03	1 7500	7 615E+10
Eu-154	3 6656E-02	881.01	1,762.02	0 00E+00	3.23E+01	6 46E+01	2.2500	9.526E+07
Eu-155	9 6841E-03	881.01	1,762.02	0 00E+00	8.53E+00	1 71E+01	2 7500	5 725E+06
Fe-55	4 6977E-04	881.01	1,762.02	0 00E+00	4 14E-01	8.28E-01	3.5000	3 639E+05
H-3	6 0485E-03	881.01	1,762.02	0 00E+00	5 33E+00	1.07E+01	5 0000	8 474E+02
I-129	7.5300E-07	881.01	1,762.02	0 00E+00	6 63E-04	1.33E-03	7 0000	9 387E+01
Kr-85	1.4989E-01	881.01	1,762.02	0 00E+00	1 32E+02	2 64E+02	11 0000	1 054E+01
Np-237	9 5534E-06	881.01	1,762.02	0 00E+00	8 42E-03	1 68E-02		
Pa-231	1 6550E-09	881.01	1,762.02	0 00E+00	1 46E-06	2 92E-06		
Pb-210	2 6631E-11	881.01	1,762.02	0 00E+00	2.35E-08	4 69E-08		
Pm-147	1 8156E-01	881.01	1,762.02	0 00E+00	1 60E+02	3 20E+02		
Pu-238	1 8990E-02	881.01	1,762.02	0 00E+00	1 67E+01	3 35E+01		
Pu-239	4 2838E-04	881.01	1,762.02	0 00E+00	3 77E-01	7.55E-01		
Pu-240	2 4379E-04	881.01	1,762.02	0 00E+00	2 15E-01	4 30E-01		
Pu-241	4 2511E-02	881.01	1,762.02	0 00E+00	3 75E+01	7 49E+01		
Pu-242	3 6329E-07	881.01	1,762.02	0 00E+00	3.20E-04	6 40E-04		
Ra-226	1 4725E-10	881.01	1,762.02	0 00E+00	1.30E-07	2.59E-07		
Ra-228	8 9760E-15	881.01	1,762.02	0 00E+00	7 91E-12	1.58E-11		
Ru-106	1 9752E-04	881.01	1,762.02	0 00E+00	1 74E-01	3 48E-01		
Se-79	1 2933E-05	881.01	1,762.02	0 00E+00	1 14E-02	2 28E-02		
Sn-126	1 1574E-05	881.01	1,762.02	0 00E+00	1 02E-02	2 04E-02		
Sr-90	2 1680E+00	881.01	1,762.02	0 00E+00	1 91E+03	3 82E+03		
Tc-99	4 2239E-04	881.01	1,762.02	0 00E+00	3 72E-01	7 44E-01		
Th-229	3 9270E-12	881.01	1,762.02	0 00E+00	3 46E-09	6 92E-09		
Th-230	3 3578E-08	881.01	1,762.02	0 00E+00	2 96E-05	5 92E-05		
Th-232	1 5452E-14	881.01	1,762.02	0 00E+00	1.36E-11	2 72E-11		
Ti-208	4 6705E-08	881.01	1,762.02	0 00E+00	4.11E-05	8.23E-05		
U-232	1 3045E-07	881.01	1,762.02	0 00E+00	1.15E-04	2.30E-04		
U-233	2 3739E-09	881.01	1,762.02	0 00E+00	2 09E-06	4 18E-06		
U-234	1 8423E-04	881.01	1,762.02	0 00E+00	1 62E-01	3.25E-01		
U-235	-2.7235E-06	881.01	0 00	4.08E-03	1 68E-03	4 08E-03		
U-236	1 5493E-05	881.01	1,762.02	0 00E+00	1.36E-02	2 73E-02		
U-238	-4 2851E-09	881.01	0 00	2.58E-03	2 58E-03	2 58E-03		
Y-90	2 1686E+00	881.01	1,762.02	0 00E+00	1 91E+03	3 82E+03		
Other Radionuclides					1 92E+03	3 83E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19 73077542	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Nominal		881.01	
Bounding		1,762.02	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 1.01
Nominal	0.29		
Bounding	0.59		

¹Reactor shutdown, core removal, storage shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRG-1 (U3S2 LEU) GERMANY
 SNF ID #: 741
 Fuel Units & Descr: 109 - MTR TYPE
 Heavy Metal Mass: BOL=161.56kg, EOL=150.932kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1994
 Estimates as of: 2010
 Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 15 years

Estimated
 Canister usage
 18"x10"
 4.54

II. Estimates	m	X _n	X _b	b	Y _n	Y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	10,064.45	20,128.90	0.00E+00	4.62E-06	9.23E-06	Avg MeV	
Am-241	1.7832E-03	10,064.45	20,128.90	0.00E+00	1.79E+01	3.59E+01	0.0150	2.401E+15
Am-242m	4.3410E-07	10,064.45	20,128.90	0.00E+00	4.37E-03	8.74E-03	0.0250	5.008E+14
Am-243	1.4907E-06	10,064.45	20,128.90	0.00E+00	1.50E-02	3.00E-02	0.0375	4.373E+14
C-14	5.7162E-09	10,064.45	20,128.90	0.00E+00	5.75E-05	1.15E-04	0.0575	4.663E+14
Cl-36	1.3124E-32	10,064.45	20,128.90	0.00E+00	1.32E-28	2.64E-28	0.0850	2.824E+14
Cm-243	1.8568E-07	10,064.45	20,128.90	0.00E+00	1.87E-03	3.74E-03	0.1250	1.936E+14
Cm-244	3.5512E-05	10,064.45	20,128.90	0.00E+00	3.57E-01	7.15E-01	0.2250	2.433E+14
Co-60	1.0261E-05	10,064.45	20,128.90	0.00E+00	1.03E-01	2.07E-01	0.3750	1.066E+14
Cs-134	1.6931E-02	10,064.45	20,128.90	0.00E+00	1.70E+02	3.41E+02	0.5750	1.730E+15
Cs-135	3.4477E-06	10,064.45	20,128.90	0.00E+00	3.47E-02	6.94E-02	0.8500	4.110E+13
Cs-137	2.2800E+00	10,064.45	20,128.90	0.00E+00	2.29E+04	4.59E+04	1.2500	2.076E+13
Eu-154	3.6656E-02	10,064.45	20,128.90	0.00E+00	3.69E+02	7.38E+02	1.7500	8.699E+11
Eu-155	9.6841E-03	10,064.45	20,128.90	0.00E+00	9.75E+01	1.95E+02	2.2500	1.086E+09
Fe-55	4.6977E-04	10,064.45	20,128.90	0.00E+00	4.73E+00	9.46E+00	2.7500	6.540E+07
H-3	6.0485E-03	10,064.45	20,128.90	0.00E+00	6.09E+01	1.22E+02	3.5000	4.157E+06
I-129	7.5300E-07	10,064.45	20,128.90	0.00E+00	7.58E-03	1.52E-02	5.0000	9.713E+03
Kr-85	1.4989E-01	10,064.45	20,128.90	0.00E+00	1.51E+03	3.02E+03	7.0000	1.076E+03
Np-237	9.5534E-06	10,064.45	20,128.90	0.00E+00	9.61E-02	1.92E-01	11.0000	1.209E+02
Pa-231	1.6550E-09	10,064.45	20,128.90	0.00E+00	1.67E-05	3.33E-05		
Pb-210	2.6631E-11	10,064.45	20,128.90	0.00E+00	2.68E-07	5.36E-07		
Pm-147	1.8156E-01	10,064.45	20,128.90	0.00E+00	1.83E+03	3.65E+03		
Pu-238	1.8990E-02	10,064.45	20,128.90	0.00E+00	1.91E+02	3.82E+02		
Pu-239	4.2838E-04	10,064.45	20,128.90	0.00E+00	4.31E+00	8.62E+00		
Pu-240	2.4379E-04	10,064.45	20,128.90	0.00E+00	2.45E+00	4.91E+00		
Pu-241	4.2511E-02	10,064.45	20,128.90	0.00E+00	4.28E+02	8.56E+02		
Pu-242	3.6329E-07	10,064.45	20,128.90	0.00E+00	3.66E-03	7.31E-03		
Ra-226	1.4725E-10	10,064.45	20,128.90	0.00E+00	1.48E-06	2.96E-06		
Ra-228	8.9760E-15	10,064.45	20,128.90	0.00E+00	9.03E-11	1.81E-10		
Ru-106	1.9752E-04	10,064.45	20,128.90	0.00E+00	1.99E+00	3.98E+00		
Se-79	1.2933E-05	10,064.45	20,128.90	0.00E+00	1.30E-01	2.60E-01		
Sn-126	1.1574E-05	10,064.45	20,128.90	0.00E+00	1.16E-01	2.33E-01		
Sr-90	2.1680E+00	10,064.45	20,128.90	0.00E+00	2.18E+04	4.36E+04		
Tc-99	4.2239E-04	10,064.45	20,128.90	0.00E+00	4.25E+00	8.50E+00		
Th-229	3.9270E-12	10,064.45	20,128.90	0.00E+00	3.95E-08	7.90E-08		
Th-230	3.3578E-08	10,064.45	20,128.90	0.00E+00	3.38E-04	6.76E-04		
Th-232	1.5452E-14	10,064.45	20,128.90	0.00E+00	1.56E-10	3.11E-10		
Th-208	4.6705E-08	10,064.45	20,128.90	0.00E+00	4.70E-04	9.40E-04		
U-232	1.3045E-07	10,064.45	20,128.90	0.00E+00	1.31E-03	2.63E-03		
U-233	2.3739E-09	10,064.45	20,128.90	0.00E+00	2.39E-05	4.78E-05		
U-234	1.8423E-04	10,064.45	20,128.90	0.00E+00	1.85E+00	3.71E+00		
U-235	-2.7235E-06	10,064.45	0.00	6.92E-02	4.18E-02	6.92E-02		
U-236	1.5493E-05	10,064.45	20,128.90	0.00E+00	1.56E-01	3.12E-01		
U-238	-4.2851E-09	10,064.45	0.00	4.35E-02	4.35E-02	4.35E-02		
Y-90	2.1686E+00	10,064.45	20,128.90	0.00E+00	2.18E+04	4.37E+04		
Other Radionuclides					2.19E+04	4.38E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

From SFD		Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19.81106509	60 to 100	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)²

From SFD		Estimated	Basis for burnup used in estimate:
Nominal		10,064.45	
Bounding		20,128.90	
			Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup

Checks

Burnup Multiplier		Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.20		
Bounding	0.40		
			1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRG-1 (UALX HEU) GERMANY
SNF ID #: 742
Fuel Units & Descr: 141 - MTR TYPE
Heavy Metal Mass BOL=23.42kg EOL=16.539kg
ROD Storage Site: SRS

Fuel decay start date: 1995
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
*Template Burnup(MWD) 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 15 years

Estimated
Canister usage
18"x10"
5.88

II. Estimates							Gamma Sources	
	m	x _n	x _b	b	y _n	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	4.5861E-10	6,516.25	13,032.50	0.00E+00	2.99E-06	5.98E-06	Avg MeV	
Am-241	1.7832E-03	6,516.25	13,032.50	0.00E+00	1.16E+01	2.32E+01	0.0150	1.555E+15
Am-242m	4.3410E-07	6,516.25	13,032.50	0.00E+00	2.83E-03	5.66E-03	0.0250	3.242E+14
Am-243	1.4907E-06	6,516.25	13,032.50	0.00E+00	9.71E-03	1.94E-02	0.0375	2.831E+14
C-14	5.7162E-09	6,516.25	13,032.50	0.00E+00	3.72E-05	7.45E-05	0.0575	3.019E+14
Cl-36	1.3124E-32	6,516.25	13,032.50	0.00E+00	8.55E-29	1.71E-28	0.0850	1.829E+14
Cm-243	1.8568E-07	6,516.25	13,032.50	0.00E+00	1.21E-03	2.42E-03	0.1250	1.254E+14
Cm-244	3.5512E-05	6,516.25	13,032.50	0.00E+00	2.31E-01	4.63E-01	0.2250	1.575E+14
Co-60	1.0261E-05	6,516.25	13,032.50	0.00E+00	6.69E-02	1.34E-01	0.3750	6.902E+13
Cs-134	1.6931E-02	6,516.25	13,032.50	0.00E+00	1.10E+02	2.21E+02	0.5750	1.120E+15
Cs-135	3.4477E-06	6,516.25	13,032.50	0.00E+00	2.25E-02	4.49E-02	0.8500	2.661E+13
Cs-137	2.2800E+00	6,516.25	13,032.50	0.00E+00	1.49E+04	2.97E+04	1.2500	1.344E+13
Eu-154	3.6656E-02	6,516.25	13,032.50	0.00E+00	2.39E+02	4.78E+02	1.7500	5.632E+11
Eu-155	9.6841E-03	6,516.25	13,032.50	0.00E+00	6.31E+01	1.26E+02	2.2500	7.046E+08
Fe-55	4.6977E-04	6,516.25	13,032.50	0.00E+00	3.06E+00	6.12E+00	2.7500	4.235E+07
H-3	6.0485E-03	6,516.25	13,032.50	0.00E+00	3.94E+01	7.88E+01	3.5000	2.691E+06
I-129	7.5300E-07	6,516.25	13,032.50	0.00E+00	4.91E-03	9.81E-03	5.0000	6.225E+03
Kr-85	1.4989E-01	6,516.25	13,032.50	0.00E+00	9.77E+02	1.95E+03	7.0000	6.894E+02
Np-237	9.5534E-06	6,516.25	13,032.50	0.00E+00	6.23E-02	1.25E-01	11.0000	7.741E+01
Pa-231	1.6550E-09	6,516.25	13,032.50	0.00E+00	1.08E-05	2.16E-05		
Pb-210	2.6631E-11	6,516.25	13,032.50	0.00E+00	1.74E-07	3.47E-07		
Pm-147	1.8156E-01	6,516.25	13,032.50	0.00E+00	1.18E+03	2.37E+03		
Pu-238	1.8990E-02	6,516.25	13,032.50	0.00E+00	1.24E+02	2.47E+02		
Pu-239	4.2838E-04	6,516.25	13,032.50	0.00E+00	2.79E+00	5.58E+00		
Pu-240	2.4379E-04	6,516.25	13,032.50	0.00E+00	1.59E+00	3.18E+00		
Pu-241	4.2511E-02	6,516.25	13,032.50	0.00E+00	2.77E+02	5.54E+02		
Pu-242	3.6329E-07	6,516.25	13,032.50	0.00E+00	2.37E-03	4.73E-03		
Ra-226	1.4725E-10	6,516.25	13,032.50	0.00E+00	9.60E-07	1.92E-06		
Ra-228	8.9760E-15	6,516.25	13,032.50	0.00E+00	5.85E-11	1.17E-10		
Ru-106	1.9752E-04	6,516.25	13,032.50	0.00E+00	1.29E+00	2.57E+00		
Se-79	1.2933E-05	6,516.25	13,032.50	0.00E+00	8.43E-02	1.69E-01		
Sn-126	1.1574E-05	6,516.25	13,032.50	0.00E+00	7.54E-02	1.51E-01		
Sr-90	2.1680E+00	6,516.25	13,032.50	0.00E+00	1.41E+04	2.83E+04		
Tc-99	4.2239E-04	6,516.25	13,032.50	0.00E+00	2.75E+00	5.50E+00		
Th-229	3.9270E-12	6,516.25	13,032.50	0.00E+00	2.56E-08	5.12E-08		
Th-230	3.3578E-08	6,516.25	13,032.50	0.00E+00	2.19E-04	4.38E-04		
Th-232	1.5452E-14	6,516.25	13,032.50	0.00E+00	1.01E-10	2.01E-10		
Ti-208	4.6705E-08	6,516.25	13,032.50	0.00E+00	3.04E-04	6.09E-04		
U-232	1.3045E-07	6,516.25	13,032.50	0.00E+00	8.50E-04	1.70E-03	Thermal Power	
U-233	2.3739E-09	6,516.25	13,032.50	0.00E+00	1.55E-05	3.09E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8423E-04	6,516.25	13,032.50	0.00E+00	1.20E+00	2.40E+00		
U-235	2.7235E-06	6,516.25	0.00	4.70E-02	2.92E-02	4.70E-02		
U-236	1.5493E-05	6,516.25	13,032.50	0.00E+00	1.01E-01	2.02E-01	1.76E+02	3.53E+02
U-238	4.2851E-09	6,516.25	0.00	5.63E-04	5.35E-04	5.63E-04	Total	Total
Y-90	2.1686E+00	6,516.25	13,032.50	0.00E+00	1.41E+04	2.83E+04		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences*
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	92.84381755	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		6,516.25	
Bounding		13,032.50	

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.88		
Bounding	1.77		

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRJ (UALX-HEU) GERMANY
SNF ID #: 933
Fuel Units & Descr: 195 - CONCENTRIC TUBES
Heavy Metal Mass: BOL=39 312kg; EOL=26.871kg
ROD Storage Site: SRS

¹Fuel decay start date: 1995
Estimates as of: 2010
Template: HFBR (Heavy Water, Alum, 40 to 100% U)
²Template Burnup(MWd): 164.6
Template BOL Heavy Metal Mass (MT): 0.000377
Template Decay Time: 15 years

Estimated
Canister usage
18"x10"
5.42

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.1567E-10	11,459.44	22,918.88	0.00E+00	2.47E-06	4.94E-06	Avg. MeV	
Am-241	7.1264E-03	11,459.44	22,918.88	0.00E+00	8.17E+01	1.63E+02	0.0150	2.740E+15
Am-242m	1.4010E-06	11,459.44	22,918.88	0.00E+00	1.61E-02	3.21E-02	0.0250	5.663E+14
Am-243	3.7114E-05	11,459.44	22,918.88	0.00E+00	4.25E-01	8.51E-01	0.0375	5.074E+14
C-14	2.6476E-08	11,459.44	22,918.88	0.00E+00	3.03E-04	6.07E-04	0.0575	5.316E+14
Cl-36	4.4441E-31	11,459.44	22,918.88	0.00E+00	5.09E-27	1.02E-26	0.0850	3.245E+14
Cm-243	6.4399E-06	11,459.44	22,918.88	0.00E+00	7.38E-02	1.48E-01	0.1250	2.357E+14
Cm-244	5.6367E-03	11,459.44	22,918.88	0.00E+00	6.46E+01	1.29E+02	0.2250	2.776E+14
Co-60	9.3864E-05	11,459.44	22,918.88	0.00E+00	1.08E+00	2.15E+00	0.3750	1.206E+14
Cs-134	5.7047E-02	11,459.44	22,918.88	0.00E+00	6.54E+02	1.31E+03	0.5750	2.020E+15
Cs-135	4.2564E-06	11,459.44	22,918.88	0.00E+00	4.88E-02	9.76E-02	0.8500	9.318E+13
Cs-137	2.2855E+00	11,459.44	22,918.88	0.00E+00	2.62E+04	5.24E+04	1.2500	4.403E+13
Eu-154	7.7704E-02	11,459.44	22,918.88	0.00E+00	8.90E+02	1.78E+03	1.7500	1.536E+12
Eu-155	2.8736E-02	11,459.44	22,918.88	0.00E+00	3.29E+02	6.59E+02	2.2500	1.340E+09
Fe-55	5.1379E-03	11,459.44	22,918.88	0.00E+00	5.89E+01	1.18E+02	2.7500	8.390E+07
H-3	6.1239E-03	11,459.44	22,918.88	0.00E+00	7.02E+01	1.40E+02	3.5000	7.370E+06
I-129	6.6403E-07	11,459.44	22,918.88	0.00E+00	7.61E-03	1.52E-02	5.0000	8.266E+05
Kr-85	1.4927E-01	11,459.44	22,918.88	0.00E+00	1.71E+03	3.42E+03	7.0000	9.495E+04
Np-237	3.1525E-05	11,459.44	22,918.88	0.00E+00	3.61E-01	7.23E-01	11.0000	1.088E+04
Pa-231	7.8676E-10	11,459.44	22,918.88	0.00E+00	9.02E-06	1.80E-05		
Pb-210	6.1847E-12	11,459.44	22,918.88	0.00E+00	7.09E-08	1.42E-07		
Pm-147	9.1373E-02	11,459.44	22,918.88	0.00E+00	1.05E+03	2.09E+03		
Pu-238	1.5978E-01	11,459.44	22,918.88	0.00E+00	1.83E+03	3.66E+03		
Pu-239	6.9502E-04	11,459.44	22,918.88	0.00E+00	7.96E+00	1.59E+01		
Pu-240	3.7424E-04	11,459.44	22,918.88	0.00E+00	4.29E+00	8.58E+00		
Pu-241	1.7090E-01	11,459.44	22,918.88	0.00E+00	1.96E+03	3.92E+03		
Pu-242	3.0911E-06	11,459.44	22,918.88	0.00E+00	3.54E-02	7.08E-02		
Ra-226	3.4848E-11	11,459.44	22,918.88	0.00E+00	3.99E-07	7.99E-07		
Ra-228	9.6173E-15	11,459.44	22,918.88	0.00E+00	1.10E-10	2.20E-10		
Ru-106	2.2789E-04	11,459.44	22,918.88	0.00E+00	2.61E+00	5.22E+00		
Sa-79	1.2339E-05	11,459.44	22,918.88	0.00E+00	1.41E-01	2.83E-01		
Sn-126	1.0194E-05	11,459.44	22,918.88	0.00E+00	1.17E-01	2.34E-01		
Sr-90	2.1476E+00	11,459.44	22,918.88	0.00E+00	2.46E+04	4.92E+04		
Tc-99	3.8056E-04	11,459.44	22,918.88	0.00E+00	4.36E+00	8.72E+00		
Th-229	3.3026E-12	11,459.44	22,918.88	0.00E+00	3.78E-08	7.57E-08		
Th-230	8.2503E-09	11,459.44	22,918.88	0.00E+00	9.45E-05	1.89E-04		
Th-232	1.6586E-14	11,459.44	22,918.88	0.00E+00	1.90E-10	3.80E-10		
Th-208	4.8827E-08	11,459.44	22,918.88	0.00E+00	5.60E-04	1.12E-03		
U-232	1.3821E-07	11,459.44	22,918.88	0.00E+00	1.58E-03	3.17E-03		
U-233	3.0790E-09	11,459.44	22,918.88	0.00E+00	3.53E-05	7.06E-05		
U-234	4.9915E-05	11,459.44	22,918.88	0.00E+00	5.72E-01	1.14E+00		
U-235	-2.8661E-06	11,459.44	0.00	6.79E-02	3.50E-02	6.79E-02		
U-236	1.6701E-05	11,459.44	22,918.88	0.00E+00	1.91E-01	3.83E-01		
U-238	-9.4194E-09	11,459.44	0.00	2.66E-03	2.55E-03	2.66E-03		
Y-90	2.1482E+00	11,459.44	22,918.88	0.00E+00	2.46E+04	4.92E+04		
Other Radionuclides					2.51E+04	5.02E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator: Fuel Cladding: BOL HM Constituents: BOL Enrichment %	From SFD	Used	
	HEAVY WATER	HEAVY WATER	
	ALUM	ALUM	
	U	U	
	79.89992512	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal Bounding	From SFD	Estimated	
		11.459.44 22,918.88	

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
Nominal Bounding	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0.67 1.34		

1.01

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRJ (UALX-MEU) GERMANY
 SNF ID # 1000
 Fuel Units & Descr 10 - CONCENTRIC TUBES
 Heavy Metal Mass BOL=3 781kg; EOL=3.338kg
 ROD Storage Site SRS

¹Fuel decay start date 1993
 Estimates as of 2010
 Template HFBR (Heavy Water, Alum, 40 to 100% U)
²Template Burnup(MWd) 164 6
 Template BOL Heavy Metal Mass (MT) 0 000377
 Template Decay Time 15 years

Estimated
 Canister usage
 18"x10"
 0.28

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventones(Ci)	Bounding Fuel Inventones(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.1567E-10	408 05	816 10	0 00E+00	8 80E-08	1.76E-07	Avg MeV	
Am-241	7.1264E-03	408 05	816 10	0 00E+00	2 91E+00	5 82E+00	0 0150	9 756E+13
Am-242m	1 4010E-06	408 05	816 10	0 00E+00	5 72E-04	1.14E-03	0 0250	2 017E+13
Am-243	3 7114E-05	408 05	816 10	0 00E+00	1 51E-02	3 03E-02	0 0375	1 807E+13
C-14	2 6476E-08	408 05	816 10	0 00E+00	1 08E-05	2.16E-05	0 0575	1 893E+13
Cf-252	4 4441E-31	408 05	816 10	0 00E+00	1 81E-28	3 63E-28	0 0850	1 156E+13
Cm-243	6 4399E-06	408 05	816 10	0 00E+00	2 63E-03	5.26E-03	0 1250	8 394E+12
Cm-244	5 6367E-03	408 05	816 10	0 00E+00	2 30E+00	4 60E+00	0 2250	9 884E+12
Co-60	9 3864E-05	408 05	816 10	0 00E+00	3 83E-02	7.66E-02	0 3750	4 293E+12
Cs-134	5 7047E-02	408 05	816 10	0 00E+00	2 33E+01	4 66E+01	0 5750	7 192E+13
Cs-135	4 2564E-06	408 05	816 10	0 00E+00	1.74E-03	3 47E-03	0 8500	3 318E+12
Cs-137	2 2855E+00	408 05	816 10	0 00E+00	9 33E+02	1.87E+03	1 2500	1 568E+12
Eu-154	7 7704E-02	408 05	816 10	0 00E+00	3 17E+01	6.34E+01	1 7500	5 469E+10
Eu-155	2 8736E-02	408 05	816 10	0 00E+00	1.17E+01	2.35E+01	2 2500	4 771E+07
Fe-55	5 1379E-03	408 05	816 10	0 00E+00	2 10E+00	4 19E+00	2 7500	2 987E+06
H-3	6 1239E-03	408 05	816 10	0 00E+00	2.50E+00	5 00E+00	3 5000	2 624E+05
I-129	6 6403E-07	408 05	816 10	0 00E+00	2.71E-04	5 42E-04	5 0000	2 943E+04
Kr-85	1 4927E-01	408 05	816 10	0 00E+00	6.09E+01	1.22E+02	7 0000	3 381E+03
Np-237	3 1525E-05	408 05	816 10	0 00E+00	1.29E-02	2 57E-02	11 0000	3 876E+02
Pa-231	7 8676E-10	408 05	816 10	0 00E+00	3.21E-07	6 42E-07		
Pb-210	6 1847E-12	408 05	816 10	0 00E+00	2 52E-09	5 05E-09		
Pm-147	9 1373E-02	408 05	816 10	0 00E+00	3 73E+01	7 46E+01		
Pu-238	1 5978E-01	408 05	816 10	0 00E+00	6 52E+01	1 30E+02		
Pu-239	6 9502E-04	408 05	816 10	0 00E+00	2 84E-01	5 67E-01		
Pu-240	3 7424E-04	408 05	816 10	0 00E+00	1.53E-01	3 05E-01		
Pu-241	1 7090E-01	408 05	816 10	0 00E+00	6 97E+01	1 39E+02		
Pu-242	3 0911E-06	408 05	816 10	0 00E+00	1 26E-03	2 52E-03		
Ra-226	3 4848E-11	408 05	816 10	0 00E+00	1 42E-08	2 84E-08		
Ra-228	9 6173E-15	408 05	816 10	0 00E+00	3 92E-12	7 85E-12		
Ru-106	2 2789E-04	408 05	816 10	0 00E+00	9 30E-02	1 86E-01		
Se-79	1 2339E-05	408 05	816 10	0 00E+00	5 03E-03	1.01E-02		
Sn-126	1 0194E-05	408 05	816 10	0 00E+00	4 16E-03	8.32E-03		
Sr-90	2 1476E+00	408 05	816 10	0 00E+00	8 76E+02	1 75E+03		
Tc-99	3 8056E-04	408 05	816 10	0 00E+00	1 55E-01	3.11E-01		
Th-229	3 3026E-12	408 05	816 10	0 00E+00	1 35E-09	2 70E-09		
Th-230	8 2503E-09	408 05	816 10	0 00E+00	3 37E-06	6 73E-06		
Th-232	1 6586E-14	408 05	816 10	0 00E+00	6 77E-12	1.35E-11		
Th-208	4 8827E-08	408 05	816 10	0 00E+00	1 99E-05	3 98E-05		
U-232	1 3821E-07	408 05	816 10	0 00E+00	5 64E-05	1.13E-04		
U-233	3 0790E-09	408 05	816 10	0 00E+00	1.26E-06	2 51E-06		
U-234	4 9915E-05	408 05	816 10	0 00E+00	2 04E-02	4 07E-02		
U-235	2 8661E-06	408 05	0 00	3 67E-03	2.50E-03	3 67E-03		
U-236	1 6701E-05	408 05	816 10	0 00E+00	6 81E-03	1.36E-02		
U-238	9 4194E-09	408 05	0 00	7 00E-04	6 97E-04	7 00E-04		
Y-90	2 1482E+00	408 05	816 10	0 00E+00	8 77E+02	1 75E+03		
Other Radionuclides					8 93E+02	1 79E+03		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
Fuel Cladding	HEAVY WATER	HEAVY WATER	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	44 88296013	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		408 05	
Bounding		816 10	

Nominal burnup calculated from the heavy metal mass destroyed
 Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.25		
Bounding	0.49		

Estimated EOL HM/Given EOL HM 1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRJ TUBES (U308 LEU) GERMANY
 SNF ID #: 999
 Fuel Units & Descr: 3 - CONCENTRIC TUBES
 Heavy Metal Mass: BOL=3.038kg; EOL=3.008kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1998
 Estimates as of: 2010
 Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
²Template Burnup(MWd): 15
 Template BOL Heavy Metal Mass (MT): 0.00034251
 Template Decay Time: 10 years

Estimated
 Canister usage
 18"x10"
 0 13

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg. MeV	
Ac-227	3.5433E-10	28.23	56.46	0.00E+00	1.00E-08	2.00E-08	0.0150	7.361E+12
Am-241	1.6993E-02	28.23	56.46	0.00E+00	4.80E-01	9.59E-01	0.0250	1.548E+12
Am-242m	9.3333E-06	28.23	56.46	0.00E+00	2.63E-04	5.27E-04	0.0375	1.357E+12
Am-243	6.4067E-06	28.23	56.46	0.00E+00	1.81E-04	3.62E-04	0.0575	1.436E+12
C-14	2.9653E-08	28.23	56.46	0.00E+00	8.37E-07	1.67E-06	0.0850	8.652E+11
Cl-36	5.9513E-35	28.23	56.46	0.00E+00	1.68E-33	3.36E-33	0.1250	6.001E+11
Cm-243	2.8167E-06	28.23	56.46	0.00E+00	7.95E-05	1.59E-04	0.2250	7.429E+11
Cm-244	1.6140E-04	28.23	56.46	0.00E+00	4.56E-03	9.11E-03	0.3750	3.331E+11
Co-60	6.0893E-05	28.23	56.46	0.00E+00	1.72E-03	3.44E-03	0.5750	5.550E+12
Cs-134	6.1567E-02	28.23	56.46	0.00E+00	1.74E+00	3.48E+00	0.8500	2.118E+11
Cs-135	4.8607E-06	28.23	56.46	0.00E+00	1.37E-04	2.74E-04	1.2500	7.682E+10
Cs-137	2.5487E+00	28.23	56.46	0.00E+00	7.19E+01	1.44E+02	1.7500	2.967E+09
Eu-154	4.6760E-02	28.23	56.46	0.00E+00	1.32E+00	2.64E+00	2.2500	1.794E+08
Eu-155	1.6533E-02	28.23	56.46	0.00E+00	4.67E-01	9.33E-01	2.7500	3.843E+06
Fe-55	2.0373E-02	28.23	56.46	0.00E+00	5.75E-01	1.15E+00	3.5000	4.824E+05
H-3	8.1800E-03	28.23	56.46	0.00E+00	2.31E-01	4.62E-01	5.0000	1.371E+02
I-129	7.1600E-07	28.23	56.46	0.00E+00	2.02E-05	4.04E-05	7.0000	1.559E+01
Kr-85	1.9547E-01	28.23	56.46	0.00E+00	5.52E+00	1.10E+01	11.0000	1.778E+00
Np-237	3.6573E-06	28.23	56.46	0.00E+00	1.03E-04	2.06E-04		
Pa-231	1.6420E-09	28.23	56.46	0.00E+00	4.64E-08	9.27E-08		
Pb-210	7.4600E-15	28.23	56.46	0.00E+00	2.11E-13	4.21E-13		
Pm-147	6.5033E-01	28.23	56.46	0.00E+00	1.84E+01	3.67E+01		
Pu-238	5.9807E-03	28.23	56.46	0.00E+00	1.69E-01	3.38E-01		
Pu-239	1.0320E-02	28.23	56.46	0.00E+00	2.91E-01	5.83E-01		
Pu-240	5.4233E-03	28.23	56.46	0.00E+00	1.53E-01	3.06E-01		
Pu-241	6.0807E-01	28.23	56.46	0.00E+00	1.72E+01	3.43E+01		
Pu-242	3.0713E-06	28.23	56.46	0.00E+00	8.67E-05	1.73E-04		
Ra-226	6.1580E-14	28.23	56.46	0.00E+00	1.74E-12	3.48E-12		
Ra-228	4.9953E-15	28.23	56.46	0.00E+00	1.41E-13	2.82E-13		
Ru-106	8.2133E-03	28.23	56.46	0.00E+00	2.32E-01	4.64E-01		
Se-79	1.2540E-05	28.23	56.46	0.00E+00	3.54E-04	7.08E-04		
Sn-126	1.1393E-05	28.23	56.46	0.00E+00	3.22E-04	6.43E-04		
Sr-90	2.3340E+00	28.23	56.46	0.00E+00	6.59E+01	1.32E+02		
Tc-99	4.3540E-04	28.23	56.46	0.00E+00	1.23E-02	2.46E-02		
Th-229	2.4973E-13	28.23	56.46	0.00E+00	7.05E-12	1.41E-11		
Th-230	2.4613E-11	28.23	56.46	0.00E+00	6.95E-10	1.39E-09		
Th-232	9.9467E-15	28.23	56.46	0.00E+00	2.81E-13	5.62E-13		
Th-208	7.7667E-09	28.23	56.46	0.00E+00	2.19E-07	4.38E-07		
U-232	2.1927E-08	28.23	56.46	0.00E+00	6.19E-07	1.24E-06		
U-233	2.7887E-10	28.23	56.46	0.00E+00	7.87E-09	1.57E-08		
U-234	3.0807E-07	28.23	56.46	0.00E+00	8.70E-06	1.74E-05		
U-235	-2.5341E-06	28.23	0.00	1.30E-03	1.22E-03	1.30E-03		
U-236	1.3000E-05	28.23	56.46	0.00E+00	3.67E-04	7.34E-04		
U-238	-1.4207E-08	28.23	0.00	8.20E-04	8.19E-04	8.20E-04		
Y-90	2.3347E+00	28.23	56.46	0.00E+00	6.59E+01	1.32E+02		
Other Radionuclides					6.96E+01	1.39E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
	HEAVY WATER	HEAVY WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19.73	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	0.25	28.23	
Bounding		56.46	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.21	113.31	
Bounding:	0.42		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRM (UALX HEU 45%) GERMANY
SNF ID #: 805
Fuel Units & Descr: 50 - MTR TYPE
Heavy Metal Mass BOL=28 18kg, EOL=23 47kg
ROD Storage Site SRS

¹Fuel decay start date: 1995
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 15 years

Estimated
Canister usage
18"x10"
2 08

II. Estimates							Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	4,460 46	8,920 92	0 00E+00	2 05E-06	4 09E-06	Avg MeV	
Am-241	1 7832E-03	4,460 46	8,920 92	0 00E+00	7.95E+00	1.59E+01	0 0150	1 064E+15
Am-242m	4 3410E-07	4,460 46	8,920 92	0 00E+00	1 94E-03	3 87E-03	0 0250	2.219E+14
Am-243	1 4907E-06	4,460 46	8,920 92	0 00E+00	6 65E-03	1.33E-02	0 0375	1 938E+14
C-14	5 7162E-09	4,460 46	8,920 92	0 00E+00	2 55E-05	5 10E-05	0 0575	2 066E+14
Cl-36	1.3124E-32	4,460 46	8,920 92	0 00E+00	5 85E-29	1 17E-28	0 0850	1.252E+14
Cm-243	1 8568E-07	4,460 46	8,920 92	0 00E+00	8 28E-04	1 66E-03	0 1250	8 582E+13
Cm-244	3 5512E-05	4,460 46	8,920 92	0 00E+00	1 58E-01	3 17E-01	0 2250	1 078E+14
Co-60	1 0261E-05	4,460 46	8,920 92	0 00E+00	4 58E-02	9 15E-02	0 3750	4 724E+13
Cs-134	1.6931E-02	4,460 46	8,920 92	0 00E+00	7 55E+01	1 51E+02	0 5750	7 668E+14
Cs-135	3.4477E-06	4,460 46	8,920 92	0 00E+00	1 54E-02	3 08E-02	0 8500	1 821E+13
Cs-137	2.2800E+00	4,460 46	8,920 92	0 00E+00	1 02E+04	2 03E+04	1.2500	9 201E+12
Eu-154	3 6656E-02	4,460 46	8,920 92	0 00E+00	1 64E+02	3 27E+02	1 7500	3.855E+11
Eu-155	9 6841E-03	4,460 46	8,920 92	0 00E+00	4 32E+01	8 64E+01	2 2500	4 823E+08
Fe-55	4 6977E-04	4,460 46	8,920 92	0 00E+00	2 10E+00	4 19E+00	2 7500	2.899E+07
H-3	6 0485E-03	4,460 46	8,920 92	0 00E+00	2 70E+01	5 40E+01	3 5000	1.842E+06
I-129	7 5300E-07	4,460 46	8,920 92	0 00E+00	3 36E-03	6 72E-03	5 0000	4.272E+03
Kr-85	1 4989E-01	4,460 46	8,920 92	0 00E+00	6 69E+02	1 34E+03	7 0000	4.732E+02
Np-237	9 5534E-06	4,460 46	8,920 92	0 00E+00	4.26E-02	8 52E-02	11 0000	5.314E+01
Pa-231	1 6550E-09	4,460 46	8,920 92	0 00E+00	7.38E-06	1.48E-05		
Pb-210	2 6631E-11	4,460 46	8,920 92	0 00E+00	1 19E-07	2.38E-07		
Pm-147	1 8156E-01	4,460 46	8,920 92	0 00E+00	8 10E+02	1 62E+03		
Pu-238	1 8990E-02	4,460 46	8,920 92	0 00E+00	8.47E+01	1.69E+02		
Pu-239	4 2838E-04	4,460 46	8,920 92	0 00E+00	1.91E+00	3 82E+00		
Pu-240	2 4379E-04	4,460 46	8,920 92	0 00E+00	1 09E+00	2.17E+00		
Pu-241	4.2511E-02	4,460 46	8,920 92	0 00E+00	1 90E+02	3 79E+02		
Pu-242	3 6329E-07	4,460 46	8,920 92	0 00E+00	1 62E-03	3 24E-03		
Ra-226	1 4725E-10	4,460 46	8,920 92	0 00E+00	6 57E-07	1 31E-06		
Ra-228	8 9760E-15	4,460 46	8,920 92	0 00E+00	4 00E-11	8 01E-11		
Ru-106	1.9752E-04	4,460 46	8,920 92	0 00E+00	8 81E-01	1 76E+00		
Se-79	1.2933E-05	4,460 46	8,920 92	0 00E+00	5 77E-02	1 15E-01		
Sn-126	1 1574E-05	4,460 46	8,920 92	0 00E+00	5 16E-02	1 03E-01		
Sr-90	2 1680E+00	4,460 46	8,920 92	0 00E+00	9 67E+03	1 93E+04		
Tc-99	4.2239E-04	4,460 46	8,920 92	0 00E+00	1 88E+00	3 77E+00		
Th-229	3 9270E-12	4,460 46	8,920 92	0 00E+00	1 75E-08	3 50E-08		
Th-230	3 3578E-08	4,460 46	8,920 92	0 00E+00	1 50E-04	3 00E-04		
Th-232	1 5452E-14	4,460 46	8,920 92	0 00E+00	6 89E-11	1.38E-10		
Ti-208	4 6705E-08	4,460 46	8,920 92	0 00E+00	2 08E-04	4 17E-04		
U-232	1 3045E-07	4,460 46	8,920 92	0 00E+00	5.82E-04	1 16E-03		
U-233	2 3739E-09	4,460 46	8,920 92	0 00E+00	1.06E-05	2 12E-05		
U-234	1 8423E-04	4,460 46	8,920 92	0 00E+00	8.22E-01	1.64E+00		
U-235	-2 7235E-06	4,460 46	0 00	2.74E-02	1.52E-02	2 74E-02		
U-236	1.5493E-05	4,460 46	8,920 92	0 00E+00	6 91E-02	1.38E-01		
U-238	-4.2851E-09	4,460 46	0 00	5.21E-03	5 19E-03	5 21E-03		
Y-90	2.1686E+00	4,460 46	8,920 92	0 00E+00	9 67E+03	1 93E+04		
Other Radionuclides					9 70E+03	1 94E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match
BOL HM Constituents:	U	U	
BOL Enrichment %:	44 97952648	60 to 100	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	686.61	4 460 46	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		8,920 92	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.50	6.50	1 01
Bounding:	1.01		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRM (UALX HEU) GERMANY
 SNF ID #: 806
 Fuel Units & Descr: 31 - MTR TYPE
 Heavy Metal Mass: BOL=6.395kg, EOL=3.171kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1995
 Estimates as of: 2010
 Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 15 years

Estimated
 Canister usage
 18"x10"
 1 29

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	3.053.19	6.056.47	0.00E+00	1.40E-06	2.78E-06	Avg. MeV	
Am-241	1.7832E-03	3.053.19	6.056.47	0.00E+00	5.44E+00	1.08E+01	0.0150	7.225E+14
Am-242m	4.3410E-07	3.053.19	6.056.47	0.00E+00	1.33E-03	2.63E-03	0.0250	1.507E+14
Am-243	1.4907E-06	3.053.19	6.056.47	0.00E+00	4.55E-03	9.03E-03	0.0375	1.316E+14
C-14	5.7162E-09	3.053.19	6.056.47	0.00E+00	1.75E-05	3.46E-05	0.0575	1.403E+14
Cl-36	1.3124E-32	3.053.19	6.056.47	0.00E+00	4.01E-29	7.95E-29	0.0850	8.498E+13
Cm-243	1.8568E-07	3.053.19	6.056.47	0.00E+00	5.67E-04	1.12E-03	0.1250	5.826E+13
Cm-244	3.5512E-05	3.053.19	6.056.47	0.00E+00	1.08E-01	2.15E-01	0.2250	7.321E+13
Co-60	1.0261E-05	3.053.19	6.056.47	0.00E+00	3.13E-02	6.21E-02	0.3750	3.207E+13
Cs-134	1.6931E-02	3.053.19	6.056.47	0.00E+00	5.17E+01	1.03E+02	0.5750	5.206E+14
Cs-135	3.4477E-06	3.053.19	6.056.47	0.00E+00	1.05E-02	2.09E-02	0.8500	1.237E+13
Cs-137	2.2800E+00	3.053.19	6.056.47	0.00E+00	6.96E+03	1.38E+04	1.2500	6.247E+12
Eu-154	3.6656E-02	3.053.19	6.056.47	0.00E+00	1.12E+02	2.22E+02	1.7500	2.617E+11
Eu-155	9.6941E-03	3.053.19	6.056.47	0.00E+00	2.96E+01	5.87E+01	2.2500	3.274E+08
Fe-55	4.6977E-04	3.053.19	6.056.47	0.00E+00	1.43E+00	2.85E+00	2.7500	1.968E+07
H-3	6.0485E-03	3.053.19	6.056.47	0.00E+00	1.85E+01	3.66E+01	3.5000	1.251E+06
I-129	7.5300E-07	3.053.19	6.056.47	0.00E+00	2.30E-03	4.56E-03	5.0000	2.893E+03
Kr-85	1.4989E-01	3.053.19	6.056.47	0.00E+00	4.58E+02	9.08E+02	7.0000	3.204E+02
Np-237	9.5534E-06	3.053.19	6.056.47	0.00E+00	2.92E-02	5.79E-02	11.0000	3.597E+01
Pa-231	1.6550E-09	3.053.19	6.056.47	0.00E+00	5.05E-06	1.00E-05		
Pb-210	2.6631E-11	3.053.19	6.056.47	0.00E+00	8.13E-08	1.61E-07		
Pm-147	1.8156E-01	3.053.19	6.056.47	0.00E+00	5.54E+02	1.10E+03		
Pu-238	1.8990E-02	3.053.19	6.056.47	0.00E+00	5.80E+01	1.15E+02		
Pu-239	4.2838E-04	3.053.19	6.056.47	0.00E+00	1.31E+00	2.59E+00		
Pu-240	2.4379E-04	3.053.19	6.056.47	0.00E+00	7.44E-01	1.48E+00		
Pu-241	4.2511E-02	3.053.19	6.056.47	0.00E+00	1.30E+02	2.57E+02		
Pu-242	3.6329E-07	3.053.19	6.056.47	0.00E+00	1.11E-03	2.20E-03		
Ra-226	1.4725E-10	3.053.19	6.056.47	0.00E+00	4.50E-07	8.92E-07		
Ra-228	8.9760E-15	3.053.19	6.056.47	0.00E+00	2.74E-11	5.44E-11		
Ru-106	1.9752E-04	3.053.19	6.056.47	0.00E+00	6.03E-01	1.20E+00		
Se-79	1.2933E-05	3.053.19	6.056.47	0.00E+00	3.95E-02	7.83E-02		
Sn-126	1.1574E-05	3.053.19	6.056.47	0.00E+00	3.53E-02	7.01E-02		
Sr-90	2.1680E+00	3.053.19	6.056.47	0.00E+00	6.62E+03	1.31E+04		
Tc-99	4.2239E-04	3.053.19	6.056.47	0.00E+00	1.29E+00	2.56E+00		
Th-229	3.9270E-12	3.053.19	6.056.47	0.00E+00	1.20E-08	2.38E-08		
Th-230	3.3578E-08	3.053.19	6.056.47	0.00E+00	1.03E-04	2.03E-04		
Th-232	1.5452E-14	3.053.19	6.056.47	0.00E+00	4.72E-11	9.36E-11		
Th-208	4.6705E-08	3.053.19	6.056.47	0.00E+00	1.43E-04	2.83E-04		
U-232	1.3045E-07	3.053.19	6.056.47	0.00E+00	3.98E-04	7.90E-04		
U-233	2.3739E-09	3.053.19	6.056.47	0.00E+00	7.25E-06	1.44E-05		
U-234	1.8423E-04	3.053.19	6.056.47	0.00E+00	5.62E-01	1.12E+00		
U-235	-2.7235E-06	3.053.19	0.00	1.26E-02	4.28E-03	1.26E-02		
U-236	1.5493E-05	3.053.19	6.056.47	0.00E+00	4.73E-02	9.38E-02		
U-238	-4.2851E-09	3.053.19	0.00	1.91E-04	1.78E-04	1.91E-04		
Y-90	2.1686E+00	3.053.19	6.056.47	0.00E+00	6.62E+03	1.31E+04		
Other Radionuclides					6.64E+03	1.32E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	91.10863593	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		3.053.19	
Bounding		6.056.47	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup calculated assuming all BOL heavy metal burned.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	1.52		
Bounding	3.01		1.06

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR ASTRA (U308-LEU) AUSTRIA
 SNF ID #: 556
 Fuel Units & Descr.: 4 - MTR TYPE
 Heavy Metal Mass: BOL= , EOL=6 96kg
 ROD Storage Site: SRS

Fuel decay start date: 2010
 Estimates as of: 2010
 Template: ATR (Light Water Alum, 60 to 100%, U)
 Template Burnup (MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 5 years

Estimated
 Canister usage
 18"x10"
 0.11

II. Estimates							Gamma Sources	
	m	x _n	x _b	b	y _n	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Avg MeV	
Ac-227	1.4545E-10	6,591.26	6,591.26	0.00E+00	9.59E-07	9.59E-07	0.0150	1.272E+15
Am-241	1.1190E-03	6,591.26	6,591.26	0.00E+00	7.38E+00	7.38E+00	0.0250	2.740E+14
Am-242m	4.5425E-07	6,591.26	6,591.26	0.00E+00	2.99E-03	2.99E-03	0.0375	2.528E+14
Am-243	1.4921E-06	6,591.26	6,591.26	0.00E+00	9.83E-03	9.83E-03	0.0575	2.486E+14
C-14	5.7244E-09	6,591.26	6,591.26	0.00E+00	3.77E-05	3.77E-05	0.0850	1.585E+14
Ci-36	1.3124E-32	6,591.26	6,591.26	0.00E+00	8.65E-29	8.65E-29	0.1250	1.372E+14
Cm-243	2.3676E-07	6,591.26	6,591.26	0.00E+00	1.56E-03	1.56E-03	0.2250	1.343E+14
Cm-244	5.2042E-05	6,591.26	6,591.26	0.00E+00	3.43E-01	3.43E-01	0.3750	6.501E+13
Co-60	3.8208E-05	6,591.26	6,591.26	0.00E+00	2.52E-01	2.52E-01	0.5750	8.930E+14
Cs-134	4.8693E-01	6,591.26	6,591.26	0.00E+00	3.21E+03	3.21E+03	0.8500	1.251E+14
Cs-135	3.4477E-06	6,591.26	6,591.26	0.00E+00	2.27E-02	2.27E-02	1.2500	2.327E+13
Cs-137	2.8731E+00	6,591.26	6,591.26	0.00E+00	1.89E+04	1.89E+04	1.7500	9.757E+11
Eu-154	8.2053E-02	6,591.26	6,591.26	0.00E+00	5.41E+02	5.41E+02	2.2500	2.047E+12
Eu-155	3.9134E-02	6,591.26	6,591.26	0.00E+00	2.58E+02	2.58E+02	2.7500	1.177E+10
Fe-55	6.7429E-03	6,591.26	6,591.26	0.00E+00	4.44E+01	4.44E+01	3.5000	1.306E+09
H-3	1.0599E-02	6,591.26	6,591.26	0.00E+00	6.99E+01	6.99E+01	5.0000	3.905E+03
I-129	7.5300E-07	6,591.26	6,591.26	0.00E+00	4.96E-03	4.96E-03	7.0000	4.353E+02
Kr-85	2.8595E-01	6,591.26	6,591.26	0.00E+00	1.88E+03	1.88E+03	11.0000	4.906E+01
Np-237	9.5479E-06	6,591.26	6,591.26	0.00E+00	6.29E-02	6.29E-02		
Pa-231	8.9297E-10	6,591.26	6,591.26	0.00E+00	5.89E-06	5.89E-06		
Pb-210	3.7609E-12	6,591.26	6,591.26	0.00E+00	2.48E-08	2.48E-08		
Pm-147	2.5452E+00	6,591.26	6,591.26	0.00E+00	1.68E+04	1.68E+04		
Pu-238	2.0550E-02	6,591.26	6,591.26	0.00E+00	1.35E+02	1.35E+02		
Pu-239	4.2838E-04	6,591.26	6,591.26	0.00E+00	2.82E+00	2.82E+00		
Pu-240	2.4401E-04	6,591.26	6,591.26	0.00E+00	1.61E+00	1.61E+00		
Pu-241	6.8764E-02	6,591.26	6,591.26	0.00E+00	4.53E+02	4.53E+02		
Pu-242	3.6329E-07	6,591.26	6,591.26	0.00E+00	2.39E-03	2.39E-03		
Ra-226	3.8045E-11	6,591.26	6,591.26	0.00E+00	2.51E-07	2.51E-07		
Ra-228	2.9902E-15	6,591.26	6,591.26	0.00E+00	1.97E-11	1.97E-11		
Ru-106	1.9055E-01	6,591.26	6,591.26	0.00E+00	1.26E+03	1.26E+03		
Se-79	1.2936E-05	6,591.26	6,591.26	0.00E+00	8.53E-02	8.53E-02		
Sn-126	1.1574E-05	6,591.26	6,591.26	0.00E+00	7.63E-02	7.63E-02		
Sr-90	2.7505E+00	6,591.26	6,591.26	0.00E+00	1.81E+04	1.81E+04		
Tc-99	4.2239E-04	6,591.26	6,591.26	0.00E+00	2.78E+00	2.78E+00		
Th-229	1.8848E-12	6,591.26	6,591.26	0.00E+00	1.24E-08	1.24E-08		
Th-230	1.7042E-08	6,591.26	6,591.26	0.00E+00	1.12E-04	1.12E-04		
Th-232	7.8132E-15	6,591.26	6,591.26	0.00E+00	5.15E-11	5.15E-11		
Ti-208	4.4063E-08	6,591.26	6,591.26	0.00E+00	2.90E-04	2.90E-04		
U-232	1.3151E-07	6,591.26	6,591.26	0.00E+00	8.67E-04	8.67E-04		
U-233	1.9564E-09	6,591.26	6,591.26	0.00E+00	1.29E-05	1.29E-05		
U-234	1.8371E-04	6,591.26	6,591.26	0.00E+00	1.21E+00	1.21E+00		
U-235	-2.7235E-06	6,591.26	0.00	2.77E-02	9.76E-03	2.77E-02		
U-236	1.5493E-05	6,591.26	6,591.26	0.00E+00	1.02E-01	1.02E-01		
U-238	-4.2851E-09	6,591.26	0.00	2.80E-04	2.52E-04	2.80E-04		
Y-90	2.7505E+00	6,591.26	6,591.26	0.00E+00	1.81E+04	1.81E+04		
Other Radionuclides					3.39E+04	3.39E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown)
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL
	From SFD	Estimated	
Nominal		6,591.26	
Bounding		6,591.26	

Checks			Estimated EOL HM/Given EOL HM 1.02
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	1.50		
Bounding	1.50		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR ASTRA (U3Si2 LEU) AUSTRIA
SNF ID #: 515
Fuel Units & Descr: 49 - MTR TYPE
Heavy Metal Mass: BOL=78.4kg; EOL=74.602kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum 60 to 100% U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
2.04

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	3,596.31	7,192.61	0.00E+00	5.23E-07	1.05E-06	Avg MeV	
Am-241	1.1190E-03	3,596.31	7,192.61	0.00E+00	4.02E+00	8.05E+00	0.0150	1.388E+15
Am-242m	4.5425E-07	3,596.31	7,192.61	0.00E+00	1.63E-03	3.27E-03	0.0250	2.989E+14
Am-243	1.4921E-06	3,596.31	7,192.61	0.00E+00	5.37E-03	1.07E-02	0.0375	2.759E+14
C-14	5.7244E-09	3,596.31	7,192.61	0.00E+00	2.06E-05	4.12E-05	0.0575	2.713E+14
Cl-36	1.3124E-32	3,596.31	7,192.61	0.00E+00	4.72E-29	9.44E-29	0.0850	1.729E+14
Cm-243	2.3676E-07	3,596.31	7,192.61	0.00E+00	8.51E-04	1.70E-03	0.1250	1.498E+14
Cm-244	5.2042E-05	3,596.31	7,192.61	0.00E+00	1.87E-01	3.74E-01	0.2250	1.466E+14
Co-60	3.8208E-05	3,596.31	7,192.61	0.00E+00	1.37E-01	2.75E-01	0.3750	7.095E+13
Cs-134	4.8693E-01	3,596.31	7,192.61	0.00E+00	1.75E+03	3.50E+03	0.5750	9.745E+14
Cs-135	3.4477E-06	3,596.31	7,192.61	0.00E+00	1.24E-02	2.48E-02	0.8500	1.365E+14
Cs-137	2.8731E+00	3,596.31	7,192.61	0.00E+00	1.03E+04	2.07E+04	1.2500	2.539E+13
Eu-154	8.2053E-02	3,596.31	7,192.61	0.00E+00	2.95E+02	5.90E+02	1.7500	1.065E+12
Eu-155	3.9134E-02	3,596.31	7,192.61	0.00E+00	1.41E+02	2.81E+02	2.2500	2.233E+12
Fe-55	6.7429E-03	3,596.31	7,192.61	0.00E+00	2.42E+01	4.85E+01	2.7500	1.285E+10
H-3	1.0599E-02	3,596.31	7,192.61	0.00E+00	3.81E+01	7.62E+01	3.5000	1.425E+09
I-129	7.5300E-07	3,596.31	7,192.61	0.00E+00	2.71E-03	5.42E-03	5.0000	4.315E+03
Kr-85	2.8595E-01	3,596.31	7,192.61	0.00E+00	1.03E+03	2.06E+03	7.0000	4.812E+02
Np-237	9.5479E-06	3,596.31	7,192.61	0.00E+00	3.43E-02	6.87E-02	11.0000	5.426E+01
Pa-231	8.9297E-10	3,596.31	7,192.61	0.00E+00	3.21E-06	6.42E-06		
Pb-210	3.7609E-12	3,596.31	7,192.61	0.00E+00	1.35E-08	2.71E-08		
Pm-147	2.5452E+00	3,596.31	7,192.61	0.00E+00	9.15E+03	1.83E+04		
Pu-238	2.0550E-02	3,596.31	7,192.61	0.00E+00	7.39E+01	1.48E+02		
Pu-239	4.2838E-04	3,596.31	7,192.61	0.00E+00	1.54E+00	3.08E+00		
Pu-240	2.4401E-04	3,596.31	7,192.61	0.00E+00	8.78E-01	1.76E+00		
Pu-241	6.8764E-02	3,596.31	7,192.61	0.00E+00	2.47E+02	4.95E+02		
Pu-242	3.6329E-07	3,596.31	7,192.61	0.00E+00	1.31E-03	2.61E-03		
Ra-226	3.8045E-11	3,596.31	7,192.61	0.00E+00	1.37E-07	2.74E-07		
Ra-228	2.9902E-15	3,596.31	7,192.61	0.00E+00	1.08E-11	2.15E-11		
Ru-106	1.9055E-01	3,596.31	7,192.61	0.00E+00	6.85E+02	1.37E+03		
Se-79	1.2936E-05	3,596.31	7,192.61	0.00E+00	4.65E-02	9.30E-02		
Sn-126	1.1574E-05	3,596.31	7,192.61	0.00E+00	4.16E-02	8.32E-02		
Sr-90	2.7505E+00	3,596.31	7,192.61	0.00E+00	9.89E+03	1.98E+04		
Tc-99	4.2239E-04	3,596.31	7,192.61	0.00E+00	1.52E+00	3.04E+00		
Th-229	1.8848E-12	3,596.31	7,192.61	0.00E+00	6.78E-09	1.36E-08		
Th-230	1.7042E-08	3,596.31	7,192.61	0.00E+00	6.13E-05	1.23E-04		
Th-232	7.8132E-15	3,596.31	7,192.61	0.00E+00	2.81E-11	5.62E-11		
Th-208	4.4063E-08	3,596.31	7,192.61	0.00E+00	1.58E-04	3.17E-04		
U-232	1.3151E-07	3,596.31	7,192.61	0.00E+00	4.73E-04	9.46E-04		
U-233	1.9564E-09	3,596.31	7,192.61	0.00E+00	7.04E-06	1.41E-05	Thermal Power	
U-234	1.8371E-04	3,596.31	7,192.61	0.00E+00	6.61E-01	1.32E+00	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2.7235E-06	3,596.31	0.00	1.43E-02	4.50E-03	1.43E-02	1.82E+02	3.65E+02
U-236	1.5493E-05	3,596.31	7,192.61	0.00E+00	5.57E-02	1.11E-01	Total	Total
U-238	-4.2851E-09	3,596.31	0.00	2.41E-02	2.41E-02	2.41E-02		
Y-90	2.7505E+00	3,596.31	7,192.61	0.00E+00	9.89E+03	1.98E+04		
Other Radionuclides					1.85E+04	3.70E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ALUM	ALUM	
	U	U	
	8.4375	60 to 100	This Template was used for the following reasons: This fuel matches on all parameters except enrichment.

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal Bounding	From SFD	Estimated	
		3.596.31 7,192.61	
			Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
Nominal Bounding	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0.15 0.29		
			1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR ASTRA (UALX-HEU) AUSTRIA
SNF ID # 654
Fuel Units & Descr 2 - MTR TYPE
Heavy Metal Mass BOL=0 14kg EOL=0 12kg
ROD Storage Site SRS

*Fuel decay start date 2010
Estimates as of 2010
Template ATR (Light Water Alum, 60 to 100%, U)
*Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0.08

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	18.94	37.88	0.00E+00	2.75E-09	5.51E-09	Avg MeV	
Am-241	1.1190E-03	18.94	37.88	0.00E+00	2.12E-02	4.24E-02	0.0150	7.308E+12
Am-242m	4.5425E-07	18.94	37.88	0.00E+00	8.60E-06	1.72E-05	0.0250	1.574E+12
Am-243	1.4921E-06	18.94	37.88	0.00E+00	2.83E-05	5.65E-05	0.0375	1.453E+12
C-14	5.7244E-09	18.94	37.88	0.00E+00	1.08E-07	2.17E-07	0.0575	1.429E+12
Cl-36	1.3124E-32	18.94	37.88	0.00E+00	2.49E-31	4.97E-31	0.0850	9.107E+11
Cm-243	2.3676E-07	18.94	37.88	0.00E+00	4.48E-06	8.97E-06	0.1250	7.887E+11
Cm-244	5.2042E-05	18.94	37.88	0.00E+00	9.86E-04	1.97E-03	0.2250	7.719E+11
Co-60	3.8208E-05	18.94	37.88	0.00E+00	7.24E-04	1.45E-03	0.3750	3.736E+11
Cs-134	4.8693E-01	18.94	37.88	0.00E+00	9.22E+00	1.84E+01	0.5750	5.132E+12
Cs-135	3.4477E-06	18.94	37.88	0.00E+00	6.53E-05	1.31E-04	0.8500	7.187E+11
Cs-137	2.8731E+00	18.94	37.88	0.00E+00	5.44E+01	1.09E+02	1.2500	1.337E+11
Eu-154	8.2053E-02	18.94	37.88	0.00E+00	1.55E+00	3.11E+00	1.7500	5.608E+09
Eu-155	3.9134E-02	18.94	37.88	0.00E+00	7.41E-01	1.48E+00	2.2500	1.176E+10
Fe-55	6.7429E-03	18.94	37.88	0.00E+00	1.28E-01	2.55E-01	2.7500	6.767E+07
H-3	1.0599E-02	18.94	37.88	0.00E+00	2.01E-01	4.02E-01	3.5000	7.505E+06
I-129	7.5300E-07	18.94	37.88	0.00E+00	1.43E-05	2.85E-05	5.0000	2.245E+01
Kr-85	2.8595E-01	18.94	37.88	0.00E+00	5.42E+00	1.08E+01	7.0000	2.502E+00
Np-237	9.5479E-06	18.94	37.88	0.00E+00	1.81E-04	3.62E-04	11.0000	2.820E-01
Pa-231	8.9297E-10	18.94	37.88	0.00E+00	1.69E-08	3.38E-08		
Pb-210	3.7609E-12	18.94	37.88	0.00E+00	7.12E-11	1.42E-10		
Pm-147	2.5452E+00	18.94	37.88	0.00E+00	4.82E+01	9.64E+01		
Pu-238	2.0550E-02	18.94	37.88	0.00E+00	3.89E-01	7.78E-01		
Pu-239	4.2838E-04	18.94	37.88	0.00E+00	8.11E-03	1.62E-02		
Pu-240	2.4401E-04	18.94	37.88	0.00E+00	4.62E-03	9.24E-03		
Pu-241	6.8764E-02	18.94	37.88	0.00E+00	1.30E+00	2.60E+00		
Pu-242	3.6329E-07	18.94	37.88	0.00E+00	6.88E-06	1.38E-05		
Ra-226	3.8045E-11	18.94	37.88	0.00E+00	7.21E-10	1.44E-09		
Ra-228	2.9902E-15	18.94	37.88	0.00E+00	5.66E-14	1.13E-13		
Ru-106	1.9055E-01	18.94	37.88	0.00E+00	3.61E+00	7.22E+00		
Se-79	1.2936E-05	18.94	37.88	0.00E+00	2.45E-04	4.90E-04		
Sn-126	1.1574E-05	18.94	37.88	0.00E+00	2.19E-04	4.38E-04		
Sr-90	2.7505E+00	18.94	37.88	0.00E+00	5.21E+01	1.04E+02		
Tc-99	4.2239E-04	18.94	37.88	0.00E+00	8.00E-03	1.60E-02		
Th-229	1.8848E-12	18.94	37.88	0.00E+00	3.57E-11	7.14E-11		
Th-230	1.7042E-08	18.94	37.88	0.00E+00	3.23E-07	6.46E-07		
Th-232	7.8132E-15	18.94	37.88	0.00E+00	1.48E-13	2.96E-13		
Th-208	4.4063E-08	18.94	37.88	0.00E+00	8.35E-07	1.67E-06		
U-232	1.3151E-07	18.94	37.88	0.00E+00	2.49E-06	4.98E-06	Thermal Power	
U-233	1.9564E-09	18.94	37.88	0.00E+00	3.71E-08	7.41E-08	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8371E-04	18.94	37.88	0.00E+00	3.48E-03	6.96E-03	9.50E-01	1.92E+00
U-235	-2.7235E-06	18.94	0.00	2.82E-04	2.30E-04	2.82E-04	Total	Total
U-236	1.5493E-05	18.94	37.88	0.00E+00	2.93E-04	5.87E-04		
U-238	-4.2851E-09	18.94	0.00	3.22E-06	3.14E-06	3.22E-06		
Y-90	2.7505E+00	18.94	37.88	0.00E+00	5.21E+01	1.04E+02		
Other Radionuclides					9.74E+01	1.95E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	93.15	60 to 100	
Burnup Summary (MWd) ²			Basis for burnup used in estimate
	From SFD	Estimated	
Nominal		18.94	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		37.88	Bounding burnup assumed to be twice nominal burnup
Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.43		1.01
Bounding	0.86		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR ASTRA (UALX-HEU) AUSTRIA
SNF ID #: 738
Fuel Units & Descr: 14 - MTR TYPE
Heavy Metal Mass: BOL=5.6kg, EOL=4.858kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.58

II. Estimates

	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	702.69	1,405.38	0.00E+00	1.02E-07	2.04E-07	Avg. MeV	
Am-241	1.1190E-03	702.69	1,405.38	0.00E+00	7.86E-01	1.57E+00	0.0150	2.711E+14
Am-242m	4.5425E-07	702.69	1,405.38	0.00E+00	3.19E-04	6.38E-04	0.0250	5.841E+13
Am-243	1.4921E-06	702.69	1,405.38	0.00E+00	1.05E-03	2.10E-03	0.0375	5.390E+13
C-14	5.7244E-09	702.69	1,405.38	0.00E+00	4.02E-06	8.04E-06	0.0575	5.300E+13
Cf-252	1.3124E-32	702.69	1,405.38	0.00E+00	9.22E-30	1.84E-29	0.0850	3.379E+13
Cm-243	2.3676E-07	702.69	1,405.38	0.00E+00	1.66E-04	3.33E-04	0.1250	2.926E+13
Cm-244	5.2042E-05	702.69	1,405.38	0.00E+00	3.66E-02	7.31E-02	0.2250	2.864E+13
Co-60	3.8208E-05	702.69	1,405.38	0.00E+00	2.68E-02	5.37E-02	0.3750	1.386E+13
Cs-134	4.8693E-01	702.69	1,405.38	0.00E+00	3.42E+02	6.84E+02	0.5750	1.904E+14
Cs-135	3.4477E-06	702.69	1,405.38	0.00E+00	2.42E-03	4.85E-03	0.8500	2.667E+13
Cs-137	2.8731E+00	702.69	1,405.38	0.00E+00	2.02E+03	4.04E+03	1.2500	4.961E+12
Eu-154	8.2053E-02	702.69	1,405.38	0.00E+00	5.77E+01	1.15E+02	1.7500	2.080E+11
Eu-155	3.9134E-02	702.69	1,405.38	0.00E+00	2.75E+01	5.50E+01	2.2500	4.364E+11
Fe-55	6.7429E-03	702.69	1,405.38	0.00E+00	4.74E+00	9.48E+00	2.7500	2.510E+09
H-3	1.0599E-02	702.69	1,405.38	0.00E+00	7.45E+00	1.49E+01	3.5000	2.784E+08
I-129	7.5300E-07	702.69	1,405.38	0.00E+00	5.29E-04	1.06E-03	5.0000	8.328E+02
Kr-85	2.8595E-01	702.69	1,405.38	0.00E+00	2.01E+02	4.02E+02	7.0000	9.283E+01
Np-237	9.5479E-06	702.69	1,405.38	0.00E+00	6.71E-03	1.34E-02	11.0000	1.046E+01
Pa-231	8.9297E-10	702.69	1,405.38	0.00E+00	6.27E-07	1.25E-06		
Pb-210	3.7609E-12	702.69	1,405.38	0.00E+00	2.64E-09	5.29E-09		
Pm-147	2.5452E+00	702.69	1,405.38	0.00E+00	1.79E+03	3.58E+03		
Pu-238	2.0550E-02	702.69	1,405.38	0.00E+00	1.44E+01	2.89E+01		
Pu-239	4.2838E-04	702.69	1,405.38	0.00E+00	3.01E-01	6.02E-01		
Pu-240	2.4401E-04	702.69	1,405.38	0.00E+00	1.71E-01	3.43E-01		
Pu-241	6.8764E-02	702.69	1,405.38	0.00E+00	4.83E+01	9.66E+01		
Pu-242	3.6329E-07	702.69	1,405.38	0.00E+00	2.55E-04	5.11E-04		
Ra-226	3.8045E-11	702.69	1,405.38	0.00E+00	2.67E-08	5.35E-08		
Ra-228	2.9902E-15	702.69	1,405.38	0.00E+00	2.10E-12	4.20E-12		
Ru-106	1.9055E-01	702.69	1,405.38	0.00E+00	1.34E+02	2.68E+02		
Se-79	1.2936E-05	702.69	1,405.38	0.00E+00	9.09E-03	1.82E-02		
Sn-126	1.1574E-05	702.69	1,405.38	0.00E+00	8.13E-03	1.63E-02		
Sr-90	2.7505E+00	702.69	1,405.38	0.00E+00	1.93E+03	3.87E+03		
Tc-99	4.2239E-04	702.69	1,405.38	0.00E+00	2.97E-01	5.94E-01		
Th-229	1.8848E-12	702.69	1,405.38	0.00E+00	1.32E-09	2.65E-09		
Th-230	1.7042E-08	702.69	1,405.38	0.00E+00	1.20E-05	2.40E-05		
Th-232	7.8132E-15	702.69	1,405.38	0.00E+00	5.49E-12	1.10E-11		
Ti-208	4.4063E-08	702.69	1,405.38	0.00E+00	3.10E-05	6.19E-05		
U-232	1.3151E-07	702.69	1,405.38	0.00E+00	9.24E-05	1.85E-04		
U-233	1.9564E-09	702.69	1,405.38	0.00E+00	1.37E-06	2.75E-06		
U-234	1.8371E-04	702.69	1,405.38	0.00E+00	1.29E-01	2.58E-01		
U-235	-2.7235E-06	702.69	0.00	1.13E-02	9.36E-03	1.13E-02		
U-236	1.5493E-05	702.69	1,405.38	0.00E+00	1.09E-02	2.18E-02		
U-238	-4.2851E-09	702.69	0.00	1.29E-04	1.26E-04	1.29E-04		
Y-90	2.7505E+00	702.69	1,405.38	0.00E+00	1.93E+03	3.87E+03		
Other Radionuclides					3.61E+03	7.23E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LIGHT WATER	LIGHT WATER
Fuel Cladding	ALUM	ALUM
BOL HM Constituents	U	U
BOL Enrichment % ¹	93.15	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		702.69
Bounding		1,405.38

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.40	
Bounding	0.80	

Estimated EOL HM/Given EOL HM

1.01

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR FMRB (GERMANY)
 SNF ID # 1066
 Fuel Units & Descr 18 - MTR TYPE
 Heavy Metal Mass BOL=2.57kg EOL=2.282kg
 ROD Storage Site SRS

¹Fuel decay start date 1994
 Estimates as of 2010
 Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
 Template BOL Heavy Metal Mass (MT) 0.00116689
 Template Decay Time 15 years

Estimated
 Canister usage:
 18"x10"
 0.75

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	4.5861E-10	272.74	545.48	0.00E+00	1.25E-07	2.50E-07	0.0150	6.507E+13
Am-241	1.7832E-03	272.74	545.48	0.00E+00	4.86E-01	9.73E-01	0.0250	1.357E+13
Am-242m	4.3410E-07	272.74	545.48	0.00E+00	1.18E-04	2.37E-04	0.0375	1.185E+13
Am-243	1.4907E-06	272.74	545.48	0.00E+00	4.07E-04	8.13E-04	0.0575	1.264E+13
C-14	5.7162E-09	272.74	545.48	0.00E+00	1.56E-06	3.12E-06	0.0850	7.654E+12
Cl-36	1.3124E-32	272.74	545.48	0.00E+00	3.58E-30	7.16E-30	0.1250	5.247E+12
Cm-243	1.8568E-07	272.74	545.48	0.00E+00	5.06E-05	1.01E-04	0.2250	6.594E+12
Cm-244	3.5512E-05	272.74	545.48	0.00E+00	9.69E-03	1.94E-02	0.3750	2.889E+12
Co-60	1.0261E-05	272.74	545.48	0.00E+00	2.80E-03	5.60E-03	0.5750	4.689E+13
Cs-134	1.6931E-02	272.74	545.48	0.00E+00	4.62E+00	9.24E+00	0.8500	1.114E+12
Cs-135	3.4477E-06	272.74	545.48	0.00E+00	9.40E-04	1.88E-03	1.2500	5.626E+11
Cs-137	2.2800E+00	272.74	545.48	0.00E+00	6.22E+02	1.24E+03	1.7500	2.357E+10
Eu-154	3.6656E-02	272.74	545.48	0.00E+00	1.00E+01	2.00E+01	2.2500	2.949E+07
Eu-155	9.6841E-03	272.74	545.48	0.00E+00	2.64E+00	5.28E+00	2.7500	1.772E+06
Fe-55	4.6977E-04	272.74	545.48	0.00E+00	1.28E-01	2.56E-01	3.5000	1.127E+05
H-3	6.0485E-03	272.74	545.48	0.00E+00	1.65E+00	3.30E+00	5.0000	2.607E+02
I-129	7.5300E-07	272.74	545.48	0.00E+00	2.05E-04	4.11E-04	7.0000	2.887E+01
Kr-85	1.4989E-01	272.74	545.48	0.00E+00	4.09E+01	8.18E+01	11.0000	3.242E+00
Np-237	9.5534E-06	272.74	545.48	0.00E+00	2.61E-03	5.21E-03		
Pa-231	1.6550E-09	272.74	545.48	0.00E+00	4.51E-07	9.03E-07		
Pb-210	2.6631E-11	272.74	545.48	0.00E+00	7.26E-09	1.45E-08		
Pm-147	1.8156E-01	272.74	545.48	0.00E+00	4.95E+01	9.90E+01		
Pu-238	1.8990E-02	272.74	545.48	0.00E+00	5.18E+00	1.04E+01		
Pu-239	4.2838E-04	272.74	545.48	0.00E+00	1.17E-01	2.34E-01		
Pu-240	2.4379E-04	272.74	545.48	0.00E+00	6.65E-02	1.33E-01		
Pu-241	4.2511E-02	272.74	545.48	0.00E+00	1.16E+01	2.32E+01		
Pu-242	3.6329E-07	272.74	545.48	0.00E+00	9.91E-05	1.98E-04		
Ra-226	1.4725E-10	272.74	545.48	0.00E+00	4.02E-08	8.03E-08		
Ra-228	8.9760E-15	272.74	545.48	0.00E+00	2.45E-12	4.90E-12		
Ru-106	1.9752E-04	272.74	545.48	0.00E+00	5.39E-02	1.08E-01		
Se-79	1.2933E-05	272.74	545.48	0.00E+00	3.53E-03	7.05E-03		
Sn-126	1.1574E-05	272.74	545.48	0.00E+00	3.16E-03	6.31E-03		
Sr-90	2.1680E+00	272.74	545.48	0.00E+00	5.91E+02	1.18E+03		
Tc-99	4.2239E-04	272.74	545.48	0.00E+00	1.15E-01	2.30E-01		
Th-229	3.9270E-12	272.74	545.48	0.00E+00	1.07E-09	2.14E-09		
Th-230	3.3578E-08	272.74	545.48	0.00E+00	9.16E-06	1.83E-05		
Th-232	1.5452E-14	272.74	545.48	0.00E+00	4.21E-12	8.43E-12		
Ti-208	4.6705E-08	272.74	545.48	0.00E+00	1.27E-05	2.55E-05		
U-232	1.3045E-07	272.74	545.48	0.00E+00	3.56E-05	7.12E-05		
U-233	2.3739E-09	272.74	545.48	0.00E+00	6.47E-07	1.29E-06		
U-234	1.8423E-04	272.74	545.48	0.00E+00	5.02E-02	1.00E-01		
U-235	2.7235E-06	272.74	0.00	5.07E-03	4.33E-03	5.07E-03		
U-236	1.5493E-05	272.74	545.48	0.00E+00	4.23E-03	8.45E-03		
U-238	4.2851E-09	272.74	0.00	7.55E-05	7.44E-05	7.55E-05		
Y-90	2.1686E+00	272.74	545.48	0.00E+00	5.91E+02	1.18E+03		
Other Radionuclides					5.93E+02	1.19E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	91.25787542	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate
	From SFD	Estimated	
Nominal		272.74	
Bounding		545.48	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.34		
Bounding	0.67		1.01

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX HEU) AUSTRALIA
SNF ID #: 649
Fuel Units & Descr: 12 - ASSEMBLY
Heavy Metal Mass, BOL=3.32kg; EOL=3.317kg
ROD Storage Site, SRS

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0.50

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	1.4545E-10	3.41	6.82	0.00E+00	4.96E-10	9.92E-10	Avg. MeV	
Am-241	1.1190E-03	3.41	6.82	0.00E+00	3.82E-03	7.63E-03	0.0150	1.316E+12
Am-242m	4.5425E-07	3.41	6.82	0.00E+00	1.55E-06	3.10E-06	0.0250	2.834E+11
Am-243	1.4921E-06	3.41	6.82	0.00E+00	5.09E-06	1.02E-05	0.0375	2.615E+11
C-14	5.7244E-09	3.41	6.82	0.00E+00	1.95E-08	3.90E-08	0.0575	2.572E+11
Cl-36	1.3124E-32	3.41	6.82	0.00E+00	4.47E-32	8.95E-32	0.0850	1.640E+11
Cm-243	2.3676E-07	3.41	6.82	0.00E+00	8.07E-07	1.61E-06	0.1250	1.420E+11
Cm-244	5.2042E-05	3.41	6.82	0.00E+00	1.77E-04	3.55E-04	0.2250	1.391E+11
Co-60	3.8208E-05	3.41	6.82	0.00E+00	1.30E-04	2.61E-04	0.3750	6.726E+10
Cs-134	4.8693E-01	3.41	6.82	0.00E+00	1.66E+00	3.32E+00	0.5750	9.238E+11
Cs-135	3.4477E-06	3.41	6.82	0.00E+00	1.18E-05	2.35E-05	0.8500	1.294E+11
Cs-137	2.8731E+00	3.41	6.82	0.00E+00	9.80E+00	1.96E+01	1.2500	2.407E+10
Eu-154	8.2053E-02	3.41	6.82	0.00E+00	2.80E-01	5.59E-01	1.7500	1.009E+09
Eu-155	3.9134E-02	3.41	6.82	0.00E+00	1.33E-01	2.67E-01	2.2500	2.117E+09
Fe-55	6.7429E-03	3.41	6.82	0.00E+00	2.30E-02	4.60E-02	2.7500	1.218E+07
H-3	1.0599E-02	3.41	6.82	0.00E+00	3.61E-02	7.23E-02	3.5000	1.351E+06
I-129	7.5300E-07	3.41	6.82	0.00E+00	2.57E-06	5.13E-06	5.0000	4.382E+00
Kr-85	2.8595E-01	3.41	6.82	0.00E+00	9.75E-01	1.95E+00	7.0000	4.891E-01
Np-237	9.5479E-06	3.41	6.82	0.00E+00	3.26E-05	6.51E-05	11.0000	5.518E-02
Pa-231	8.9297E-10	3.41	6.82	0.00E+00	3.04E-09	6.09E-09		
Pb-210	3.7609E-12	3.41	6.82	0.00E+00	1.28E-11	2.56E-11		
Pm-147	2.5452E+00	3.41	6.82	0.00E+00	8.68E+00	1.74E+01		
Pu-238	2.0550E-02	3.41	6.82	0.00E+00	7.01E-02	1.40E-01		
Pu-239	4.2838E-04	3.41	6.82	0.00E+00	1.46E-03	2.92E-03		
Pu-240	2.4401E-04	3.41	6.82	0.00E+00	8.32E-04	1.66E-03		
Pu-241	6.8764E-02	3.41	6.82	0.00E+00	2.34E-01	4.69E-01		
Pu-242	3.6329E-07	3.41	6.82	0.00E+00	1.24E-06	2.48E-06		
Ra-226	3.8045E-11	3.41	6.82	0.00E+00	1.30E-10	2.59E-10		
Ra-228	2.9902E-15	3.41	6.82	0.00E+00	1.02E-14	2.04E-14		
Ru-106	1.9055E-01	3.41	6.82	0.00E+00	6.50E-01	1.30E+00		
Se-79	1.2936E-05	3.41	6.82	0.00E+00	4.41E-05	8.82E-05		
Sn-126	1.1574E-05	3.41	6.82	0.00E+00	3.95E-05	7.89E-05		
Sr-90	2.7505E+00	3.41	6.82	0.00E+00	9.38E+00	1.88E+01		
Tc-99	4.2239E-04	3.41	6.82	0.00E+00	1.44E-03	2.88E-03		
Th-229	1.8848E-12	3.41	6.82	0.00E+00	6.43E-12	1.29E-11		
Th-230	1.7042E-08	3.41	6.82	0.00E+00	5.81E-08	1.16E-07		
Th-232	7.8132E-15	3.41	6.82	0.00E+00	2.66E-14	5.33E-14		
Ti-208	4.4063E-08	3.41	6.82	0.00E+00	1.50E-07	3.00E-07		
U-232	1.3151E-07	3.41	6.82	0.00E+00	4.48E-07	8.97E-07		
U-233	1.9564E-09	3.41	6.82	0.00E+00	6.67E-09	1.33E-08		
U-234	1.8371E-04	3.41	6.82	0.00E+00	6.26E-04	1.25E-03		
U-235	-2.7235E-06	3.41	0.00	6.46E-03	6.45E-03	6.46E-03		
U-236	1.5493E-05	3.41	6.82	0.00E+00	5.28E-05	1.06E-04		
U-238	-4.2851E-09	3.41	0.00	1.12E-04	1.12E-04	1.12E-04		
Y-90	2.7505E+00	3.41	6.82	0.00E+00	9.38E+00	1.88E+01		
Other Radionuclides					1.75E+01	3.51E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	89.99998815	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		3.41	
Bounding		6.82	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.00		
Bounding	0.01		1.00

¹Reactor shutdown, core removal storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR MTR (JALX-HEU) JAPAN
SNF ID # 603
Fuel Units & Descr. 12 - MTR TYPE
Heavy Metal Mass BOL=3.553kg EOL=3.553kg
ROD Storage Site SRS

*Fuel decay start date 2010
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
*Template Burnup(MWd), 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0.33

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	67.30	134.60	0.00E+00	9.79E-09	1.96E-08	Avg MeV	
Am-241	1.1190E-03	67.30	134.60	0.00E+00	7.53E-02	1.51E-01	0.0150	2.597E+13
Am-242m	4.5425E-07	67.30	134.60	0.00E+00	3.06E-05	6.11E-05	0.0250	5.594E+12
Am-243	1.4921E-06	67.30	134.60	0.00E+00	1.00E-04	2.01E-04	0.0375	5.162E+12
C-14	5.7244E-09	67.30	134.60	0.00E+00	3.85E-07	7.70E-07	0.0575	5.076E+12
Cl-36	1.3124E-32	67.30	134.60	0.00E+00	8.83E-31	1.77E-30	0.0850	3.236E+12
Cm-243	2.3676E-07	67.30	134.60	0.00E+00	1.59E-05	3.19E-05	0.1250	2.802E+12
Cm-244	5.2042E-05	67.30	134.60	0.00E+00	3.50E-03	7.00E-03	0.2250	2.743E+12
Co-60	3.8208E-05	67.30	134.60	0.00E+00	2.57E-03	5.14E-03	0.3750	1.328E+12
Cs-134	4.8693E-01	67.30	134.60	0.00E+00	3.28E+01	6.55E+01	0.5750	1.824E+13
Cs-135	3.4477E-06	67.30	134.60	0.00E+00	2.32E-04	4.64E-04	0.8500	2.554E+12
Cs-137	2.8731E+00	67.30	134.60	0.00E+00	1.93E+02	3.87E+02	1.2500	4.751E+11
Eu-154	8.2053E-02	67.30	134.60	0.00E+00	5.52E+00	1.10E+01	1.7500	1.993E+10
Eu-155	3.9134E-02	67.30	134.60	0.00E+00	2.63E+00	5.27E+00	2.2500	4.179E+10
Fe-55	6.7429E-03	67.30	134.60	0.00E+00	4.54E-01	9.08E-01	2.7500	2.404E+08
H-3	1.0599E-02	67.30	134.60	0.00E+00	7.13E-01	1.43E+00	3.5000	2.667E+07
I-129	7.5300E-07	67.30	134.60	0.00E+00	5.07E-05	1.01E-04	5.0000	8.009E+01
Kr-85	2.8595E-01	67.30	134.60	0.00E+00	1.92E+01	3.85E+01	7.0000	8.928E+00
Np-237	9.5479E-06	67.30	134.60	0.00E+00	6.43E-04	1.29E-03	11.0000	1.006E+00
Pa-231	8.9297E-10	67.30	134.60	0.00E+00	6.01E-08	1.20E-07		
Pb-210	3.7609E-12	67.30	134.60	0.00E+00	2.53E-10	5.06E-10		
Pm-147	2.5452E+00	67.30	134.60	0.00E+00	1.71E+02	3.43E+02		
Pu-238	2.0550E-02	67.30	134.60	0.00E+00	1.38E+00	2.77E+00		
Pu-239	4.2838E-04	67.30	134.60	0.00E+00	2.88E-02	5.77E-02		
Pu-240	2.4401E-04	67.30	134.60	0.00E+00	1.64E-02	3.28E-02		
Pu-241	6.8764E-02	67.30	134.60	0.00E+00	4.63E+00	9.26E+00		
Pu-242	3.6329E-07	67.30	134.60	0.00E+00	2.44E-05	4.89E-05		
Ra-226	3.8045E-11	67.30	134.60	0.00E+00	2.56E-09	5.12E-09		
Ra-228	2.9902E-15	67.30	134.60	0.00E+00	2.01E-13	4.02E-13		
Ru-106	1.9055E-01	67.30	134.60	0.00E+00	1.28E+01	2.56E+01		
Se-79	1.2936E-05	67.30	134.60	0.00E+00	8.71E-04	1.74E-03		
Sn-126	1.1574E-05	67.30	134.60	0.00E+00	7.79E-04	1.56E-03		
Sr-90	2.7505E+00	67.30	134.60	0.00E+00	1.85E+02	3.70E+02		
Tc-99	4.2239E-04	67.30	134.60	0.00E+00	2.84E-02	5.69E-02		
Th-229	1.8848E-12	67.30	134.60	0.00E+00	1.27E-10	2.54E-10		
Th-230	1.7042E-08	67.30	134.60	0.00E+00	1.15E-06	2.29E-06		
Th-232	7.8132E-15	67.30	134.60	0.00E+00	5.26E-13	1.05E-12		
Th-208	4.4063E-08	67.30	134.60	0.00E+00	2.97E-06	5.93E-06		
U-232	1.3151E-07	67.30	134.60	0.00E+00	8.85E-06	1.77E-05		
U-233	1.9564E-09	67.30	134.60	0.00E+00	1.32E-07	2.63E-07		
U-234	1.8371E-04	67.30	134.60	0.00E+00	1.24E-02	2.47E-02		
U-235	-2.7235E-06	67.30	0.00	6.90E-03	6.71E-03	6.90E-03		
U-236	1.5493E-05	67.30	134.60	0.00E+00	1.04E-03	2.09E-03		
U-238	-4.2851E-09	67.30	0.00	1.22E-04	1.21E-04	1.22E-04		
Y-90	2.7505E+00	67.30	134.60	0.00E+00	1.85E+02	3.70E+02		
Other Radionuclides					3.46E+02	6.92E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	89.81998522	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		67.30	
Bounding		134.60	
			Nominal burnup assumed to be 2% of BOL heavy metal mass.
			Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.06		
Bounding	0.12		
			0.98

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-HEU) JAPAN
 SNF ID #: 605
 Fuel Units & Descr: 81 - MTR TYPE
 Heavy Metal Mass: BOL=24,818kg, EOL=24 786kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2010
 Estimates as of: 2010
 Template: ATR (Light Water, Alum., 60 to 100% U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 5 years

Estimated
 Canister usage
 18"x10"
 338

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventones(Ci)	Bounding Fuel Inventones(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	30.68	61.37	0.00E+00	4.46E-09	8.93E-09	Avg. MeV	
Am-241	1.1190E-03	30.68	61.37	0.00E+00	3.43E-02	6.87E-02	0.0150	1.184E+13
Am-242m	4.5425E-07	30.68	61.37	0.00E+00	1.39E-05	2.79E-05	0.0250	2.551E+12
Am-243	1.4921E-06	30.68	61.37	0.00E+00	4.58E-05	9.16E-05	0.0375	2.354E+12
C-14	5.7244E-09	30.68	61.37	0.00E+00	1.76E-07	3.51E-07	0.0575	2.314E+12
Cl-36	1.3124E-32	30.68	61.37	0.00E+00	4.03E-31	8.05E-31	0.0850	1.476E+12
Cm-243	2.3676E-07	30.68	61.37	0.00E+00	7.26E-06	1.45E-05	0.1250	1.278E+12
Cm-244	5.2042E-05	30.68	61.37	0.00E+00	1.60E-03	3.19E-03	0.2250	1.251E+12
Co-60	3.8208E-05	30.68	61.37	0.00E+00	1.17E-03	2.34E-03	0.3750	6.053E+11
Cs-134	4.8693E-01	30.68	61.37	0.00E+00	1.49E+01	2.99E+01	0.5750	8.315E+12
Cs-135	3.4477E-06	30.68	61.37	0.00E+00	1.06E-04	2.12E-04	0.8500	1.164E+12
Cs-137	2.8731E+00	30.68	61.37	0.00E+00	8.82E+01	1.76E+02	1.2500	2.166E+11
Eu-154	8.2053E-02	30.68	61.37	0.00E+00	2.52E+00	5.04E+00	1.7500	9.084E+09
Eu-155	3.9134E-02	30.68	61.37	0.00E+00	1.20E+00	2.40E+00	2.2500	1.905E+10
Fe-55	6.7429E-03	30.68	61.37	0.00E+00	2.07E-01	4.14E-01	2.7500	1.096E+08
H-3	1.0599E-02	30.68	61.37	0.00E+00	3.25E-01	6.50E-01	3.5000	1.216E+07
I-129	7.5300E-07	30.68	61.37	0.00E+00	2.31E-05	4.62E-05	5.0000	3.836E+01
Kr-85	2.8595E-01	30.68	61.37	0.00E+00	8.77E+00	1.75E+01	7.0000	4.279E+00
Np-237	9.5479E-06	30.68	61.37	0.00E+00	2.93E-04	5.86E-04	11.0000	4.825E-01
Pa-231	8.9297E-10	30.68	61.37	0.00E+00	2.74E-08	5.48E-08		
Pb-210	3.7609E-12	30.68	61.37	0.00E+00	1.15E-10	2.31E-10		
Pm-147	2.5452E+00	30.68	61.37	0.00E+00	7.81E+01	1.56E+02		
Pu-238	2.0550E-02	30.68	61.37	0.00E+00	6.31E-01	1.26E+00		
Pu-239	4.2838E-04	30.68	61.37	0.00E+00	1.31E-02	2.63E-02		
Pu-240	2.4401E-04	30.68	61.37	0.00E+00	7.49E-03	1.50E-02		
Pu-241	6.8764E-02	30.68	61.37	0.00E+00	2.11E+00	4.22E+00		
Pu-242	3.6329E-07	30.68	61.37	0.00E+00	1.11E-05	2.23E-05		
Ra-226	3.8045E-11	30.68	61.37	0.00E+00	1.17E-09	2.33E-09		
Ra-228	2.9902E-15	30.68	61.37	0.00E+00	9.18E-14	1.84E-13		
Ru-106	1.9055E-01	30.68	61.37	0.00E+00	5.85E+00	1.17E+01		
Se-79	1.2936E-05	30.68	61.37	0.00E+00	3.97E-04	7.94E-04		
Sn-126	1.1574E-05	30.68	61.37	0.00E+00	3.55E-04	7.10E-04		
Sr-90	2.7505E+00	30.68	61.37	0.00E+00	8.44E+01	1.69E+02		
Tc-99	4.2239E-04	30.68	61.37	0.00E+00	1.30E-02	2.59E-02		
Th-229	1.8848E-12	30.68	61.37	0.00E+00	5.78E-11	1.16E-10		
Th-230	1.7042E-08	30.68	61.37	0.00E+00	5.23E-07	1.05E-06		
Th-232	7.8132E-15	30.68	61.37	0.00E+00	2.40E-13	4.79E-13		
Tl-208	4.4063E-08	30.68	61.37	0.00E+00	1.35E-06	2.70E-06		
U-232	1.3151E-07	30.68	61.37	0.00E+00	4.04E-06	8.07E-06		
U-233	1.9564E-09	30.68	61.37	0.00E+00	6.00E-08	1.20E-07		
U-234	1.8371E-04	30.68	61.37	0.00E+00	5.64E-03	1.13E-02		
U-235	-2.7235E-06	30.68	0.00	4.99E-02	4.98E-02	4.99E-02		
U-236	1.5493E-05	30.68	61.37	0.00E+00	4.75E-04	9.51E-04		
U-238	-4.2851E-09	30.68	0.00	5.84E-04	5.84E-04	5.84E-04		
Y-90	2.7505E+00	30.68	61.37	0.00E+00	8.44E+01	1.69E+02		
Other Radionuclides					1.58E+02	3.16E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93.0000613	60 to 100	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		30.68	
Bounding		61.37	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.00		
Bounding	0.01		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR MTR (UAX-HEU) NETHERLANDS
SNF ID # 609
Fuel Units & Descr 14 - MTR TYPE
Heavy Metal Mass BOL=3 192kg EOL=3 188kg
ROD Storage Site SRS

¹Fuel decay start date 2010
Estimates as of. 2010
Template* ATR (Light Water Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time* 5 years

Estimated
Canister usage,
18"x10"
0 58

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	3.98	7.96	0.00E+00	5.79E-10	1.16E-09	Avg MeV	
Am-241	1.1190E-03	3.98	7.96	0.00E+00	4.45E-03	8.90E-03	0.0150	1.535E+12
Am-242m	4.5425E-07	3.98	7.96	0.00E+00	1.81E-06	3.61E-06	0.0250	3.306E+11
Am-243	1.4921E-06	3.98	7.96	0.00E+00	5.93E-06	1.19E-05	0.0375	3.051E+11
C-14	5.7244E-09	3.98	7.96	0.00E+00	2.28E-08	4.55E-08	0.0575	3.000E+11
Cl-36	1.3124E-32	3.98	7.96	0.00E+00	5.22E-32	1.04E-31	0.0850	1.913E+11
Cm-243	2.3676E-07	3.98	7.96	0.00E+00	9.42E-07	1.88E-06	0.1250	1.657E+11
Cm-244	5.2042E-05	3.98	7.96	0.00E+00	2.07E-04	4.14E-04	0.2250	1.622E+11
Co-60	3.8208E-05	3.98	7.96	0.00E+00	1.52E-04	3.04E-04	0.3750	7.847E+10
Cs-134	4.8693E-01	3.98	7.96	0.00E+00	1.94E+00	3.87E+00	0.5750	1.078E+12
Cs-135	3.4477E-06	3.98	7.96	0.00E+00	1.37E-05	2.74E-05	0.8500	1.509E+11
Cs-137	2.8731E+00	3.98	7.96	0.00E+00	1.14E+01	2.29E+01	1.2500	2.808E+10
Eu-154	8.2053E-02	3.98	7.96	0.00E+00	3.26E-01	6.53E-01	1.7500	1.178E+09
Eu-155	3.9134E-02	3.98	7.96	0.00E+00	1.56E-01	3.11E-01	2.2500	2.470E+09
Fe-55	6.7429E-03	3.98	7.96	0.00E+00	2.68E-02	5.36E-02	2.7500	1.421E+07
H-3	1.0599E-02	3.98	7.96	0.00E+00	4.22E-02	8.43E-02	3.5000	1.576E+06
I-129	7.5300E-07	3.98	7.96	0.00E+00	3.00E-06	5.99E-06	5.0000	4.971E+00
Kr-85	2.8595E-01	3.98	7.96	0.00E+00	1.14E+00	2.27E+00	7.0000	5.544E-01
Np-237	9.5479E-06	3.98	7.96	0.00E+00	3.80E-05	7.60E-05	11.0000	6.252E-02
Pa-231	8.9297E-10	3.98	7.96	0.00E+00	3.55E-09	7.10E-09		
Pb-210	3.7609E-12	3.98	7.96	0.00E+00	1.50E-11	2.99E-11		
Pm-147	2.5452E+00	3.98	7.96	0.00E+00	1.01E+01	2.02E+01		
Pu-238	2.0550E-02	3.98	7.96	0.00E+00	8.17E-02	1.63E-01		
Pu-239	4.2838E-04	3.98	7.96	0.00E+00	1.70E-03	3.41E-03		
Pu-240	2.4401E-04	3.98	7.96	0.00E+00	9.71E-04	1.94E-03		
Pu-241	6.8764E-02	3.98	7.96	0.00E+00	2.74E-01	5.47E-01		
Pu-242	3.6329E-07	3.98	7.96	0.00E+00	1.44E-06	2.89E-06		
Ra-226	3.8045E-11	3.98	7.96	0.00E+00	1.51E-10	3.03E-10		
Ra-228	2.9902E-15	3.98	7.96	0.00E+00	1.19E-14	2.38E-14		
Ru-106	1.9055E-01	3.98	7.96	0.00E+00	7.58E-01	1.52E+00		
Se-79	1.2936E-05	3.98	7.96	0.00E+00	5.15E-05	1.03E-04		
Sn-126	1.1574E-05	3.98	7.96	0.00E+00	4.60E-05	9.21E-05		
Sr-90	2.7505E+00	3.98	7.96	0.00E+00	1.09E+01	2.19E+01		
Tc-99	4.2239E-04	3.98	7.96	0.00E+00	1.68E-03	3.36E-03		
Th-229	1.8848E-12	3.98	7.96	0.00E+00	7.50E-12	1.50E-11		
Th-230	1.7042E-08	3.98	7.96	0.00E+00	6.78E-08	1.36E-07		
Th-232	7.8132E-15	3.98	7.96	0.00E+00	3.11E-14	6.22E-14		
Ti-208	4.4063E-08	3.98	7.96	0.00E+00	1.75E-07	3.51E-07		
U-232	1.3151E-07	3.98	7.96	0.00E+00	5.23E-07	1.05E-06		
U-233	1.9564E-09	3.98	7.96	0.00E+00	7.78E-09	1.56E-08		
U-234	1.8371E-04	3.98	7.96	0.00E+00	7.31E-04	1.46E-03		
U-235	-2.7235E-06	3.98	0.00	6.42E-03	6.40E-03	6.42E-03		
U-236	1.5493E-05	3.98	7.96	0.00E+00	6.16E-05	1.23E-04		
U-238	-4.2851E-09	3.98	0.00	7.51E-05	7.51E-05	7.51E-05		
Y-90	2.7505E+00	3.98	7.96	0.00E+00	1.09E+01	2.19E+01		
Other Radionuclides					2.05E+01	4.09E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	Fuel Cladding	ALUM	
	BOL HM Constituents	U	
BOL Enrichment %	92.9999964	60 to 100	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
		3.98	
Bounding		7.96	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0.00		
Bounding	0.01		1.00

¹Reactor shutdown, core removal storage, shipping or other date confirming that Irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-HEU) TAIWAN
 SNF ID #: 628
 Fuel Units & Descr: 35 - MTR TYPE
 Heavy Metal Mass: BOL=4 764kg, EOL=4 76kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2010
 Estimates as of: 2010
 Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0 00116689
 Template Decay Time: 5 years

Estimated
 Canister usage
 18"x10"
 1 46

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 4545E-10	3 31	6 63	0 00E+00	4 82E-10	9 64E-10	Avg. MeV	
Am-241	1 1190E-03	3 31	6 63	0 00E+00	3 71E-03	7 42E-03	0 0150	1 279E+12
Am-242m	4 5425E-07	3 31	6 63	0 00E+00	1 51E-06	3 01E-06	0 0250	2 755E+11
Am-243	1 4921E-06	3 31	6 63	0 00E+00	4 95E-06	9 89E-06	0 0375	2 543E+11
C-14	5 7244E-09	3 31	6 63	0 00E+00	1 90E-08	3 79E-08	0 0575	2 500E+11
Cl-36	1 3124E-32	3 31	6 63	0 00E+00	4 35E-32	8 70E-32	0 0850	1 594E+11
Cm-243	2 3676E-07	3 31	6 63	0 00E+00	7 85E-07	1 57E-06	0 1250	1 381E+11
Cm-244	5 2042E-05	3 31	6 63	0 00E+00	1 72E-04	3 45E-04	0 2250	1 353E+11
Co-60	3 8208E-05	3 31	6 63	0 00E+00	1 27E-04	2 53E-04	0 3750	6 539E+10
Cs-134	4 8693E-01	3 31	6 63	0 00E+00	1 61E+00	3 23E+00	0 5750	8 982E+11
Cs-135	3 4477E-06	3 31	6 63	0 00E+00	1 14E-05	2 29E-05	0 8500	1 258E+11
Cs-137	2 8731E+00	3 31	6 63	0 00E+00	9 52E+00	1 90E+01	1 2500	2 340E+10
Eu-154	8 2053E-02	3 31	6 63	0 00E+00	2 72E-01	5 44E-01	1 7500	9 813E+08
Eu-155	3 9134E-02	3 31	6 63	0 00E+00	1 30E-01	2 59E-01	2 2500	2 058E+09
Fe-55	6 7429E-03	3 31	6 63	0 00E+00	2 24E-02	4 47E-02	2 7500	1 184E+07
H-3	1 0599E-02	3 31	6 63	0 00E+00	3 51E-02	7 03E-02	3 5000	1 313E+06
I-129	7 5300E-07	3 31	6 63	0 00E+00	2 50E-06	4 99E-06	5 0000	4 306E+00
Kr-85	2 8595E-01	3 31	6 63	0 00E+00	9 48E-01	1 90E+00	7 0000	4 805E-01
Np-237	9 5479E-06	3 31	6 63	0 00E+00	3 16E-05	6 33E-05	11 0000	5 420E-02
Pa-231	8 9297E-10	3 31	6 63	0 00E+00	2 96E-09	5 92E-09		
Pb-210	3 7609E-12	3 31	6 63	0 00E+00	1 25E-11	2 49E-11		
Pm-147	2 5452E+00	3 31	6 63	0 00E+00	8 44E+00	1 69E+01		
Pu-238	2 0550E-02	3 31	6 63	0 00E+00	6 81E-02	1 36E-01		
Pu-239	4 2838E-04	3 31	6 63	0 00E+00	1 42E-03	2 84E-03		
Pu-240	2 4401E-04	3 31	6 63	0 00E+00	8 09E-04	1 62E-03		
Pu-241	6 8764E-02	3 31	6 63	0 00E+00	2 28E-01	4 56E-01		
Pu-242	3 6329E-07	3 31	6 63	0 00E+00	1 20E-06	2 41E-06		
Ra-226	3 8045E-11	3 31	6 63	0 00E+00	1 26E-10	2 52E-10		
Ra-228	2 9902E-15	3 31	6 63	0 00E+00	9 91E-15	1 98E-14		
Ru-106	1 9055E-01	3 31	6 63	0 00E+00	6 32E-01	1 26E+00		
Se-79	1 2936E-05	3 31	6 63	0 00E+00	4 29E-05	8 58E-05		
Sn-126	1 1574E-05	3 31	6 63	0 00E+00	3 84E-05	7 67E-05		
Sr-90	2 7505E+00	3 31	6 63	0 00E+00	9 12E+00	1 82E+01		
Tc-99	4 2239E-04	3 31	6 63	0 00E+00	1 40E-03	2 80E-03		
Th-229	1 8848E-12	3 31	6 63	0 00E+00	6 25E-12	1 25E-11		
Th-230	1 7042E-08	3 31	6 63	0 00E+00	5 65E-08	1 13E-07		
Th-232	7 8132E-15	3 31	6 63	0 00E+00	2 59E-14	5 18E-14		
Ti-208	4 4063E-08	3 31	6 63	0 00E+00	1 46E-07	2 92E-07		
U-232	1 3151E-07	3 31	6 63	0 00E+00	4 36E-07	8 72E-07		
U-233	1 9564E-09	3 31	6 63	0 00E+00	6 48E-09	1 30E-08		
U-234	1 8371E-04	3 31	6 63	0 00E+00	6 09E-04	1 22E-03		
U-235	-2 7235E-06	3 31	0 00	9 59E-03	9 58E-03	9 59E-03		
U-236	1 5493E-05	3 31	6 63	0 00E+00	5 14E-05	1 03E-04		
U-238	-4 2851E-09	3 31	0 00	1 09E-04	1 09E-04	1 09E-04		
Y-90	2 7505E+00	3 31	6 63	0 00E+00	9 12E+00	1 82E+01		
Other Radionuclides					1 70E+01	3 41E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ALUM	ALUM	
	U	U	
	93 19000561	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal Bounding	From SFD	Estimated	
		3 31 6 63	

Checks			Estimated EOL HM/Given EOL HM
Nominal Bounding	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0 00 0 00		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR MTR (JALX-LEU) ARGENTINA

SNF ID # 547

Fuel Units & Descr 30 - ASSEMBLY

Heavy Metal Mass BOL=18 75kg EOL=18 714kg

ROD Storage Site SRS

¹Fuel decay start date 2010

Estimates as of 2010

Template ATR (Light Water, Alum, 60 to 100%, U)

²Template Burnup(MWd) 367.2

Template BOL Heavy Metal Mass (MT) 0.00116689

Template Decay Time 5 years

Estimated

Canister usage

18"x10"

1.25

II. Estimates		m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)	Avg MeV
Ac-227	1.4545E-10	34.09	68.19	0.00E+00	4.96E-09	9.92E-09	0.0150	1.316E+13	0.0150
Am-241	1.1190E-03	34.09	68.19	0.00E+00	3.82E-02	7.63E-02	0.0250	2.834E+12	0.0250
Am-242m	4.5425E-07	34.09	68.19	0.00E+00	1.55E-05	3.10E-05	0.0375	2.615E+12	0.0375
Am-243	1.4921E-06	34.09	68.19	0.00E+00	5.09E-05	1.02E-04	0.0675	2.572E+12	0.0675
C-14	5.7244E-09	34.09	68.19	0.00E+00	1.95E-07	3.90E-07	0.0850	1.639E+12	0.0850
Cl-36	1.3124E-32	34.09	68.19	0.00E+00	4.47E-31	8.95E-31	0.1250	1.420E+12	0.1250
Cm-243	2.3676E-07	34.09	68.19	0.00E+00	8.07E-06	1.61E-05	0.2250	1.390E+12	0.2250
Cm-244	5.2042E-05	34.09	68.19	0.00E+00	1.77E-03	3.55E-03	0.3750	6.726E+11	0.3750
Co-60	3.8208E-05	34.09	68.19	0.00E+00	1.30E-03	2.61E-03	0.5750	9.238E+12	0.5750
Cs-134	4.8693E-01	34.09	68.19	0.00E+00	1.66E+01	3.32E+01	0.8500	1.294E+12	0.8500
Cs-135	3.4477E-06	34.09	68.19	0.00E+00	1.18E-04	2.35E-04	1.2500	2.407E+11	1.2500
Cs-137	2.8731E+00	34.09	68.19	0.00E+00	9.80E+01	1.96E+02	1.7500	1.009E+10	1.7500
Eu-154	8.2053E-02	34.09	68.19	0.00E+00	2.80E+00	5.59E+00	2.2500	2.117E+10	2.2500
Eu-155	3.9134E-02	34.09	68.19	0.00E+00	1.33E+00	2.67E+00	2.7500	1.218E+08	2.7500
Fe-55	6.7429E-03	34.09	68.19	0.00E+00	2.30E-01	4.60E-01	3.5000	1.351E+07	3.5000
H-3	1.0599E-02	34.09	68.19	0.00E+00	3.61E-01	7.23E-01	5.0000	5.204E+01	5.0000
I-129	7.5300E-07	34.09	68.19	0.00E+00	2.57E-05	5.13E-05	7.0000	5.843E+00	7.0000
Kr-85	2.8595E-01	34.09	68.19	0.00E+00	9.75E+00	1.95E+01	11.0000	6.617E-01	11.0000
Np-237	9.5479E-06	34.09	68.19	0.00E+00	3.26E-04	6.51E-04			
Pa-231	8.9297E-10	34.09	68.19	0.00E+00	3.04E-08	6.09E-08			
Pb-210	3.7609E-12	34.09	68.19	0.00E+00	1.28E-10	2.56E-10			
Pm-147	2.5452E+00	34.09	68.19	0.00E+00	8.68E+01	1.74E+02			
Pu-238	2.0550E-02	34.09	68.19	0.00E+00	7.01E-01	1.40E+00			
Pu-239	4.2838E-04	34.09	68.19	0.00E+00	1.46E-02	2.92E-02			
Pu-240	2.4401E-04	34.09	68.19	0.00E+00	8.32E-03	1.66E-02			
Pu-241	6.8764E-02	34.09	68.19	0.00E+00	2.34E+00	4.69E+00			
Pu-242	3.6329E-07	34.09	68.19	0.00E+00	1.24E-05	2.48E-05			
Ra-226	3.8045E-11	34.09	68.19	0.00E+00	1.30E-09	2.59E-09			
Ra-228	2.9902E-15	34.09	68.19	0.00E+00	1.02E-13	2.04E-13			
Ru-106	1.9055E-01	34.09	68.19	0.00E+00	6.50E+00	1.30E+01			
Se-79	1.2936E-05	34.09	68.19	0.00E+00	4.41E-04	8.82E-04			
Sn-126	1.1574E-05	34.09	68.19	0.00E+00	3.95E-04	7.89E-04			
Sr-90	2.7505E+00	34.09	68.19	0.00E+00	9.38E+01	1.88E+02			
Tc-99	4.2239E-04	34.09	68.19	0.00E+00	1.44E-02	2.88E-02			
Th-229	1.8848E-12	34.09	68.19	0.00E+00	6.43E-11	1.29E-10			
Th-230	1.7042E-08	34.09	68.19	0.00E+00	5.81E-07	1.16E-06			
Th-232	7.8132E-15	34.09	68.19	0.00E+00	2.66E-13	5.33E-13			
Ti-208	4.4063E-08	34.09	68.19	0.00E+00	1.50E-06	3.00E-06			
U-232	1.3151E-07	34.09	68.19	0.00E+00	4.48E-06	8.97E-06			
U-233	1.9564E-09	34.09	68.19	0.00E+00	6.67E-08	1.33E-07			
U-234	1.8371E-04	34.09	68.19	0.00E+00	6.26E-03	1.25E-02			
U-235	-2.7235E-06	34.09	0.00	8.10E-03	8.01E-03	8.10E-03			
U-236	1.5493E-05	34.09	68.19	0.00E+00	5.28E-04	1.06E-03			
U-238	-4.2851E-09	34.09	0.00	5.04E-03	5.04E-03	5.04E-03			
Y-90	2.7505E+00	34.09	68.19	0.00E+00	9.38E+01	1.88E+02			
Other Radionuclides					1.75E+02	3.51E+02			

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Reactor Moderator	From SFD	Used	Basis for Parameter Differences*
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match
BOL HM Constituents	U	U	
BOL Enrichment %	20	60 to 100	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate*
Nominal		34.09	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding		68.19	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.01		1.00
Bounding	0.01		

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-LEU) JAPAN
SNF ID #: 551
Fuel Units & Descr: 27 - ASSEMBLY
Heavy Metal Mass: BOL=17 482kg, EOL=17 469kg
ROD Storage Site: SRS

Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
1 13

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	12.78	25.57	0.00E+00	1.86E-09	3.72E-09	Avg MeV	-
Am-241	1.1190E-03	12.78	25.57	0.00E+00	1.43E-02	2.86E-02	0.0150	4.933E+12
Am-242m	4.5425E-07	12.78	25.57	0.00E+00	5.81E-06	1.16E-05	0.0250	1.063E+12
Am-243	1.4921E-06	12.78	25.57	0.00E+00	1.91E-05	3.82E-05	0.0375	9.807E+11
C-14	5.7244E-09	12.78	25.57	0.00E+00	7.32E-08	1.46E-07	0.0575	9.643E+11
Cl-36	1.3124E-32	12.78	25.57	0.00E+00	1.68E-31	3.36E-31	0.0850	6.148E+11
Cm-243	2.3676E-07	12.78	25.57	0.00E+00	3.03E-06	6.05E-06	0.1250	5.324E+11
Cm-244	5.2042E-05	12.78	25.57	0.00E+00	6.65E-04	1.33E-03	0.2250	5.212E+11
Co-60	3.8208E-05	12.78	25.57	0.00E+00	4.88E-04	9.77E-04	0.3750	2.522E+11
Cs-134	4.8693E-01	12.78	25.57	0.00E+00	6.23E+00	1.25E+01	0.5750	3.464E+12
Cs-135	3.4477E-06	12.78	25.57	0.00E+00	4.41E-05	8.82E-05	0.8500	4.852E+11
Cs-137	2.8731E+00	12.78	25.57	0.00E+00	3.67E+01	7.35E+01	1.2500	9.026E+10
Eu-154	8.2053E-02	12.78	25.57	0.00E+00	1.05E+00	2.10E+00	1.7500	3.785E+09
Eu-155	3.9134E-02	12.78	25.57	0.00E+00	5.00E-01	1.00E+00	2.2500	7.939E+09
Fe-55	6.7429E-03	12.78	25.57	0.00E+00	8.62E-02	1.72E-01	2.7500	4.568E+07
H-3	1.0599E-02	12.78	25.57	0.00E+00	1.36E-01	2.71E-01	3.5000	5.066E+06
I-129	7.5300E-07	12.78	25.57	0.00E+00	9.63E-06	1.93E-05	5.0000	2.601E+01
Kr-85	2.8595E-01	12.78	25.57	0.00E+00	3.66E+00	7.31E+00	7.0000	2.939E+00
Np-237	9.5479E-06	12.78	25.57	0.00E+00	1.22E-04	2.44E-04	11.0000	3.341E-01
Pa-231	8.9297E-10	12.78	25.57	0.00E+00	1.14E-08	2.28E-08		
Pb-210	3.7609E-12	12.78	25.57	0.00E+00	4.81E-11	9.62E-11		
Pm-147	2.5452E+00	12.78	25.57	0.00E+00	3.25E+01	6.51E+01		
Pu-238	2.0550E-02	12.78	25.57	0.00E+00	2.63E-01	5.25E-01		
Pu-239	4.2838E-04	12.78	25.57	0.00E+00	5.48E-03	1.10E-02		
Pu-240	2.4401E-04	12.78	25.57	0.00E+00	3.12E-03	6.24E-03		
Pu-241	6.8764E-02	12.78	25.57	0.00E+00	8.79E-01	1.76E+00		
Pu-242	3.6329E-07	12.78	25.57	0.00E+00	4.64E-06	9.29E-06		
Ra-226	3.8045E-11	12.78	25.57	0.00E+00	4.86E-10	9.73E-10		
Ra-228	2.9902E-15	12.78	25.57	0.00E+00	3.82E-14	7.65E-14		
Ru-106	1.9055E-01	12.78	25.57	0.00E+00	2.44E+00	4.87E+00		
Se-79	1.2936E-05	12.78	25.57	0.00E+00	1.65E-04	3.31E-04		
Sn-126	1.1574E-05	12.78	25.57	0.00E+00	1.48E-04	2.96E-04		
Sr-90	2.7505E+00	12.78	25.57	0.00E+00	3.52E+01	7.03E+01		
Tc-99	4.2239E-04	12.78	25.57	0.00E+00	5.40E-03	1.08E-02		
Th-229	1.8848E-12	12.78	25.57	0.00E+00	2.41E-11	4.82E-11		
Th-230	1.7042E-08	12.78	25.57	0.00E+00	2.18E-07	4.36E-07		
Th-232	7.8132E-15	12.78	25.57	0.00E+00	9.99E-14	2.00E-13		
Tl-208	4.4063E-08	12.78	25.57	0.00E+00	5.63E-07	1.13E-06		
U-232	1.3151E-07	12.78	25.57	0.00E+00	1.68E-06	3.36E-06		
U-233	1.9564E-09	12.78	25.57	0.00E+00	2.50E-08	5.00E-08		
U-234	1.8371E-04	12.78	25.57	0.00E+00	2.35E-03	4.70E-03		
U-235	-2.7235E-06	12.78	0.00	7.56E-03	7.52E-03	7.56E-03		
U-236	1.5493E-05	12.78	25.57	0.00E+00	1.98E-04	3.96E-04		
U-238	-4.2851E-09	12.78	0.00	4.70E-03	4.70E-03	4.70E-03		
Y-90	2.7505E+00	12.78	25.57	0.00E+00	3.52E+01	7.03E+01		
Other Radionuclides					6.58E+01	1.32E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ALUM	ALUM	
	U	U	
	20 00000092	60 to 100	This Template was used for the following reasons: This fuel matches on all parameters except enrichment.

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
Nominal Bounding	From SFD	Estimated	
		12.78 25.57	
			Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
Nominal Bounding	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0.00 0.00		
			1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (JALX-LEU) TAIWAN
SNF ID #: 555
Fuel Units & Descr: 23 - ASSEMBLY
Heavy Metal Mass BOL=34 797kg, EOL=34 797kg
ROD Storage Site SRS

¹Fuel decay start date 2010
Estimates as of. 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0 00116689
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0 96

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	659 06	1,318 13	0 00E+00	9 59E-08	1 92E-07	Avg MeV	
Am-241	1.1190E-03	659 06	1,318 13	0 00E+00	7.37E-01	1.47E+00	0 0150	2.543E+14
Am-242m	4.5425E-07	659 06	1,318 13	0 00E+00	2 99E-04	5 99E-04	0 0250	5 479E+13
Am-243	1 4921E-06	659 06	1,318 13	0 00E+00	9 83E-04	1 97E-03	0 0375	5 056E+13
C-14	5 7244E-09	659 06	1,318 13	0 00E+00	3 77E-06	7 55E-06	0 0575	4 971E+13
Cl-36	1.3124E-32	659 06	1,318 13	0 00E+00	8 65E-30	1 73E-29	0 0850	3 169E+13
Cm-243	2 3676E-07	659 06	1,318 13	0 00E+00	1.56E-04	3 12E-04	0 1250	2 744E+13
Cm-244	5.2042E-05	659 06	1,318 13	0 00E+00	3 43E-02	6 86E-02	0 2250	2.686E+13
Co-60	3 8208E-05	659 06	1,318 13	0 00E+00	2 52E-02	5 04E-02	0 3750	1.300E+13
Cs-134	4 8693E-01	659 06	1,318 13	0 00E+00	3.21E+02	6 42E+02	0 5750	1 786E+14
Cs-135	3 4477E-06	659 06	1,318 13	0 00E+00	2 27E-03	4 54E-03	0 8500	2.501E+13
Cs-137	2 8731E+00	659 06	1,318 13	0 00E+00	1 89E+03	3 79E+03	1.2500	4 653E+12
Eu-154	8 2063E-02	659 06	1,318 13	0 00E+00	5 41E+01	1 08E+02	1 7500	1.951E+11
Eu-155	3 9134E-02	659 06	1,318 13	0 00E+00	2 58E+01	5 16E+01	2.2500	4.093E+11
Fe-55	6 7429E-03	659 06	1,318 13	0 00E+00	4 44E+00	8 89E+00	2 7500	2.355E+09
H-3	1 0599E-02	659 06	1,318 13	0 00E+00	6 99E+00	1 40E+01	3 5000	2.611E+08
I-129	7 5300E-07	659 06	1,318 13	0 00E+00	4 96E-04	9 93E-04	5 0000	8 023E+02
Kr-85	2 8595E-01	659 06	1,318 13	0 00E+00	1 88E+02	3 77E+02	7 0000	8.952E+01
Np-237	9 5479E-06	659 06	1,318 13	0 00E+00	6 29E-03	1.26E-02	11 0000	1.010E+01
Pa-231	8 9297E-10	659 06	1,318 13	0 00E+00	5 89E-07	1.18E-06		
Pb-210	3 7609E-12	659 06	1,318 13	0 00E+00	2 48E-09	4.96E-09		
Pm-147	2.5452E+00	659 06	1,318 13	0 00E+00	1 68E+03	3 35E+03		
Pu-238	2.0500E-02	659 06	1,318 13	0 00E+00	1 35E+01	2 71E+01		
Pu-239	4.2838E-04	659 06	1,318 13	0 00E+00	2 82E-01	5 65E-01		
Pu-240	2.4401E-04	659 06	1,318 13	0 00E+00	1 61E-01	3.22E-01		
Pu-241	6.8764E-02	659 06	1,318 13	0 00E+00	4 53E+01	9 06E+01		
Pu-242	3 6329E-07	659 06	1,318 13	0 00E+00	2.39E-04	4 79E-04		
Ra-226	3 8045E-11	659 06	1,318 13	0 00E+00	2.51E-08	5 01E-08		
Ra-228	2 9902E-15	659 06	1,318 13	0 00E+00	1.97E-12	3 94E-12		
Ru-106	1 9055E-01	659 06	1,318 13	0 00E+00	1.26E+02	2.51E+02		
Se-79	1.2936E-05	659 06	1,318 13	0 00E+00	8.53E-03	1 71E-02		
Sn-126	1 1574E-05	659 06	1,318 13	0 00E+00	7.63E-03	1 53E-02		
Sr-90	2 7505E+00	659 06	1,318 13	0 00E+00	1.81E+03	3 63E+03		
Tc-99	4 2239E-04	659 06	1,318 13	0 00E+00	2 78E-01	5 57E-01		
Th-229	1 8848E-12	659 06	1,318 13	0 00E+00	1.24E-09	2 48E-09		
Th-230	1 7042E-08	659 06	1,318 13	0 00E+00	1 12E-05	2 25E-05		
Th-232	7 8132E-15	659 06	1,318 13	0 00E+00	5 15E-12	1 03E-11		
Ti-208	4 4063E-08	659 06	1,318 13	0 00E+00	2 90E-05	5 81E-05		
U-232	1.3151E-07	659 06	1,318 13	0 00E+00	8 67E-05	1 73E-04		
U-233	1 9564E-09	659 06	1,318 13	0 00E+00	1 29E-06	2 58E-06		
U-234	1 8371E-04	659 06	1,318 13	0 00E+00	1 21E-01	2 42E-01		
U-235	-2 7235E-06	659 06	0 00	1 49E-02	1 31E-02	1 49E-02		
U-236	1.5493E-05	659 06	1,318 13	0 00E+00	1 02E-02	2 04E-02		
U-238	-4.2851E-09	659 06	0 00	9 38E-03	9 37E-03	9 38E-03		
Y-90	2.7505E+00	659 06	1,318 13	0 00E+00	1 81E+03	3 63E+03		
Other Radionuclides					3 39E+03	6 78E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19 83000026	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		659 06	Nominal burnup assumed to be 2% of BOL heavy metal mass
Bounding		1,318 13	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0 06		0 96
Bounding	0 12		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-LEU) VENEZUELA
 SNF ID #: 559
 Fuel Units & Descr: 64 - ASSEMBLY
 Heavy Metal Mass: BOL=43.2kg, EOL=39.046kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2010
 Estimates as of: 2010
 Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 5 years

Estimated
 Canister usage
 18"x10"
 2.67

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	3,933.54	7,867.08	0.00E+00	5.72E-07	1.14E-06	Avg MeV	
Am-241	1.1190E-03	3,933.54	7,867.08	0.00E+00	4.40E+00	8.80E+00	0.0150	1.518E+15
Am-242m	4.5425E-07	3,933.54	7,867.08	0.00E+00	1.79E-03	3.57E-03	0.0250	3.270E+14
Am-243	1.4921E-06	3,933.54	7,867.08	0.00E+00	5.87E-03	1.17E-02	0.0375	3.017E+14
C-14	5.7244E-09	3,933.54	7,867.08	0.00E+00	2.25E-05	4.50E-05	0.0575	2.967E+14
Cl-36	1.3124E-32	3,933.54	7,867.08	0.00E+00	5.16E-29	1.03E-28	0.0850	1.891E+14
Cm-243	2.3676E-07	3,933.54	7,867.08	0.00E+00	9.31E-04	1.86E-03	0.1250	1.638E+14
Cm-244	5.2042E-05	3,933.54	7,867.08	0.00E+00	2.05E-01	4.09E-01	0.2250	1.603E+14
Co-60	3.8208E-05	3,933.54	7,867.08	0.00E+00	1.50E-01	3.01E-01	0.3750	7.760E+13
Cs-134	4.8693E-01	3,933.54	7,867.08	0.00E+00	1.92E+03	3.83E+03	0.5750	1.066E+15
Cs-135	3.4477E-06	3,933.54	7,867.08	0.00E+00	1.36E-02	2.71E-02	0.8500	1.493E+14
Cs-137	2.8731E+00	3,933.54	7,867.08	0.00E+00	1.13E+04	2.26E+04	1.2500	2.777E+13
Eu-154	8.2053E-02	3,933.54	7,867.08	0.00E+00	3.23E+02	6.46E+02	1.7500	1.165E+12
Eu-155	3.9134E-02	3,933.54	7,867.08	0.00E+00	1.54E+02	3.08E+02	2.2500	2.443E+12
Fe-55	6.7429E-03	3,933.54	7,867.08	0.00E+00	2.65E+01	5.30E+01	2.7500	1.405E+10
H-3	1.0599E-02	3,933.54	7,867.08	0.00E+00	4.17E+01	8.34E+01	3.5000	1.559E+09
I-129	7.5300E-07	3,933.54	7,867.08	0.00E+00	2.96E-03	5.92E-03	5.0000	4.686E+03
Kr-85	2.8595E-01	3,933.54	7,867.08	0.00E+00	1.12E+03	2.25E+03	7.0000	5.225E+02
Np-237	9.5479E-06	3,933.54	7,867.08	0.00E+00	3.76E-02	7.51E-02	11.0000	5.890E+01
Pa-231	8.9297E-10	3,933.54	7,867.08	0.00E+00	3.51E-06	7.03E-06		
Pb-210	3.7609E-12	3,933.54	7,867.08	0.00E+00	1.48E-08	2.96E-08		
Pm-147	2.5452E+00	3,933.54	7,867.08	0.00E+00	1.00E+04	2.00E+04		
Pu-238	2.0550E-02	3,933.54	7,867.08	0.00E+00	8.08E+01	1.62E+02		
Pu-239	4.2838E-04	3,933.54	7,867.08	0.00E+00	1.69E+00	3.37E+00		
Pu-240	2.4401E-04	3,933.54	7,867.08	0.00E+00	9.60E-01	1.92E+00		
Pu-241	6.8764E-02	3,933.54	7,867.08	0.00E+00	2.70E+02	5.41E+02		
Pu-242	3.6329E-07	3,933.54	7,867.08	0.00E+00	1.43E-03	2.86E-03		
Ra-226	3.8045E-11	3,933.54	7,867.08	0.00E+00	1.50E-07	2.99E-07		
Ra-228	2.9902E-15	3,933.54	7,867.08	0.00E+00	1.18E-11	2.35E-11		
Ru-106	1.9055E-01	3,933.54	7,867.08	0.00E+00	7.50E+02	1.50E+03		
Se-79	1.2936E-05	3,933.54	7,867.08	0.00E+00	5.09E-02	1.02E-01		
Sn-126	1.1574E-05	3,933.54	7,867.08	0.00E+00	4.55E-02	9.11E-02		
Sr-90	2.7505E+00	3,933.54	7,867.08	0.00E+00	1.08E+04	2.16E+04		
Tc-99	4.2239E-04	3,933.54	7,867.08	0.00E+00	1.66E+00	3.32E+00		
Th-229	1.8848E-12	3,933.54	7,867.08	0.00E+00	7.41E-09	1.48E-08		
Th-230	1.7042E-08	3,933.54	7,867.08	0.00E+00	6.70E-05	1.34E-04		
Th-232	7.8132E-15	3,933.54	7,867.08	0.00E+00	3.07E-11	6.15E-11		
Th-208	4.4063E-08	3,933.54	7,867.08	0.00E+00	1.73E-04	3.47E-04		
U-232	1.3151E-07	3,933.54	7,867.08	0.00E+00	5.17E-04	1.03E-03		
U-233	1.9564E-09	3,933.54	7,867.08	0.00E+00	7.70E-06	1.54E-05		
U-234	1.8371E-04	3,933.54	7,867.08	0.00E+00	7.23E-01	1.45E+00		
U-235	-2.7235E-06	3,933.54	0.00	1.87E-02	7.96E-03	1.87E-02		
U-236	1.5493E-05	3,933.54	7,867.08	0.00E+00	6.09E-02	1.22E-01		
U-238	-4.2851E-09	3,933.54	0.00	1.16E-02	1.16E-02	1.16E-02		
Y-90	2.7505E+00	3,933.54	7,867.08	0.00E+00	1.08E+04	2.16E+04		
Other Radionuclides								
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							1.99E+02	3.99E+02
							Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

From SFD		Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	20	60 to 100	

This Template was used for the following reasons:
 This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)²

From SFD		Estimated	Basis for burnup used in estimate:
Nominal		3,933.54	
Bounding		7,867.08	

Nominal burnup calculated from the heavy metal mass destroyed
 Bounding burnup assumed to be twice nominal burnup

Checks

Burnup Multiplier		Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.29		
Bounding	0.58		

1.01

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR MTR (UALX-MEU) JAPAN
SNF ID # 565
Fuel Units & Descr: 30 - MTR TYPE
Heavy Metal Mass: BOL=21.543kg, EOL=21.525kg
ROD Storage Site: SRS

¹Fuel decay start date 2010
Estimates as of: 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
125

II. Estimates	m	X _n	X _b	b	Y _n	Y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	17.05	34.09	0.00E+00	2.48E-09	4.96E-09	Avg MeV	
Am-241	1.1190E-03	17.05	34.09	0.00E+00	1.91E-02	3.82E-02	0.0150	6.578E+12
Am-242m	4.5425E-07	17.05	34.09	0.00E+00	7.74E-06	1.55E-05	0.0250	1.417E+12
Am-243	1.4921E-06	17.05	34.09	0.00E+00	2.54E-05	5.09E-05	0.0375	1.308E+12
C-14	5.7244E-09	17.05	34.09	0.00E+00	9.76E-08	1.95E-07	0.0575	1.286E+12
Cl-36	1.3124E-32	17.05	34.09	0.00E+00	2.24E-31	4.47E-31	0.0850	8.197E+11
Cm-243	2.3676E-07	17.05	34.09	0.00E+00	4.04E-06	8.07E-06	0.1250	7.099E+11
Cm-244	5.2042E-05	17.05	34.09	0.00E+00	8.87E-04	1.77E-03	0.2250	6.951E+11
Co-60	3.8208E-05	17.05	34.09	0.00E+00	6.51E-04	1.30E-03	0.3750	3.363E+11
Cs-134	4.8693E-01	17.05	34.09	0.00E+00	8.30E+00	1.66E+01	0.5750	4.619E+12
Cs-135	3.4477E-06	17.05	34.09	0.00E+00	5.88E-05	1.18E-04	0.8500	6.469E+11
Cs-137	2.8731E+00	17.05	34.09	0.00E+00	4.90E+01	9.80E+01	1.2500	1.204E+11
Eu-154	8.2053E-02	17.05	34.09	0.00E+00	1.40E+00	2.80E+00	1.7500	5.047E+09
Eu-155	3.9134E-02	17.05	34.09	0.00E+00	6.67E-01	1.33E+00	2.2500	1.059E+10
Fe-55	6.7429E-03	17.05	34.09	0.00E+00	1.15E-01	2.30E-01	2.7500	6.090E+07
H-3	1.0599E-02	17.05	34.09	0.00E+00	1.81E-01	3.61E-01	3.5000	6.754E+06
I-129	7.5300E-07	17.05	34.09	0.00E+00	1.28E-05	2.57E-05	5.0000	2.960E+01
Kr-85	2.8595E-01	17.05	34.09	0.00E+00	4.87E+00	9.75E+00	7.0000	3.333E+00
Np-237	9.5479E-06	17.05	34.09	0.00E+00	1.63E-04	3.26E-04	11.0000	3.780E-01
Pa-231	8.9297E-10	17.05	34.09	0.00E+00	1.52E-08	3.04E-08		
Pb-210	3.7609E-12	17.05	34.09	0.00E+00	6.41E-11	1.28E-10		
Pm-147	2.5452E+00	17.05	34.09	0.00E+00	4.34E+01	8.68E+01		
Pu-238	2.0550E-02	17.05	34.09	0.00E+00	3.50E-01	7.01E-01		
Pu-239	4.2838E-04	17.05	34.09	0.00E+00	7.30E-03	1.46E-02		
Pu-240	2.4401E-04	17.05	34.09	0.00E+00	4.16E-03	8.32E-03		
Pu-241	6.8764E-02	17.05	34.09	0.00E+00	1.17E+00	2.34E+00		
Pu-242	3.6329E-07	17.05	34.09	0.00E+00	6.19E-06	1.24E-05		
Ra-226	3.8045E-11	17.05	34.09	0.00E+00	6.49E-10	1.30E-09		
Ra-228	2.9902E-15	17.05	34.09	0.00E+00	5.10E-14	1.02E-13		
Ru-106	1.9055E-01	17.05	34.09	0.00E+00	3.25E+00	6.50E+00		
Se-79	1.2936E-05	17.05	34.09	0.00E+00	2.21E-04	4.41E-04		
Sn-126	1.1574E-05	17.05	34.09	0.00E+00	1.97E-04	3.95E-04		
Sr-90	2.7505E+00	17.05	34.09	0.00E+00	4.69E+01	9.38E+01		
Tc-99	4.2239E-04	17.05	34.09	0.00E+00	7.20E-03	1.44E-02		
Th-229	1.8848E-12	17.05	34.09	0.00E+00	3.21E-11	6.43E-11		
Th-230	1.7042E-08	17.05	34.09	0.00E+00	2.91E-07	5.81E-07		
Th-232	7.8132E-15	17.05	34.09	0.00E+00	1.33E-13	2.66E-13		
Ti-208	4.4063E-08	17.05	34.09	0.00E+00	7.51E-07	1.50E-06		
U-232	1.3151E-07	17.05	34.09	0.00E+00	2.24E-06	4.48E-06		
U-233	1.9564E-09	17.05	34.09	0.00E+00	3.34E-08	6.67E-08		
U-234	1.8371E-04	17.05	34.09	0.00E+00	3.13E-03	6.26E-03		
U-235	-2.7235E-06	17.05	0.00	2.09E-02	2.09E-02	2.09E-02		
U-236	1.5493E-05	17.05	34.09	0.00E+00	2.64E-04	5.28E-04		
U-238	-4.2851E-09	17.05	0.00	3.98E-03	3.98E-03	3.98E-03		
Y-90	2.7505E+00	17.05	34.09	0.00E+00	4.69E+01	9.38E+01		
Other Radionuclides					8.77E+01	1.75E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	44.97911463	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal		17.05	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding		34.09	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.00		1.00
Bounding	0.01		

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR UALX HEU CANADA
SNF ID #: 294
Fuel Units & Descr: 14 - MULTI-PIN CLUSTER
Heavy Metal Mass, BOL=2.204kg, EOL=2.192kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.58

II. Estimates							Gamma Sources	
	m	x _n	x _b	b	y _n	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	1.4545E-10	10.61	21.21	0.00E+00	1.54E-09	3.09E-09	Avg MeV	
Am-241	1.1190E-03	10.61	21.21	0.00E+00	1.19E-02	2.37E-02	0.0150	4.093E+12
Am-242m	4.5425E-07	10.61	21.21	0.00E+00	4.82E-06	9.64E-06	0.0250	8.817E+11
Am-243	1.4921E-06	10.61	21.21	0.00E+00	1.58E-05	3.17E-05	0.0375	8.136E+11
C-14	5.7244E-09	10.61	21.21	0.00E+00	6.07E-08	1.21E-07	0.0575	8.000E+11
Ct-36	1.3124E-32	10.61	21.21	0.00E+00	1.39E-31	2.78E-31	0.0850	5.100E+11
Cm-243	2.3676E-07	10.61	21.21	0.00E+00	2.51E-06	5.02E-06	0.1250	4.417E+11
Cm-244	5.2042E-05	10.61	21.21	0.00E+00	5.52E-04	1.10E-03	0.2250	4.324E+11
Co-60	3.8208E-05	10.61	21.21	0.00E+00	4.05E-04	8.11E-04	0.3750	2.092E+11
Cs-134	4.8693E-01	10.61	21.21	0.00E+00	5.16E+00	1.03E+01	0.5750	2.874E+12
Cs-135	3.4477E-06	10.61	21.21	0.00E+00	3.66E-05	7.31E-05	0.8500	4.025E+11
Cs-137	2.8731E+00	10.61	21.21	0.00E+00	3.05E+01	6.09E+01	1.2500	7.488E+10
Eu-154	8.2053E-02	10.61	21.21	0.00E+00	8.70E-01	1.74E+00	1.7500	3.140E+09
Eu-155	3.9134E-02	10.61	21.21	0.00E+00	4.15E-01	8.30E-01	2.2500	6.587E+09
Fe-55	6.7429E-03	10.61	21.21	0.00E+00	7.15E-02	1.43E-01	2.7500	3.789E+07
H-3	1.0599E-02	10.61	21.21	0.00E+00	1.12E-01	2.25E-01	3.5000	4.203E+06
I-129	7.5300E-07	10.61	21.21	0.00E+00	7.99E-06	1.60E-05	5.0000	1.274E+01
Kr-85	2.8595E-01	10.61	21.21	0.00E+00	3.03E+00	6.07E+00	7.0000	1.420E+00
Np-237	9.5479E-06	10.61	21.21	0.00E+00	1.01E-04	2.03E-04	11.0000	1.601E-01
Pa-231	8.9297E-10	10.61	21.21	0.00E+00	9.47E-09	1.89E-08		
Pb-210	3.7609E-12	10.61	21.21	0.00E+00	3.99E-11	7.98E-11		
Pm-147	2.5452E+00	10.61	21.21	0.00E+00	2.70E+01	5.40E+01		
Pu-238	2.0550E-02	10.61	21.21	0.00E+00	2.18E-01	4.36E-01		
Pu-239	4.2838E-04	10.61	21.21	0.00E+00	4.54E-03	9.09E-03		
Pu-240	2.4401E-04	10.61	21.21	0.00E+00	2.59E-03	5.18E-03		
Pu-241	6.8764E-02	10.61	21.21	0.00E+00	7.29E-01	1.46E+00		
Pu-242	3.6329E-07	10.61	21.21	0.00E+00	3.85E-06	7.71E-06		
Ra-226	3.8045E-11	10.61	21.21	0.00E+00	4.04E-10	8.07E-10		
Ra-228	2.9902E-15	10.61	21.21	0.00E+00	3.17E-14	6.34E-14		
Ru-106	1.9055E-01	10.61	21.21	0.00E+00	2.02E+00	4.04E+00		
Se-79	1.2936E-05	10.61	21.21	0.00E+00	1.37E-04	2.74E-04		
Sn-126	1.1574E-05	10.61	21.21	0.00E+00	1.23E-04	2.46E-04		
Sr-90	2.7505E+00	10.61	21.21	0.00E+00	2.92E+01	5.83E+01		
Tc-99	4.2239E-04	10.61	21.21	0.00E+00	4.48E-03	8.96E-03		
Th-229	1.8848E-12	10.61	21.21	0.00E+00	2.00E-11	4.00E-11		
Th-230	1.7042E-08	10.61	21.21	0.00E+00	1.81E-07	3.62E-07		
Th-232	7.8132E-15	10.61	21.21	0.00E+00	8.29E-14	1.66E-13		
Th-208	4.4063E-08	10.61	21.21	0.00E+00	4.67E-07	9.35E-07		
U-232	1.3151E-07	10.61	21.21	0.00E+00	1.39E-06	2.79E-06		
U-233	1.9564E-09	10.61	21.21	0.00E+00	2.08E-08	4.15E-08		
U-234	1.8371E-04	10.61	21.21	0.00E+00	1.95E-03	3.90E-03		
U-235	-2.7235E-06	10.61	0.00	4.43E-03	4.40E-03	4.43E-03		
U-236	1.5493E-05	10.61	21.21	0.00E+00	1.64E-04	3.29E-04		
U-238	-4.2851E-09	10.61	0.00	5.11E-05	5.11E-05	5.11E-05		
Y-90	2.7505E+00	10.61	21.21	0.00E+00	2.92E+01	5.83E+01		
Other Radionuclides					5.46E+01	1.09E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93.09999644	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		10.61	
Bounding		21.21	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.02		
Bounding	0.03		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR MTR-C (U308-LEU) PERU
 SNF ID # 503
 Fuel Units & Descr 6 - ASSEMBLY
 Heavy Metal Mass BOL=6kg EOL=5.67kg
 ROD Storage Site SRS
 Fuel decay start date 2010
 Estimates as of 2010
 Template ATR (Light Water, Alum, 60 to 100%, U)
 Template Burnup(MWd) 367.2
 Template BOL Heavy Metal Mass (MT) 0.00116689
 Template Decay Time 5 years

Estimated
 Canister usage*
 18"x10"
 0.25

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	312.52	625.03	0.00E+00	4.55E-08	9.09E-08	Avg MeV	
Am-241	1.1190E-03	312.52	625.03	0.00E+00	3.50E-01	6.99E-01	0.0150	1.206E+14
Am-242m	4.5425E-07	312.52	625.03	0.00E+00	1.42E-04	2.84E-04	0.0250	2.598E+13
Am-243	1.4921E-06	312.52	625.03	0.00E+00	4.66E-04	9.33E-04	0.0375	2.397E+13
C-14	5.7244E-09	312.52	625.03	0.00E+00	1.79E-06	3.58E-06	0.0575	2.357E+13
Cl-36	1.3124E-32	312.52	625.03	0.00E+00	4.10E-30	8.20E-30	0.0850	1.503E+13
Cm-243	2.3676E-07	312.52	625.03	0.00E+00	7.40E-05	1.48E-04	0.1250	1.301E+13
Cm-244	5.2042E-05	312.52	625.03	0.00E+00	1.63E-02	3.25E-02	0.2250	1.274E+13
Co-60	3.8208E-05	312.52	625.03	0.00E+00	1.19E-02	2.39E-02	0.3750	6.165E+12
Cs-134	4.8693E-01	312.52	625.03	0.00E+00	1.52E+02	3.04E+02	0.5750	8.468E+13
Cs-135	3.4477E-06	312.52	625.03	0.00E+00	1.08E-03	2.15E-03	0.8500	1.186E+13
Cs-137	2.8731E+00	312.52	625.03	0.00E+00	8.98E+02	1.80E+03	1.2500	2.206E+12
Eu-154	8.2053E-02	312.52	625.03	0.00E+00	2.56E+01	5.13E+01	1.7500	9.253E+10
Eu-155	3.9134E-02	312.52	625.03	0.00E+00	1.22E+01	2.45E+01	2.2500	1.941E+11
Fe-55	6.7429E-03	312.52	625.03	0.00E+00	2.11E+00	4.21E+00	2.7500	1.117E+09
H-3	1.0599E-02	312.52	625.03	0.00E+00	3.31E+00	6.62E+00	3.5000	1.238E+08
I-129	7.5300E-07	312.52	625.03	0.00E+00	2.35E-04	4.71E-04	5.0000	3.739E+02
Kr-85	2.8595E-01	312.52	625.03	0.00E+00	8.94E+01	1.79E+02	7.0000	4.169E+01
Np-237	9.5479E-06	312.52	625.03	0.00E+00	2.98E-03	5.97E-03	11.0000	4.701E+00
Pa-231	8.9297E-10	312.52	625.03	0.00E+00	2.79E-07	5.58E-07		
Pb-210	3.7609E-12	312.52	625.03	0.00E+00	1.18E-09	2.35E-09		
Pm-147	2.5452E+00	312.52	625.03	0.00E+00	7.95E+02	1.59E+03		
Pu-238	2.0550E-02	312.52	625.03	0.00E+00	6.42E+00	1.28E+01		
Pu-239	4.2838E-04	312.52	625.03	0.00E+00	1.34E-01	2.68E-01		
Pu-240	2.4401E-04	312.52	625.03	0.00E+00	7.63E-02	1.53E-01		
Pu-241	6.8764E-02	312.52	625.03	0.00E+00	2.15E+01	4.30E+01		
Pu-242	3.6329E-07	312.52	625.03	0.00E+00	1.14E-04	2.27E-04		
Ra-226	3.8045E-11	312.52	625.03	0.00E+00	1.19E-08	2.38E-08		
Ra-228	2.9902E-15	312.52	625.03	0.00E+00	9.34E-13	1.87E-12		
Ru-106	1.9055E-01	312.52	625.03	0.00E+00	5.96E+01	1.19E+02		
Se-79	1.2936E-05	312.52	625.03	0.00E+00	4.04E-03	8.09E-03		
Sn-126	1.1574E-05	312.52	625.03	0.00E+00	3.62E-03	7.23E-03		
Sr-90	2.7505E+00	312.52	625.03	0.00E+00	8.60E+02	1.72E+03		
Tc-99	4.2239E-04	312.52	625.03	0.00E+00	1.32E-01	2.64E-01		
Th-229	1.8848E-12	312.52	625.03	0.00E+00	5.89E-10	1.18E-09		
Th-230	1.7042E-08	312.52	625.03	0.00E+00	5.33E-06	1.07E-05		
Th-232	7.8132E-15	312.52	625.03	0.00E+00	2.44E-12	4.88E-12		
Ti-208	4.4063E-08	312.52	625.03	0.00E+00	1.38E-05	2.75E-05		
U-232	1.3151E-07	312.52	625.03	0.00E+00	4.11E-05	8.22E-05		
U-233	1.9564E-09	312.52	625.03	0.00E+00	6.11E-07	1.22E-06		
U-234	1.8371E-04	312.52	625.03	0.00E+00	5.74E-02	1.15E-01		
U-235	2.7235E-06	312.52	0.00	2.59E-03	1.74E-03	2.59E-03		
U-236	1.5493E-05	312.52	625.03	0.00E+00	4.84E-03	9.68E-03		
U-238	4.2851E-09	312.52	0.00	1.61E-03	1.61E-03	1.61E-03		
Y-90	2.7505E+00	312.52	625.03	0.00E+00	8.60E+02	1.72E+03		
Other Radionuclides					1.61E+03	3.21E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	20	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
	From SFD	Estimated	
Nominal		312.52	
Bounding		625.03	

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.17	
Bounding	0.33	
		Estimated EOL HM/Given EOL HM
		1.00

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (U3Si2 LEU) CANADA
 SNF ID #: 512
 Fuel Units & Descr.: 8 - ASSEMBLY
 Heavy Metal Mass: BOL=6.52kg, EOL=5.868kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2010
 Estimates as of: 2010
 Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 5 years

Estimated
 Canister usage
 18"x10"
 0.33

II. Estimates	m	X _n	X _b	b	Y _n	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	617.46	1,234.91	0.00E+00	8.98E-08	1.80E-07	Avg. MeV	
Am-241	1.1190E-03	617.46	1,234.91	0.00E+00	6.91E-01	1.38E+00	0.0150	2.382E+14
Am-242m	4.5425E-07	617.46	1,234.91	0.00E+00	2.80E-04	5.61E-04	0.0250	5.133E+13
Am-243	1.4921E-06	617.46	1,234.91	0.00E+00	9.21E-04	1.84E-03	0.0375	4.736E+13
C-14	5.7244E-09	617.46	1,234.91	0.00E+00	3.53E-06	7.07E-06	0.0575	4.657E+13
Cl-36	1.3124E-32	617.46	1,234.91	0.00E+00	8.10E-30	1.62E-29	0.0850	2.969E+13
Cm-243	2.3676E-07	617.46	1,234.91	0.00E+00	1.46E-04	2.92E-04	0.1250	2.571E+13
Cm-244	5.2042E-05	617.46	1,234.91	0.00E+00	3.21E-02	6.43E-02	0.2250	2.516E+13
Co-60	3.8208E-05	617.46	1,234.91	0.00E+00	2.36E-02	4.72E-02	0.3750	1.218E+13
Cs-134	4.8693E-01	617.46	1,234.91	0.00E+00	3.01E+02	6.01E+02	0.5750	1.673E+14
Cs-135	3.4477E-06	617.46	1,234.91	0.00E+00	2.13E-03	4.26E-03	0.8500	2.343E+13
Cs-137	2.8731E+00	617.46	1,234.91	0.00E+00	1.77E+03	3.55E+03	1.2500	4.359E+12
Eu-154	8.2053E-02	617.46	1,234.91	0.00E+00	5.07E+01	1.01E+02	1.7500	1.828E+11
Eu-155	3.9134E-02	617.46	1,234.91	0.00E+00	2.42E+01	4.83E+01	2.2500	3.834E+11
Fe-55	6.7429E-03	617.46	1,234.91	0.00E+00	4.16E+00	8.33E+00	2.7500	2.206E+09
H-3	1.0599E-02	617.46	1,234.91	0.00E+00	6.54E+00	1.31E+01	3.5000	2.447E+08
I-129	7.5300E-07	617.46	1,234.91	0.00E+00	4.65E-04	9.30E-04	5.0000	7.354E+02
Kr-85	2.8595E-01	617.46	1,234.91	0.00E+00	1.77E+02	3.53E+02	7.0000	8.199E+01
Np-237	9.5479E-06	617.46	1,234.91	0.00E+00	5.90E-03	1.18E-02	11.0000	9.243E+00
Pa-231	8.9297E-10	617.46	1,234.91	0.00E+00	5.51E-07	1.10E-06		
Pb-210	3.7609E-12	617.46	1,234.91	0.00E+00	2.32E-09	4.64E-09		
Pm-147	2.5452E+00	617.46	1,234.91	0.00E+00	1.57E+03	3.14E+03		
Pu-238	2.0550E-02	617.46	1,234.91	0.00E+00	1.27E+01	2.54E+01		
Pu-239	4.2838E-04	617.46	1,234.91	0.00E+00	2.65E-01	5.29E-01		
Pu-240	2.4401E-04	617.46	1,234.91	0.00E+00	1.51E-01	3.01E-01		
Pu-241	6.8764E-02	617.46	1,234.91	0.00E+00	4.25E+01	8.49E+01		
Pu-242	3.6329E-07	617.46	1,234.91	0.00E+00	2.24E-04	4.49E-04		
Ra-226	3.8045E-11	617.46	1,234.91	0.00E+00	2.35E-08	4.70E-08		
Ra-228	2.9902E-15	617.46	1,234.91	0.00E+00	1.85E-12	3.69E-12		
Ru-106	1.9055E-01	617.46	1,234.91	0.00E+00	1.18E+02	2.35E+02		
Se-79	1.2936E-05	617.46	1,234.91	0.00E+00	7.99E-03	1.60E-02		
Sn-126	1.1574E-05	617.46	1,234.91	0.00E+00	7.15E-03	1.43E-02		
Sr-90	2.7505E+00	617.46	1,234.91	0.00E+00	1.70E+03	3.40E+03		
Tc-99	4.2239E-04	617.46	1,234.91	0.00E+00	2.61E-01	5.22E-01		
Th-229	1.8848E-12	617.46	1,234.91	0.00E+00	1.16E-09	2.33E-09		
Th-230	1.7042E-08	617.46	1,234.91	0.00E+00	1.05E-05	2.10E-05		
Th-232	7.8132E-15	617.46	1,234.91	0.00E+00	4.82E-12	9.65E-12		
Th-208	4.4063E-08	617.46	1,234.91	0.00E+00	2.72E-05	5.44E-05		
U-232	1.3151E-07	617.46	1,234.91	0.00E+00	8.12E-05	1.62E-04		
U-233	1.9564E-09	617.46	1,234.91	0.00E+00	1.21E-06	2.42E-06		
U-234	1.8371E-04	617.46	1,234.91	0.00E+00	1.13E-01	2.27E-01		
U-235	-2.7235E-06	617.46	0.00	2.82E-03	1.14E-03	2.82E-03		
U-236	1.5493E-05	617.46	1,234.91	0.00E+00	9.57E-03	1.91E-02		
U-238	-4.2851E-09	617.46	0.00	1.75E-03	1.75E-03	1.75E-03		
Y-90	2.7505E+00	617.46	1,234.91	0.00E+00	1.70E+03	3.40E+03		
Other Radionuclides					3.18E+03	6.35E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LIGHT WATER	LIGHT WATER
Fuel Cladding	ALUM	ALUM
BOL HM Constituents	U	U
BOL Enrichment %	20.00000037	60 to 100

Basis for Parameter Differences:
 This Template was used for the following reasons.
 This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		617.46
Bounding:		1,234.91

Basis for burnup used in estimate:
 Nominal burnup calculated from the heavy metal mass destroyed.
 Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.30	
Bounding	0.60	

Estimated EOL HM/Given EOL HM
 1.01

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (U3Si2 LEU) GERMANY
SNF ID #: 517
Fuel Units & Descr: 26 - ASSEMBLY
Heavy Metal Mass BOL=30 94kg, EOL=26 114kg
ROD Storage Site SRS

Fuel decay start date 2010
Estimates as of 2010
Template TRIGA-AI (LW/U-Zr, Alum, 10 to 20%, U)
Template Burnup(MWd) 665
Template BOL Heavy Metal Mass (MT) 0.00018
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
1.08

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	4,606.13	9,212.25	0.00E+00	3.71E-06	7.43E-06	Avg MeV	
Am-241	2.2586E-03	4,606.13	9,212.25	0.00E+00	1.04E+01	2.08E+01	0.0150	1.559E+15
Am-242m	1.9925E-06	4,606.13	9,212.25	0.00E+00	9.18E-03	1.84E-02	0.0250	3.384E+14
Am-243	2.3323E-07	4,606.13	9,212.25	0.00E+00	1.07E-03	2.15E-03	0.0375	4.215E+14
C-14	4.3308E-05	4,606.13	9,212.25	0.00E+00	1.99E-01	3.99E-01	0.0575	3.231E+14
Cl-36	4.3023E-08	4,606.13	9,212.25	0.00E+00	1.98E-04	3.96E-04	0.0850	2.262E+14
Cm-243	2.7429E-07	4,606.13	9,212.25	0.00E+00	1.26E-03	2.53E-03	0.1250	3.383E+14
Cm-244	3.1504E-06	4,606.13	9,212.25	0.00E+00	1.45E-02	2.90E-02	0.2250	1.888E+14
Co-60	3.1008E-02	4,606.13	9,212.25	0.00E+00	1.43E+02	2.86E+02	0.3750	8.404E+13
Cs-134	1.0367E-01	4,606.13	9,212.25	0.00E+00	4.78E+02	9.55E+02	0.5750	1.066E+15
Cs-135	3.1549E-05	4,606.13	9,212.25	0.00E+00	1.45E-01	2.91E-01	0.8500	2.623E+14
Cs-137	2.7564E+00	4,606.13	9,212.25	0.00E+00	1.27E+04	2.54E+04	1.2500	2.719E+14
Eu-154	1.3490E+00	4,606.13	9,212.25	0.00E+00	6.21E+03	1.24E+04	1.7500	7.781E+12
Eu-155	4.3880E-01	4,606.13	9,212.25	0.00E+00	2.02E+03	4.04E+03	2.2500	9.458E+11
Fe-55	8.6782E-03	4,606.13	9,212.25	0.00E+00	4.00E+01	7.99E+01	2.7500	7.682E+09
H-3	1.0805E-02	4,606.13	9,212.25	0.00E+00	4.98E+01	9.95E+01	3.5000	8.979E+08
I-129	7.3805E-07	4,606.13	9,212.25	0.00E+00	3.40E-03	6.80E-03	5.0000	5.274E+03
Kr-85	2.5218E-01	4,606.13	9,212.25	0.00E+00	1.16E+03	2.32E+03	7.0000	5.969E+02
Np-237	1.4463E-06	4,606.13	9,212.25	0.00E+00	6.66E-03	1.33E-02	11.0000	6.798E+01
Pa-231	3.5970E-09	4,606.13	9,212.25	0.00E+00	1.66E-05	3.31E-05		
Pb-210	8.2511E-15	4,606.13	9,212.25	0.00E+00	3.80E-11	7.60E-11		
Pm-147	2.0767E+00	4,606.13	9,212.25	0.00E+00	9.57E+03	1.91E+04		
Pu-238	1.3514E-03	4,606.13	9,212.25	0.00E+00	6.22E+00	1.24E+01		
Pu-239	5.6947E-03	4,606.13	9,212.25	0.00E+00	2.62E+01	5.25E+01		
Pu-240	2.2647E-03	4,606.13	9,212.25	0.00E+00	1.04E+01	2.09E+01		
Pu-241	1.2574E-01	4,606.13	9,212.25	0.00E+00	5.79E+02	1.16E+03		
Pu-242	3.0602E-07	4,606.13	9,212.25	0.00E+00	1.41E-03	2.82E-03		
Ra-226	5.7353E-14	4,606.13	9,212.25	0.00E+00	2.64E-10	5.28E-10		
Ra-228	1.8150E-10	4,606.13	9,212.25	0.00E+00	8.36E-07	1.67E-06		
Ru-106	9.3744E-02	4,606.13	9,212.25	0.00E+00	4.32E+02	8.64E+02		
Se-79	1.2938E-05	4,606.13	9,212.25	0.00E+00	5.96E-02	1.19E-01		
Sn-126	1.2239E-05	4,606.13	9,212.25	0.00E+00	5.64E-02	1.13E-01		
Sr-90	2.6000E+00	4,606.13	9,212.25	0.00E+00	1.20E+04	2.40E+04		
Tc-99	4.4120E-04	4,606.13	9,212.25	0.00E+00	2.03E+00	4.06E+00		
Th-229	1.4749E-10	4,606.13	9,212.25	0.00E+00	6.79E-07	1.36E-06		
Th-230	1.9549E-11	4,606.13	9,212.25	0.00E+00	9.00E-08	1.80E-07		
Th-232	2.3744E-10	4,606.13	9,212.25	0.00E+00	1.09E-06	2.19E-06		
Ti-208	1.9459E-08	4,606.13	9,212.25	0.00E+00	8.96E-05	1.79E-04		
U-232	5.6015E-08	4,606.13	9,212.25	0.00E+00	2.58E-04	5.16E-04	Thermal Power	
U-233	1.3132E-07	4,606.13	9,212.25	0.00E+00	6.05E-04	1.21E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.7323E-07	4,606.13	9,212.25	0.00E+00	7.98E-04	1.60E-03	2.31E+02	4.63E+02
U-235	2.6159E-06	4,606.13	0.00	1.34E-02	1.32E-03	1.34E-02	Total	Total
U-236	1.2717E-05	4,606.13	9,212.25	0.00E+00	5.86E-02	1.17E-01		
U-238	3.8857E-08	4,606.13	0.00	8.32E-03	8.14E-03	8.32E-03		
Y-90	2.6015E+00	4,606.13	9,212.25	0.00E+00	1.20E+04	2.40E+04		
Other Radionuclides					1.75E+04	3.50E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19.999995	10 to 20.1	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		4,606.13	
Bounding		9,212.25	

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	4.03		
Bounding	8.06		

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (U3Si2 LEU) GREECE
SNF ID #: 531
Fuel Units & Descr: 18 - ASSEMBLY
Heavy Metal Mass: BOL=11 07kg EOL=10 294kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.75

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	734.70	1,469.40	0.00E+00	1.07E-07	2.14E-07	Avg MeV	
Am-241	1.1190E-03	734.70	1,469.40	0.00E+00	8.22E-01	1.64E+00	0.0150	2.835E+14
Am-242m	4.5425E-07	734.70	1,469.40	0.00E+00	3.34E-04	6.67E-04	0.0250	6.107E+13
Am-243	1.4921E-06	734.70	1,469.40	0.00E+00	1.10E-03	2.19E-03	0.0375	5.636E+13
C-14	5.7244E-09	734.70	1,469.40	0.00E+00	4.21E-06	8.41E-06	0.0575	5.542E+13
Cl-36	1.3124E-32	734.70	1,469.40	0.00E+00	9.64E-30	1.93E-29	0.0850	3.533E+13
Cm-243	2.3676E-07	734.70	1,469.40	0.00E+00	1.74E-04	3.48E-04	0.1250	3.059E+13
Cm-244	5.2042E-05	734.70	1,469.40	0.00E+00	3.82E-02	7.65E-02	0.2250	2.994E+13
Co-60	3.8208E-05	734.70	1,469.40	0.00E+00	2.81E-02	5.61E-02	0.3750	1.449E+13
Cs-134	4.8693E-01	734.70	1,469.40	0.00E+00	3.58E+02	7.15E+02	0.5750	1.991E+14
Cs-135	3.4477E-06	734.70	1,469.40	0.00E+00	2.53E-03	5.07E-03	0.8500	2.788E+13
Cs-137	2.8731E+00	734.70	1,469.40	0.00E+00	2.11E+03	4.22E+03	1.2500	5.187E+12
Eu-154	8.2053E-02	734.70	1,469.40	0.00E+00	6.03E-01	1.21E+02	1.7500	2.175E+11
Eu-155	3.9134E-02	734.70	1,469.40	0.00E+00	2.88E+01	5.75E+01	2.2500	4.562E+11
Fe-55	6.7429E-03	734.70	1,469.40	0.00E+00	4.95E+00	9.91E+00	2.7500	2.625E+09
H-3	1.0599E-02	734.70	1,469.40	0.00E+00	7.79E+00	1.56E+01	3.5000	2.911E+08
I-129	7.5300E-07	734.70	1,469.40	0.00E+00	5.53E-04	1.11E-03	5.0000	8.771E+02
Kr-85	2.8595E-01	734.70	1,469.40	0.00E+00	2.10E+02	4.20E+02	7.0000	9.780E+01
Np-237	9.5479E-06	734.70	1,469.40	0.00E+00	7.01E-03	1.40E-02	11.0000	1.103E+01
Pa-231	8.9297E-10	734.70	1,469.40	0.00E+00	6.56E-07	1.31E-06		
Pb-210	3.7609E-12	734.70	1,469.40	0.00E+00	2.76E-09	5.53E-09		
Pm-147	2.5452E+00	734.70	1,469.40	0.00E+00	1.87E+03	3.74E+03		
Pu-238	2.0550E-02	734.70	1,469.40	0.00E+00	1.51E+01	3.02E+01		
Pu-239	4.2838E-04	734.70	1,469.40	0.00E+00	3.15E-01	6.29E-01		
Pu-240	2.4401E-04	734.70	1,469.40	0.00E+00	1.79E-01	3.59E-01		
Pu-241	6.8764E-02	734.70	1,469.40	0.00E+00	5.05E+01	1.01E+02		
Pu-242	3.6329E-07	734.70	1,469.40	0.00E+00	2.67E-04	5.34E-04		
Ra-226	3.8045E-11	734.70	1,469.40	0.00E+00	2.80E-08	5.59E-08		
Ra-228	2.9902E-15	734.70	1,469.40	0.00E+00	2.20E-12	4.39E-12		
Ru-106	1.9055E-01	734.70	1,469.40	0.00E+00	1.40E+02	2.80E+02		
Se-79	1.2936E-05	734.70	1,469.40	0.00E+00	9.50E-03	1.90E-02		
Sn-126	1.1574E-05	734.70	1,469.40	0.00E+00	8.50E-03	1.70E-02		
Sr-90	2.7505E+00	734.70	1,469.40	0.00E+00	2.02E+03	4.04E+03		
Tc-99	4.2239E-04	734.70	1,469.40	0.00E+00	3.10E-01	6.21E-01		
Th-229	1.8848E-12	734.70	1,469.40	0.00E+00	1.38E-09	2.77E-09		
Th-230	1.7042E-08	734.70	1,469.40	0.00E+00	1.25E-05	2.50E-05		
Th-232	7.8132E-15	734.70	1,469.40	0.00E+00	5.74E-12	1.15E-11		
Th-208	4.4063E-08	734.70	1,469.40	0.00E+00	3.24E-05	6.47E-05		
U-232	1.3151E-07	734.70	1,469.40	0.00E+00	9.66E-05	1.93E-04		
U-233	1.9564E-09	734.70	1,469.40	0.00E+00	1.44E-06	2.87E-06	Thermal Power	
U-234	1.8371E-04	734.70	1,469.40	0.00E+00	1.35E-01	2.70E-01	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2.7235E-06	734.70	0.00	4.78E-03	2.78E-03	4.78E-03	3.73E+01	7.45E+01
U-236	1.5493E-05	734.70	1,469.40	0.00E+00	1.14E-02	2.28E-02	Total	Total
U-238	-4.2851E-09	734.70	0.00	2.98E-03	2.97E-03	2.98E-03		
Y-90	2.7505E+00	734.70	1,469.40	0.00E+00	2.02E+03	4.04E+03		
Other Radionuclides					3.78E+03	7.56E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches on all parameters except enrichment.
BOL HM Constituents:	U	U	
BOL Enrichment %:	20.00000024	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		734.70	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		1,469.40	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal	0.21		1.00
Bounding	0.42		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (U3Si2 LEU) JAPAN
 SNF ID #: 289
 Fuel Units & Descr: 17 - ASSEMBLY
 Heavy Metal Mass BOL=8 925kg, EOL=8 6kg
 ROD Storage Site SRS

¹Fuel decay start date 2010
 Estimates as of 2010
 Template ATR (Light Water, Alum, 60 to 100% U)
²Template Burnup(MWd) 367.2
 Template BOL Heavy Metal Mass (MT) 0 00116689
 Template Decay Time 5 years

Estimated
 Canister usage
 18"x10"
 0.71

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	307.50	614.99	0.00E+00	4.47E-08	8.95E-08	Avg MeV	
Am-241	1.1190E-03	307.50	614.99	0.00E+00	3.44E-01	6.88E-01	0.0150	1.186E+14
Am-242m	4.5425E-07	307.50	614.99	0.00E+00	1.40E-04	2.79E-04	0.0250	2.556E+13
Am-243	1.4921E-06	307.50	614.99	0.00E+00	4.59E-04	9.18E-04	0.0375	2.359E+13
C-14	5.7244E-09	307.50	614.99	0.00E+00	1.76E-06	3.52E-06	0.0575	2.319E+13
Cl-36	1.3124E-32	307.50	614.99	0.00E+00	4.04E-30	8.07E-30	0.0850	1.479E+13
Cm-243	2.3676E-07	307.50	614.99	0.00E+00	7.28E-05	1.46E-04	0.1250	1.280E+13
Cm-244	5.2042E-05	307.50	614.99	0.00E+00	1.60E-02	3.20E-02	0.2250	1.253E+13
Co-60	3.8208E-05	307.50	614.99	0.00E+00	1.17E-02	2.35E-02	0.3750	6.066E+12
Cs-134	4.8693E-01	307.50	614.99	0.00E+00	1.50E+02	2.99E+02	0.5750	8.332E+13
Cs-135	3.4477E-06	307.50	614.99	0.00E+00	1.06E-03	2.12E-03	0.8500	1.167E+13
Cs-137	2.8731E+00	307.50	614.99	0.00E+00	8.83E+02	1.77E+03	1.2500	2.171E+12
Eu-154	8.2053E-02	307.50	614.99	0.00E+00	2.52E+01	5.05E+01	1.7500	9.104E+10
Eu-155	3.9134E-02	307.50	614.99	0.00E+00	1.20E+01	2.41E+01	2.2500	1.910E+11
Fe-55	6.7429E-03	307.50	614.99	0.00E+00	2.07E+00	4.15E+00	2.7500	1.099E+09
H-3	1.0599E-02	307.50	614.99	0.00E+00	3.26E+00	6.52E+00	3.5000	1.218E+08
I-129	7.5300E-07	307.50	614.99	0.00E+00	2.32E-04	4.63E-04	5.0000	3.698E+02
Kr-85	2.8595E-01	307.50	614.99	0.00E+00	8.79E+01	1.76E+02	7.0000	4.124E+01
Np-237	9.5479E-06	307.50	614.99	0.00E+00	2.94E-03	5.87E-03	11.0000	4.650E+00
Pa-231	8.9297E-10	307.50	614.99	0.00E+00	2.75E-07	5.49E-07		
Pb-210	3.7609E-12	307.50	614.99	0.00E+00	1.16E-09	2.31E-09		
Pm-147	2.5452E+00	307.50	614.99	0.00E+00	7.83E+02	1.57E+03		
Pu-238	2.0550E-02	307.50	614.99	0.00E+00	6.32E+00	1.26E+01		
Pu-239	4.2838E-04	307.50	614.99	0.00E+00	1.32E-01	2.63E-01		
Pu-240	2.4401E-04	307.50	614.99	0.00E+00	7.50E-02	1.50E-01		
Pu-241	6.8764E-02	307.50	614.99	0.00E+00	2.11E+01	4.23E+01		
Pu-242	3.6329E-07	307.50	614.99	0.00E+00	1.12E-04	2.23E-04		
Ra-226	3.8045E-11	307.50	614.99	0.00E+00	1.17E-08	2.34E-08		
Ra-228	2.9902E-15	307.50	614.99	0.00E+00	9.19E-13	1.84E-12		
Ru-106	1.9055E-01	307.50	614.99	0.00E+00	5.86E+01	1.17E+02		
Se-79	1.2936E-05	307.50	614.99	0.00E+00	3.98E-03	7.96E-03		
Sn-126	1.1574E-05	307.50	614.99	0.00E+00	3.56E-03	7.12E-03		
Sr-90	2.7505E+00	307.50	614.99	0.00E+00	8.46E+02	1.69E+03		
Tc-99	4.2239E-04	307.50	614.99	0.00E+00	1.30E-01	2.60E-01		
Th-229	1.8848E-12	307.50	614.99	0.00E+00	5.80E-10	1.16E-09		
Th-230	1.7042E-08	307.50	614.99	0.00E+00	5.24E-06	1.05E-05		
Th-232	7.8132E-15	307.50	614.99	0.00E+00	2.40E-12	4.81E-12		
Ti-208	4.4063E-08	307.50	614.99	0.00E+00	1.35E-05	2.71E-05		
U-232	1.3151E-07	307.50	614.99	0.00E+00	4.04E-05	8.09E-05		
U-233	1.9564E-09	307.50	614.99	0.00E+00	6.02E-07	1.20E-06		
U-234	1.8371E-04	307.50	614.99	0.00E+00	5.65E-02	1.13E-01		
U-235	-2.7235E-06	307.50	0.00	3.86E-03	3.02E-03	3.86E-03		
U-236	1.5493E-05	307.50	614.99	0.00E+00	4.76E-03	9.53E-03		
U-238	-4.2851E-09	307.50	0.00	2.40E-03	2.40E-03	2.40E-03		
Y-90	2.7505E+00	307.50	614.99	0.00E+00	8.46E+02	1.69E+03		
Other Radionuclides					1.58E+03	3.16E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
	From SFD	Used	
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons: This fuel matches on all parameters except enrichment.
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	20 00000028	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		307.50	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding		614.99	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.11		1.00
Bounding	0.22		

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (U3Si2 LEU) NETHERLANDS
 SNF ID #: 509
 Fuel Units & Descr: 7 - ASSEMBLY
 Heavy Metal Mass: BOL=5.53kg; EOL=4.866kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2010
 Estimates as of: 2010
 Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 5 years

Estimated
 Canister usage
 18"x10"
 0.29

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	628.44	1,256.88	0.00E+00	9.14E-08	1.83E-07	Avg MeV	
Am-241	1.1190E-03	628.44	1,256.88	0.00E+00	7.03E-01	1.41E+00	0.0150	2.425E+14
Am-242m	4.5425E-07	628.44	1,256.88	0.00E+00	2.85E-04	5.71E-04	0.0250	5.224E+13
Am-243	1.4921E-06	628.44	1,256.88	0.00E+00	9.38E-04	1.88E-03	0.0375	4.821E+13
C-14	5.7244E-09	628.44	1,256.88	0.00E+00	3.60E-06	7.19E-06	0.0575	4.740E+13
Cl-36	1.3124E-32	628.44	1,256.88	0.00E+00	8.25E-30	1.65E-29	0.0850	3.022E+13
Cm-243	2.3676E-07	628.44	1,256.88	0.00E+00	1.49E-04	2.98E-04	0.1250	2.617E+13
Cm-244	5.2042E-05	628.44	1,256.88	0.00E+00	3.27E-02	6.54E-02	0.2250	2.561E+13
Co-60	3.8208E-05	628.44	1,256.88	0.00E+00	2.40E-02	4.80E-02	0.3750	1.240E+13
Cs-134	4.8693E-01	628.44	1,256.88	0.00E+00	3.06E+02	6.12E+02	0.5750	1.703E+14
Cs-135	3.4477E-06	628.44	1,256.88	0.00E+00	2.17E-03	4.33E-03	0.8500	2.385E+13
Cs-137	2.8731E+00	628.44	1,256.88	0.00E+00	1.81E+03	3.61E+03	1.2500	4.437E+12
Eu-154	8.2053E-02	628.44	1,256.88	0.00E+00	5.16E+01	1.03E+02	1.7500	1.861E+11
Eu-155	3.9134E-02	628.44	1,256.88	0.00E+00	2.46E+01	4.92E+01	2.2500	3.903E+11
Fe-55	6.7429E-03	628.44	1,256.88	0.00E+00	4.24E+00	8.48E+00	2.7500	2.245E+09
H-3	1.0599E-02	628.44	1,256.88	0.00E+00	6.66E+00	1.33E+01	3.5000	2.490E+08
I-129	7.5300E-07	628.44	1,256.88	0.00E+00	4.73E-04	9.46E-04	5.0000	7.478E-02
Kr-85	2.8595E-01	628.44	1,256.88	0.00E+00	1.80E+02	3.59E+02	7.0000	8.337E+01
Np-237	9.5479E-06	628.44	1,256.88	0.00E+00	6.00E-03	1.20E-02	11.0000	9.399E+00
Pa-231	8.9297E-10	628.44	1,256.88	0.00E+00	5.61E-07	1.12E-06		
Pb-210	3.7609E-12	628.44	1,256.88	0.00E+00	2.36E-09	4.73E-09		
Pm-147	2.5452E+00	628.44	1,256.88	0.00E+00	1.60E+03	3.20E+03		
Pu-238	2.0550E-02	628.44	1,256.88	0.00E+00	1.29E+01	2.58E+01		
Pu-239	4.2838E-04	628.44	1,256.88	0.00E+00	2.69E-01	5.38E-01		
Pu-240	2.4401E-04	628.44	1,256.88	0.00E+00	1.53E-01	3.07E-01		
Pu-241	6.8764E-02	628.44	1,256.88	0.00E+00	4.32E+01	8.64E+01		
Pu-242	3.6329E-07	628.44	1,256.88	0.00E+00	2.28E-04	4.57E-04		
Ra-226	3.8045E-11	628.44	1,256.88	0.00E+00	2.39E-08	4.78E-08		
Ra-228	2.9902E-15	628.44	1,256.88	0.00E+00	1.88E-12	3.76E-12		
Ru-106	1.9055E-01	628.44	1,256.88	0.00E+00	1.20E+02	2.39E+02		
Se-79	1.2936E-05	628.44	1,256.88	0.00E+00	8.13E-03	1.63E-02		
Sn-126	1.1574E-05	628.44	1,256.88	0.00E+00	7.27E-03	1.45E-02		
Sr-90	2.7505E+00	628.44	1,256.88	0.00E+00	1.73E+03	3.46E+03		
Tc-99	4.2239E-04	628.44	1,256.88	0.00E+00	2.65E-01	5.31E-01		
Th-229	1.8848E-12	628.44	1,256.88	0.00E+00	1.18E-09	2.37E-09		
Th-230	1.7042E-08	628.44	1,256.88	0.00E+00	1.07E-05	2.14E-05		
Th-232	7.8132E-15	628.44	1,256.88	0.00E+00	4.91E-12	9.82E-12		
Th-208	4.4063E-08	628.44	1,256.88	0.00E+00	2.77E-05	5.54E-05		
U-232	1.3151E-07	628.44	1,256.88	0.00E+00	8.26E-05	1.65E-04		
U-233	1.9564E-09	628.44	1,256.88	0.00E+00	1.23E-06	2.46E-06		
U-234	1.8371E-04	628.44	1,256.88	0.00E+00	1.15E-01	2.31E-01		
U-235	-2.7235E-06	628.44	0.00	2.39E-03	6.78E-04	2.39E-03		
U-236	1.5493E-05	628.44	1,256.88	0.00E+00	9.74E-03	1.95E-02		
U-238	-4.2851E-09	628.44	0.00	1.49E-03	1.48E-03	1.49E-03		
Y-90	2.7505E+00	628.44	1,256.88	0.00E+00	1.73E+03	3.46E+03		
Other Radionuclides					3.23E+03	6.46E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches on all parameters except enrichment.
Reactor Moderator	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	20.00000038	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
	From SFD	Estimated	
Nominal		628.44	
Bounding		1,256.88	

Checks			Estimated EOL HM/Given EOL HM 1.01
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.36		
Bounding	0.72		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR MTR-C (UALX LEU) SWEDEN
SNF ID # 523
Fuel Units & Descr 480 - ASSEMBLY
Heavy Metal Mass BOL=960kg EOL=789 888kg
ROD Storage Site SRS

Fuel decay start date 2010
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100% U)
Template Burnup (MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
20.00

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	161,099.36	322,198.73	0.00E+00	2.34E-05	4.69E-05	Avg MeV	
Am-241	1.1190E-03	161,099.36	322,198.73	0.00E+00	1.80E+02	3.61E+02	0.0150	6.216E+16
Am-242m	4.5425E-07	161,099.36	322,198.73	0.00E+00	7.32E-02	1.46E-01	0.0250	1.339E+16
Am-243	1.4921E-06	161,099.36	322,198.73	0.00E+00	2.40E-01	4.81E-01	0.0375	1.236E+16
C-14	5.7244E-09	161,099.36	322,198.73	0.00E+00	9.22E-04	1.84E-03	0.0575	1.215E+16
Cl-36	1.3124E-32	161,099.36	322,198.73	0.00E+00	2.11E-27	4.23E-27	0.0850	7.746E+15
Cm-243	2.3676E-07	161,099.36	322,198.73	0.00E+00	3.81E-02	7.63E-02	0.1250	6.708E+15
Cm-244	5.2042E-05	161,099.36	322,198.73	0.00E+00	8.38E+00	1.68E+01	0.2250	6.565E+15
Co-60	3.8208E-05	161,099.36	322,198.73	0.00E+00	6.16E+00	1.23E+01	0.3750	3.178E+15
Cs-134	4.8693E-01	161,099.36	322,198.73	0.00E+00	7.84E+04	1.57E+05	0.5750	4.365E+16
Cs-135	3.4477E-06	161,099.36	322,198.73	0.00E+00	5.55E-01	1.11E+00	0.8500	6.113E+15
Cs-137	2.8731E+00	161,099.36	322,198.73	0.00E+00	4.63E+05	9.26E+05	1.2500	1.137E+15
Eu-154	8.2053E-02	161,099.36	322,198.73	0.00E+00	1.32E+04	2.64E+04	1.7500	4.770E+13
Eu-155	3.9134E-02	161,099.36	322,198.73	0.00E+00	6.30E+03	1.26E+04	2.2500	1.000E+14
Fe-55	6.7429E-03	161,099.36	322,198.73	0.00E+00	1.09E+03	2.17E+03	2.7500	5.756E+11
H-3	1.0599E-02	161,099.36	322,198.73	0.00E+00	1.71E+03	3.42E+03	3.5000	6.383E+10
I-129	7.5300E-07	161,099.36	322,198.73	0.00E+00	1.21E-01	2.43E-01	5.0000	1.914E+05
Kr-85	2.8595E-01	161,099.36	322,198.73	0.00E+00	4.61E+04	9.21E+04	7.0000	2.134E+04
Np-237	9.5479E-06	161,099.36	322,198.73	0.00E+00	1.54E+00	3.08E+00	11.0000	2.406E+03
Pa-231	8.9297E-10	161,099.36	322,198.73	0.00E+00	1.44E-04	2.88E-04		
Pb-210	3.7609E-12	161,099.36	322,198.73	0.00E+00	6.06E-07	1.21E-06		
Pm-147	2.5452E+00	161,099.36	322,198.73	0.00E+00	4.10E+05	8.20E+05		
Pu-238	2.0550E-02	161,099.36	322,198.73	0.00E+00	3.31E+03	6.62E+03		
Pu-239	4.2838E-04	161,099.36	322,198.73	0.00E+00	6.90E+01	1.38E+02		
Pu-240	2.4401E-04	161,099.36	322,198.73	0.00E+00	3.93E+01	7.86E+01		
Pu-241	6.8764E-02	161,099.36	322,198.73	0.00E+00	1.11E+04	2.22E+04		
Pu-242	3.6329E-07	161,099.36	322,198.73	0.00E+00	5.85E-02	1.17E-01		
Ra-226	3.8045E-11	161,099.36	322,198.73	0.00E+00	6.13E-06	1.23E-05		
Ra-228	2.9902E-15	161,099.36	322,198.73	0.00E+00	4.82E-10	9.63E-10		
Ru-106	1.9055E-01	161,099.36	322,198.73	0.00E+00	3.07E+04	6.14E+04		
Se-79	1.2936E-05	161,099.36	322,198.73	0.00E+00	2.08E+00	4.17E+00		
Sn-126	1.1574E-05	161,099.36	322,198.73	0.00E+00	1.86E+00	3.73E+00		
Sr-90	2.7505E+00	161,099.36	322,198.73	0.00E+00	4.43E+05	8.86E+05		
Tc-99	4.2239E-04	161,099.36	322,198.73	0.00E+00	6.80E+01	1.36E+02		
Th-229	1.8848E-12	161,099.36	322,198.73	0.00E+00	3.04E-07	6.07E-07		
Th-230	1.7042E-08	161,099.36	322,198.73	0.00E+00	2.75E-03	5.49E-03		
Th-232	7.8132E-15	161,099.36	322,198.73	0.00E+00	1.26E-09	2.52E-09		
Th-208	4.4063E-08	161,099.36	322,198.73	0.00E+00	7.10E-03	1.42E-02		
U-232	1.3151E-07	161,099.36	322,198.73	0.00E+00	2.12E-02	4.24E-02	Thermal Power	
U-233	1.9564E-09	161,099.36	322,198.73	0.00E+00	3.15E-04	6.30E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8371E-04	161,099.36	322,198.73	0.00E+00	2.96E+01	5.92E+01	8.17E+03	1.63E+04
U-235	-2.7235E-06	161,099.36	0.00	4.15E-01	0.00E+00	4.15E-01	Total	Total
U-236	-1.5493E-05	161,099.36	322,198.73	0.00E+00	2.50E+00	4.99E+00		
U-238	-4.2851E-09	161,099.36	0.00	2.58E-01	2.57E-01	2.58E-01		
Y-90	2.7505E+00	161,099.36	322,198.73	0.00E+00	4.43E+05	8.86E+05		
Other Radionuclides					8.29E+05	1.66E+06		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents	U	U	
BOL Enrichment %:	20	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate
Nominal:		161,099.36	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		322,198.73	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.53		1.03
Bounding	1.07		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-HEU) ARGENTINA
 SNF ID #: 635
 Fuel Units & Descr: 14 - MTR TYPE
 Heavy Metal Mass: BOL=2.395kg; EOL=1.749kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2010
 Estimates as of: 2010
 Template: ATR (Light Water, Alum, 60 to 100% U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.58

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	612.53	1,225.06	0.00E+00	8.91E-08	1.78E-07	Avg MeV	
Am-241	1.1190E-03	612.53	1,225.06	0.00E+00	6.85E-01	1.37E+00	0.0150	2.363E+14
Am-242m	4.5425E-07	612.53	1,225.06	0.00E+00	2.78E-04	5.56E-04	0.0250	5.092E+13
Am-243	1.4921E-06	612.53	1,225.06	0.00E+00	9.14E-04	1.83E-03	0.0375	4.699E+13
C-14	5.7244E-09	612.53	1,225.06	0.00E+00	3.51E-06	7.01E-06	0.0575	4.620E+13
Cl-36	1.3124E-32	612.53	1,225.06	0.00E+00	8.04E-30	1.61E-29	0.0850	2.945E+13
Cm-243	2.3676E-07	612.53	1,225.06	0.00E+00	1.45E-04	2.90E-04	0.1250	2.551E+13
Cm-244	5.2042E-05	612.53	1,225.06	0.00E+00	3.19E-02	6.38E-02	0.2250	2.496E+13
Co-60	3.8208E-05	612.53	1,225.06	0.00E+00	2.34E-02	4.68E-02	0.3750	1.208E+13
Cs-134	4.8693E-01	612.53	1,225.06	0.00E+00	2.98E+02	5.97E+02	0.5750	1.660E+14
Cs-135	3.4477E-06	612.53	1,225.06	0.00E+00	2.11E-03	4.22E-03	0.8500	2.324E+13
Cs-137	2.8731E+00	612.53	1,225.06	0.00E+00	1.76E+03	3.52E+03	1.2500	4.325E+12
Eu-154	8.2053E-02	612.53	1,225.06	0.00E+00	5.03E+01	1.01E+02	1.7500	1.814E+11
Eu-155	3.9134E-02	612.53	1,225.06	0.00E+00	2.40E+01	4.79E+01	2.2500	3.804E+11
Fe-55	6.7429E-03	612.53	1,225.06	0.00E+00	4.13E+00	8.26E+00	2.7500	2.188E+09
H-3	1.0599E-02	612.53	1,225.06	0.00E+00	6.49E+00	1.30E+01	3.5000	2.427E+08
I-129	7.5300E-07	612.53	1,225.06	0.00E+00	4.61E-04	9.22E-04	5.0000	7.258E+02
Kr-85	2.8595E-01	612.53	1,225.06	0.00E+00	1.75E+02	3.50E+02	7.0000	8.091E+01
Np-237	9.5479E-06	612.53	1,225.06	0.00E+00	5.85E-03	1.17E-02	11.0000	9.120E+00
Pa-231	8.9297E-10	612.53	1,225.06	0.00E+00	5.47E-07	1.09E-06		
Pb-210	3.7609E-12	612.53	1,225.06	0.00E+00	2.30E-09	4.61E-09		
Pm-147	2.5452E+00	612.53	1,225.06	0.00E+00	1.56E+03	3.12E+03		
Pu-238	2.0550E-02	612.53	1,225.06	0.00E+00	1.26E+01	2.52E+01		
Pu-239	4.2838E-04	612.53	1,225.06	0.00E+00	2.62E-01	5.25E-01		
Pu-240	2.4401E-04	612.53	1,225.06	0.00E+00	1.49E-01	2.99E-01		
Pu-241	6.8764E-02	612.53	1,225.06	0.00E+00	4.21E+01	8.42E+01		
Pu-242	3.6329E-07	612.53	1,225.06	0.00E+00	2.23E-04	4.45E-04		
Ra-226	3.8045E-11	612.53	1,225.06	0.00E+00	2.33E-08	4.66E-08		
Ra-228	2.9902E-15	612.53	1,225.06	0.00E+00	1.83E-12	3.66E-12		
Ru-106	1.9055E-01	612.53	1,225.06	0.00E+00	1.17E+02	2.33E+02		
Se-79	1.2936E-05	612.53	1,225.06	0.00E+00	7.92E-03	1.58E-02		
Sn-126	1.1574E-05	612.53	1,225.06	0.00E+00	7.09E-03	1.42E-02		
Sr-90	2.7505E+00	612.53	1,225.06	0.00E+00	1.68E+03	3.37E+03		
Tc-99	4.2239E-04	612.53	1,225.06	0.00E+00	2.59E-01	5.17E-01		
Th-229	1.8848E-12	612.53	1,225.06	0.00E+00	1.15E-09	2.31E-09		
Th-230	1.7042E-08	612.53	1,225.06	0.00E+00	1.04E-05	2.09E-05		
Th-232	7.8132E-15	612.53	1,225.06	0.00E+00	4.79E-12	9.57E-12		
Ti-208	4.4063E-08	612.53	1,225.06	0.00E+00	2.70E-05	5.40E-05		
U-232	1.3151E-07	612.53	1,225.06	0.00E+00	8.06E-05	1.61E-04		
U-233	1.9564E-09	612.53	1,225.06	0.00E+00	1.20E-06	2.40E-06		
U-234	1.8371E-04	612.53	1,225.06	0.00E+00	1.13E-01	2.25E-01		
U-235	-2.7235E-06	612.53	0.00	4.66E-03	2.99E-03	4.66E-03		
U-236	1.5493E-05	612.53	1,225.06	0.00E+00	9.49E-03	1.90E-02		
U-238	-4.2851E-09	612.53	0.00	8.05E-05	7.79E-05	8.05E-05		
Y-90	2.7505E+00	612.53	1,225.06	0.00E+00	1.68E+03	3.37E+03		
Other Radionuclides					3.15E+03	6.30E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.11E+01	6.21E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding	ALUM	ALUM
BOL HM Constituents	U	U
BOL Enrichment %	90.0000174	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		612.53
Bounding:		1,225.06

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
 Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.81	
Bounding:	1.63	

Estimated EOL HM/Given EOL HM

1.02

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-HEU) CANADA
SNF ID #: 612
Fuel Units & Descr: 23 - MTR TYPE
Heavy Metal Mass: BOL=2 721kg EOL=1 76kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0 96

II. Estimates							Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 4545E-10	910 46	1 820 93	0 00E+00	1 32E-07	2 65E-07	Avg MeV	
Am-241	1 1190E-03	910 46	1 820 93	0 00E+00	1 02E+00	2 04E+00	0 0150	3 513E+14
Am-242m	4 5425E-07	910 46	1 820 93	0 00E+00	4 14E-04	8 27E-04	0 0250	7 568E+13
Am-243	1 4921E-06	910 46	1 820 93	0 00E+00	1 36E-03	2 72E-03	0 0375	6 984E+13
C-14	5 7244E-09	910 46	1 820 93	0 00E+00	5 21E-06	1 04E-05	0 0575	6 867E+13
Cl-36	1 3124E-32	910 46	1 820 93	0 00E+00	1 19E-29	2 39E-29	0 0850	4 378E+13
Cm-243	2 3676E-07	910 46	1 820 93	0 00E+00	2 16E-04	4 31E-04	0 1250	3 791E+13
Cm-244	5 2042E-05	910 46	1 820 93	0 00E+00	4 74E-02	9 48E-02	0 2250	3 711E+13
Co-60	3 8208E-05	910 46	1 820 93	0 00E+00	3 48E-02	6 96E-02	0 3750	1 796E+13
Cs-134	4 8693E-01	910 46	1 820 93	0 00E+00	4 43E+02	8 87E+02	0 5750	2 467E+14
Cs-135	3 4477E-06	910 46	1 820 93	0 00E+00	3 14E-03	6 28E-03	0 8500	3 455E+13
Cs-137	2 8731E+00	910 46	1 820 93	0 00E+00	2 62E+03	5 23E+03	1 2500	6 428E+12
Eu-154	8 2053E-02	910 46	1 820 93	0 00E+00	7 47E+01	1 49E+02	1 7500	2 696E+11
Eu-155	3 9134E-02	910 46	1 820 93	0 00E+00	3 56E+01	7 13E+01	2 2500	5 654E+11
Fe-55	6 7429E-03	910 46	1 820 93	0 00E+00	6 14E+00	1 23E+01	2 7500	3 253E+09
H-3	1 0599E-02	910 46	1 820 93	0 00E+00	9 65E+00	1 93E+01	3 5000	3 608E+08
I-129	7 5300E-07	910 46	1 820 93	0 00E+00	6 86E-04	1 37E-03	5 0000	1 079E+03
Kr-85	2 8595E-01	910 46	1 820 93	0 00E+00	2 60E+02	5 21E+02	7 0000	1 202E+02
Np-237	9 5479E-06	910 46	1 820 93	0 00E+00	8 69E-03	1 74E-02	11 0000	1 355E+01
Pa-231	8 9297E-10	910 46	1 820 93	0 00E+00	8 13E-07	1 63E-06		
Pb-210	3 7609E-12	910 46	1 820 93	0 00E+00	3 42E-09	6 85E-09		
Pm-147	2 5452E+00	910 46	1 820 93	0 00E+00	2 32E+03	4 63E+03		
Pu-238	2 0550E-02	910 46	1 820 93	0 00E+00	1 87E+01	3 74E+01		
Pu-239	4 2838E-04	910 46	1 820 93	0 00E+00	3 90E-01	7 80E-01		
Pu-240	2 4401E-04	910 46	1 820 93	0 00E+00	2 22E-01	4 44E-01		
Pu-241	6 8764E-02	910 46	1 820 93	0 00E+00	6 26E+01	1 25E+02		
Pu-242	3 6329E-07	910 46	1 820 93	0 00E+00	3 31E-04	6 62E-04		
Ra-226	3 8045E-11	910 46	1 820 93	0 00E+00	3 46E-08	6 93E-08		
Ra-228	2 9902E-15	910 46	1 820 93	0 00E+00	2 72E-12	5 44E-12		
Ru-106	1 9055E-01	910 46	1 820 93	0 00E+00	1 73E+02	3 47E+02		
Se-79	1 2936E-05	910 46	1 820 93	0 00E+00	1 18E-02	2 36E-02		
Sn-126	1 1574E-05	910 46	1 820 93	0 00E+00	1 05E-02	2 11E-02		
Sr-90	2 7505E+00	910 46	1 820 93	0 00E+00	2 50E+03	5 01E+03		
Tc-99	4 2239E-04	910 46	1 820 93	0 00E+00	3 85E-01	7 69E-01		
Th-229	1 8848E-12	910 46	1 820 93	0 00E+00	1 72E-09	3 43E-09		
Th-230	1 7042E-08	910 46	1 820 93	0 00E+00	1 55E-05	3 10E-05		
Th-232	7 8132E-15	910 46	1 820 93	0 00E+00	7 11E-12	1 42E-11		
Ti-208	4 4063E-08	910 46	1 820 93	0 00E+00	4 01E-05	8 02E-05		
U-232	1 3151E-07	910 46	1 820 93	0 00E+00	1 20E-04	2 39E-04		
U-233	1 9564E-09	910 46	1 820 93	0 00E+00	1 78E-06	3 56E-06		
U-234	1 8371E-04	910 46	1 820 93	0 00E+00	1 67E-01	3 35E-01		
U-235	2 7235E-06	910 46	0 00	5 47E-03	2 99E-03	5 47E-03		
U-236	1 5493E-05	910 46	1 820 93	0 00E+00	1 41E-02	2 82E-02		
U-238	4 2851E-09	910 46	0 00	6 40E-05	6 01E-05	6 40E-05		
Y-90	2 7505E+00	910 46	1 820 93	0 00E+00	2 50E+03	5 01E+03		
Other Radionuclides					4 68E+03	9 37E+03		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences ¹
	LIGHT WATER	LIGHT WATER	
Reactor Moderator			
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	92 99997633	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		910 46	
Bounding		1 820 93	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	1 06		
Bounding	2 13		1 03

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-HEU) GERMANY
SNF ID #: 579
Fuel Units & Descr: 33 - MTR TYPE
Heavy Metal Mass: BOL=3 336kg; EOL=2.062kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
1 38

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	1 4545E-10	1,206.31	2,412.63	0 00E+00	1 75E-07	3 51E-07	Avg. MeV	
Am-241	1 1190E-03	1,206.31	2,412.63	0 00E+00	1 35E+00	2 70E+00	0 0150	4 655E+14
Am-242m	4 5425E-07	1,206.31	2,412.63	0 00E+00	5 48E-04	1 10E-03	0 0250	1 003E+14
Am-243	1 4921E-06	1,206.31	2,412.63	0 00E+00	1 80E-03	3 60E-03	0 0375	9 254E+13
C-14	5 7244E-09	1,206.31	2,412.63	0 00E+00	6 91E-06	1 38E-05	0 0575	9 099E+13
Cl-36	1 3124E-32	1,206.31	2,412.63	0 00E+00	1 58E-29	3 17E-29	0 0850	5 801E+13
Cm-243	2 3676E-07	1,206.31	2,412.63	0 00E+00	2 86E-04	5 71E-04	0 1250	5 023E+13
Cm-244	5 2042E-05	1,206.31	2,412.63	0 00E+00	6 28E-02	1 26E-01	0 2250	4 916E+13
Co-60	3 8208E-05	1,206.31	2,412.63	0 00E+00	4 61E-02	9 22E-02	0 3750	2 380E+13
Cs-134	4 8693E-01	1,206.31	2,412.63	0 00E+00	5 87E+02	1 17E+03	0 5750	3 269E+14
Cs-135	3 4477E-06	1,206.31	2,412.63	0 00E+00	4 16E-03	8 32E-03	0 8500	4 578E+13
Cs-137	2 8731E+00	1,206.31	2,412.63	0 00E+00	3 47E+03	6 93E+03	1 2500	8 517E+12
Eu-154	8 2053E-02	1,206.31	2,412.63	0 00E+00	9 90E+01	1 98E+02	1 7500	3 572E+11
Eu-155	3 9134E-02	1,206.31	2,412.63	0 00E+00	4 72E+01	9 44E+01	2 2500	7 491E+11
Fe-55	6 7429E-03	1,206.31	2,412.63	0 00E+00	8 13E+00	1 63E+01	2 7500	4 310E+09
H-3	1 0599E-02	1,206.31	2,412.63	0 00E+00	1 28E+01	2 56E+01	3 5000	4 780E+08
I-129	7 5300E-07	1,206.31	2,412.63	0 00E+00	9 08E-04	1 82E-03	5 0000	1 429E+03
Kr-85	2 8595E-01	1,206.31	2,412.63	0 00E+00	3 45E+02	6 90E+02	7 0000	1 593E+02
Np-237	9 5479E-06	1,206.31	2,412.63	0 00E+00	1 15E-02	2 30E-02	11 0000	1 796E+01
Pa-231	8 9297E-10	1,206.31	2,412.63	0 00E+00	1 08E-06	2 15E-06		
Pb-210	3 7609E-12	1,206.31	2,412.63	0 00E+00	4 54E-09	9 07E-09		
Pm-147	2 5452E+00	1,206.31	2,412.63	0 00E+00	3 07E+03	6 14E+03		
Pu-238	2 0550E-02	1,206.31	2,412.63	0 00E+00	2 48E+01	4 96E+01		
Pu-239	4 2838E-04	1,206.31	2,412.63	0 00E+00	5 17E-01	1 03E+00		
Pu-240	2 4401E-04	1,206.31	2,412.63	0 00E+00	2 94E-01	5 89E-01		
Pu-241	6 8764E-02	1,206.31	2,412.63	0 00E+00	8 30E+01	1 66E+02		
Pu-242	3 6329E-07	1,206.31	2,412.63	0 00E+00	4 38E-04	8 76E-04		
Ra-226	3 8045E-11	1,206.31	2,412.63	0 00E+00	4 59E-08	9 18E-08		
Ra-228	2 9902E-15	1,206.31	2,412.63	0 00E+00	3 61E-12	7 21E-12		
Ru-106	1 9055E-01	1,206.31	2,412.63	0 00E+00	2 30E+02	4 60E+02		
Se-79	1 2936E-05	1,206.31	2,412.63	0 00E+00	1 56E-02	3 12E-02		
Sn-126	1 1574E-05	1,206.31	2,412.63	0 00E+00	1 40E-02	2 79E-02		
Sr-90	2 7505E+00	1,206.31	2,412.63	0 00E+00	3 32E+03	6 64E+03		
Tc-99	4 2239E-04	1,206.31	2,412.63	0 00E+00	5 10E-01	1 02E+00		
Th-229	1 8848E-12	1,206.31	2,412.63	0 00E+00	2 27E-09	4 55E-09		
Th-230	1 7042E-08	1,206.31	2,412.63	0 00E+00	2 06E-05	4 11E-05		
Th-232	7 8132E-15	1,206.31	2,412.63	0 00E+00	9 43E-12	1 89E-11		
Ti-208	4 4063E-08	1,206.31	2,412.63	0 00E+00	5 32E-05	1 06E-04		
U-232	1 3151E-07	1,206.31	2,412.63	0 00E+00	1 59E-04	3 17E-04		
U-233	1 9564E-09	1,206.31	2,412.63	0 00E+00	2 36E-06	4 72E-06		
U-234	1 8371E-04	1,206.31	2,412.63	0 00E+00	2 22E-01	4 43E-01		
U-235	-2 7235E-06	1,206.31	0 00	6 71E-03	3 42E-03	6 71E-03		
U-236	1 5493E-05	1,206.31	2,412.63	0 00E+00	1 87E-02	3 74E-02		
U-238	-4 2851E-09	1,206.31	0 00	7 85E-05	7 33E-05	7 85E-05		
Y-90	2 7505E+00	1,206.31	2,412.63	0 00E+00	3 32E+03	6 64E+03		
Other Radionuclides					6 20E+03	1 24E+04		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							6 12E+01	1 22E+02
							Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	92 99997131	60 to 100	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		1,206.31	
Bounding		2 412 63	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	1 15		
Bounding	2 30		1 04

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR MTR-C (JALX-HEU) JAPAN
SNF ID #: 600
Fuel Units & Descr: 54 - MTR TYPE
Heavy Metal Mass BOL=5.227kg EOL=4 158kg
ROD Storage Site SRS

¹Fuel decay start date 2010
Estimates as of 2010
Template ATR (Light Water Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.0016689
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
2.25

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	1.4545E-10	1.012.55	2.025.11	0.00E+00	1.47E-07	2.95E-07	0.0150	3.907E+14
Am-241	1.1190E-03	1.012.55	2.025.11	0.00E+00	1.13E+00	2.27E+00	0.0250	8.417E+13
Am-242m	4.5425E-07	1.012.55	2.025.11	0.00E+00	4.60E-04	9.20E-04	0.0375	7.767E+13
Am-243	1.4921E-06	1.012.55	2.025.11	0.00E+00	1.51E-03	3.02E-03	0.0575	7.637E+13
C-14	5.7244E-09	1.012.55	2.025.11	0.00E+00	5.80E-06	1.16E-05	0.0850	4.869E+13
Cl-36	1.3124E-32	1.012.55	2.025.11	0.00E+00	1.33E-29	2.66E-29	0.1250	4.216E+13
Cm-243	2.3676E-07	1.012.55	2.025.11	0.00E+00	2.40E-04	4.79E-04	0.2250	4.127E+13
Cm-244	5.2042E-05	1.012.55	2.025.11	0.00E+00	5.27E-02	1.05E-01	0.3750	1.998E+13
Co-60	3.8208E-05	1.012.55	2.025.11	0.00E+00	3.87E-02	7.74E-02	0.5750	2.744E+14
Cs-134	4.8693E-01	1.012.55	2.025.11	0.00E+00	4.93E+02	9.86E+02	0.8500	3.842E+13
Cs-135	3.4477E-06	1.012.55	2.025.11	0.00E+00	3.49E-03	6.98E-03	1.2500	7.149E+12
Cs-137	2.8731E+00	1.012.55	2.025.11	0.00E+00	2.91E+03	5.82E+03	1.7500	2.998E+11
Eu-154	8.2053E-02	1.012.55	2.025.11	0.00E+00	8.31E+01	1.66E+02	2.2500	6.288E+11
Eu-155	3.9134E-02	1.012.55	2.025.11	0.00E+00	3.96E+01	7.93E+01	2.7500	3.618E+09
Fe-55	6.7429E-03	1.012.55	2.025.11	0.00E+00	6.83E+00	1.37E+01	3.5000	4.012E+08
H-3	1.0599E-02	1.012.55	2.025.11	0.00E+00	1.07E+01	2.15E+01	5.0000	1.200E+03
I-129	7.5300E-07	1.012.55	2.025.11	0.00E+00	7.62E-04	1.52E-03	7.0000	1.337E+02
Kr-85	2.5595E-01	1.012.55	2.025.11	0.00E+00	2.90E+02	5.79E+02	11.0000	1.508E+01
Np-237	9.5479E-06	1.012.55	2.025.11	0.00E+00	9.67E-03	1.93E-02		
Pa-231	8.9297E-10	1.012.55	2.025.11	0.00E+00	9.04E-07	1.81E-06		
Pb-210	3.7609E-12	1.012.55	2.025.11	0.00E+00	3.81E-09	7.62E-09		
Pm-147	2.5452E+00	1.012.55	2.025.11	0.00E+00	2.58E+03	5.15E+03		
Pu-238	2.0550E-02	1.012.55	2.025.11	0.00E+00	2.08E+01	4.16E+01		
Pu-239	4.2838E-04	1.012.55	2.025.11	0.00E+00	4.34E-01	8.68E-01		
Pu-240	2.4401E-04	1.012.55	2.025.11	0.00E+00	2.47E-01	4.94E-01		
Pu-241	6.8764E-02	1.012.55	2.025.11	0.00E+00	6.96E+01	1.39E+02		
Pu-242	3.6329E-07	1.012.55	2.025.11	0.00E+00	3.68E-04	7.36E-04		
Ra-226	3.8045E-11	1.012.55	2.025.11	0.00E+00	3.85E-08	7.70E-08		
Ra-228	2.9902E-15	1.012.55	2.025.11	0.00E+00	3.03E-12	6.06E-12		
Ru-106	1.9055E-01	1.012.55	2.025.11	0.00E+00	1.93E+02	3.86E+02		
Se-79	1.2936E-05	1.012.55	2.025.11	0.00E+00	1.31E-02	2.62E-02		
Sn-126	1.1574E-05	1.012.55	2.025.11	0.00E+00	1.17E-02	2.34E-02		
Sr-90	2.7505E+00	1.012.55	2.025.11	0.00E+00	2.79E+03	5.57E+03		
Tc-99	4.2239E-04	1.012.55	2.025.11	0.00E+00	4.28E-01	8.55E-01		
Th-229	1.8848E-12	1.012.55	2.025.11	0.00E+00	1.91E-09	3.82E-09		
Th-230	1.7042E-08	1.012.55	2.025.11	0.00E+00	1.73E-05	3.45E-05		
Th-232	7.8132E-15	1.012.55	2.025.11	0.00E+00	7.91E-12	1.58E-11		
Ti-208	4.4063E-08	1.012.55	2.025.11	0.00E+00	4.46E-05	8.92E-05		
U-232	1.3151E-07	1.012.55	2.025.11	0.00E+00	1.33E-04	2.66E-04		
U-233	1.9564E-09	1.012.55	2.025.11	0.00E+00	1.98E-06	3.96E-06		
U-234	1.8371E-04	1.012.55	2.025.11	0.00E+00	1.86E-01	3.72E-01		
U-235	-2.7235E-06	1.012.55	0.00	1.05E-02	7.75E-03	1.05E-02		
U-236	1.5493E-05	1.012.55	2.025.11	0.00E+00	1.57E-02	3.14E-02		
U-238	-4.2851E-09	1.012.55	0.00	1.23E-04	1.19E-04	1.23E-04		
Y-90	2.7505E+00	1.012.55	2.025.11	0.00E+00	2.79E+03	5.57E+03		
Other Radionuclides					5.21E+03	1.04E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	92.99999331	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		1.012.55	
Bounding		2.025.11	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.62		
Bounding	1.23		1.02

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-HEU) PORTUGAL
 SNF ID #: 631
 Fuel Units & Descr: 9 - MTR TYPE
 Heavy Metal Mass: BOL=1 423kg; EOL=0 894kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2010
 Estimates as of: 2010
 Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd)-
 Template BOL Heavy Metal Mass (MT) 367.2
 Template Decay Time 5 years

Estimated
 Canister usage
 18"x10"
 0.38

II. Estimates

	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	501.16	1,002.33	0.00E+00	7.29E-08	1.46E-07	Avg MeV	
Am-241	1.1190E-03	501.16	1,002.33	0.00E+00	5.61E-01	1.12E+00	0.0150	1.934E+14
Am-242m	4.5425E-07	501.16	1,002.33	0.00E+00	2.28E-04	4.55E-04	0.0250	4.166E+13
Am-243	1.4921E-06	501.16	1,002.33	0.00E+00	7.48E-04	1.50E-03	0.0375	3.844E+13
C-14	5.7244E-09	501.16	1,002.33	0.00E+00	2.87E-06	5.74E-06	0.0575	3.780E+13
Cl-36	1.3124E-32	501.16	1,002.33	0.00E+00	6.58E-30	1.32E-29	0.0850	2.410E+13
Cm-243	2.3676E-07	501.16	1,002.33	0.00E+00	1.19E-04	2.37E-04	0.1250	2.087E+13
Cm-244	5.2042E-05	501.16	1,002.33	0.00E+00	2.61E-02	5.22E-02	0.2250	2.042E+13
Co-60	3.8208E-05	501.16	1,002.33	0.00E+00	1.91E-02	3.83E-02	0.3750	9.887E+12
Cs-134	4.8693E-01	501.16	1,002.33	0.00E+00	2.44E+02	4.88E+02	0.5750	1.358E+14
Cs-135	3.4477E-06	501.16	1,002.33	0.00E+00	1.73E-03	3.46E-03	0.8500	1.902E+13
Cs-137	2.8731E+00	501.16	1,002.33	0.00E+00	1.44E+03	2.88E+03	1.2500	3.538E+12
Eu-154	8.2053E-02	501.16	1,002.33	0.00E+00	4.11E+01	8.22E+01	1.7500	1.484E+11
Eu-155	3.9134E-02	501.16	1,002.33	0.00E+00	1.96E+01	3.92E+01	2.2500	3.112E+11
Fe-55	6.7429E-03	501.16	1,002.33	0.00E+00	3.38E+00	6.76E+00	2.7500	1.790E+09
H-3	1.0599E-02	501.16	1,002.33	0.00E+00	5.31E+00	1.06E+01	3.5000	1.986E+08
I-129	7.5300E-07	501.16	1,002.33	0.00E+00	3.77E-04	7.55E-04	5.0000	5.937E+02
Kr-85	2.8595E-01	501.16	1,002.33	0.00E+00	1.43E+02	2.87E+02	7.0000	6.619E+01
Np-237	9.5479E-06	501.16	1,002.33	0.00E+00	4.79E-03	9.57E-03	11.0000	7.460E+00
Pa-231	8.9297E-10	501.16	1,002.33	0.00E+00	4.48E-07	8.95E-07		
Pb-210	3.7609E-12	501.16	1,002.33	0.00E+00	1.88E-09	3.77E-09		
Pm-147	2.5452E+00	501.16	1,002.33	0.00E+00	1.28E+03	2.55E+03		
Pu-238	2.0550E-02	501.16	1,002.33	0.00E+00	1.03E+01	2.06E+01		
Pu-239	4.2838E-04	501.16	1,002.33	0.00E+00	2.15E-01	4.29E-01		
Pu-240	2.4401E-04	501.16	1,002.33	0.00E+00	1.22E-01	2.45E-01		
Pu-241	6.8764E-02	501.16	1,002.33	0.00E+00	3.45E+01	6.89E+01		
Pu-242	3.6329E-07	501.16	1,002.33	0.00E+00	1.82E-04	3.64E-04		
Ra-226	3.8045E-11	501.16	1,002.33	0.00E+00	1.91E-08	3.81E-08		
Ra-228	2.9902E-15	501.16	1,002.33	0.00E+00	1.50E-12	3.00E-12		
Ru-106	1.9055E-01	501.16	1,002.33	0.00E+00	9.55E+01	1.91E+02		
Se-79	1.2936E-05	501.16	1,002.33	0.00E+00	6.48E-03	1.30E-02		
Sn-126	1.1574E-05	501.16	1,002.33	0.00E+00	5.80E-03	1.16E-02		
Sr-90	2.7505E+00	501.16	1,002.33	0.00E+00	1.38E+03	2.76E+03		
Tc-99	4.2239E-04	501.16	1,002.33	0.00E+00	2.12E-01	4.23E-01		
Th-229	1.8848E-12	501.16	1,002.33	0.00E+00	9.45E-10	1.89E-09		
Th-230	1.7042E-08	501.16	1,002.33	0.00E+00	8.54E-06	1.71E-05		
Th-232	7.8132E-15	501.16	1,002.33	0.00E+00	3.92E-12	7.83E-12		
Th-208	4.4063E-08	501.16	1,002.33	0.00E+00	2.21E-05	4.42E-05		
U-232	1.3151E-07	501.16	1,002.33	0.00E+00	6.59E-05	1.32E-04		
U-233	1.9564E-09	501.16	1,002.33	0.00E+00	9.80E-07	1.96E-06		
U-234	1.8371E-04	501.16	1,002.33	0.00E+00	9.21E-02	1.84E-01		
U-235	-2.7235E-06	501.16	0.00	2.86E-03	1.49E-03	2.86E-03		
U-236	1.5493E-05	501.16	1,002.33	0.00E+00	7.76E-03	1.55E-02		
U-238	-4.2851E-09	501.16	0.00	3.35E-05	3.13E-05	3.35E-05		
Y-90	2.7505E+00	501.16	1,002.33	0.00E+00	1.38E+03	2.76E+03		
Other Radionuclides					2.58E+03	5.16E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.54E+01	5.08E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ALUM	ALUM	
	U	U	
	93.00000971	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
		501.16	
Bounding:		1,002.33	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/Given Burnup	
	1.12		
Bounding	2.24		1.03

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR MTR-C (UALX-HEU) TURKEY
SNF ID # 643
Fuel Units & Descr 8 - MTR TYPE
Heavy Metal Mass BOL=1 781kg EOL=0 953kg
ROD Storage Site SRS

¹Fuel decay start date 2010
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100% U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0 00116689
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0 33

II. Estimates of Radionuclides							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	1.4545E-10	784 13	1,568.26	0 00E+00	1 14E-07	2 28E-07	Avg MeV	
Am-241	1 1190E-03	784 13	1,568.26	0 00E+00	8 77E-01	1 75E+00	0 0150	3 026E+14
Am-242m	4 5425E-07	784 13	1,568.26	0 00E+00	3 56E-04	7.12E-04	0 0250	6 518E+13
Am-243	1 4921E-06	784 13	1,568.26	0 00E+00	1 17E-03	2.34E-03	0 0375	6 015E+13
C-14	5 7244E-09	784 13	1,568.26	0 00E+00	4 49E-06	8 98E-06	0 0575	5 914E+13
Cl-36	1.3124E-32	784 13	1,568.26	0 00E+00	1 03E-29	2.06E-29	0 0850	3 771E+13
Cm-243	2 3676E-07	784 13	1,568.26	0 00E+00	1 86E-04	3.71E-04	0 1250	3 265E+13
Cm-244	5 2042E-05	784 13	1,568.26	0 00E+00	4 08E-02	8 16E-02	0 2250	3 196E+13
Co-60	3 8208E-05	784 13	1,568.26	0 00E+00	3 00E-02	5 99E-02	0 3750	1 547E+13
Cs-134	4 8693E-01	784 13	1,568.26	0 00E+00	3 82E+02	7.64E+02	0 5750	2 125E+14
Cs-135	3 4477E-06	784 13	1,568.26	0 00E+00	2 70E-03	5 41E-03	0 8500	2 976E+13
Cs-137	2 8731E+00	784 13	1,568.26	0 00E+00	2 25E+03	4 51E+03	1 2500	5 536E+12
Eu-154	8 2053E-02	784.13	1,568.26	0 00E+00	6 43E+01	1 29E+02	1 7500	2 322E+11
Eu-155	3 9134E-02	784.13	1,568.26	0 00E+00	3 07E+01	6 14E+01	2 2500	4 869E+11
Fe-55	6 7429E-03	784.13	1,568.26	0 00E+00	5 29E+00	1 06E+01	2 7500	2 801E+09
H-3	1 0599E-02	784.13	1,568.26	0 00E+00	8 31E+00	1 66E+01	3.5000	3 107E+08
I-129	7.5300E-07	784 13	1,568.26	0 00E+00	5 90E-04	1 18E-03	5 0000	9 289E+02
Kr-85	2 8595E-01	784 13	1,568.26	0 00E+00	2.24E+02	4 48E+02	7 0000	1 036E+02
Np-237	9.5479E-06	784 13	1,568.26	0 00E+00	7 49E-03	1 50E-02	11 0000	1 167E+01
Pa-231	8 9297E-10	784 13	1,568.26	0 00E+00	7 00E-07	1 40E-06		
Pb-210	3 7609E-12	784 13	1,568.26	0 00E+00	2 95E-09	5.90E-09		
Pm-147	2.5452E+00	784 13	1,568.26	0 00E+00	2 00E+03	3 99E+03		
Pu-238	2 0550E-02	784 13	1,568.26	0 00E+00	1 61E+01	3.22E+01		
Pu-239	4.2838E-04	784 13	1,568.26	0 00E+00	3 36E-01	6 72E-01		
Pu-240	2 4401E-04	784 13	1,568.26	0 00E+00	1 91E-01	3 83E-01		
Pu-241	6 8764E-02	784 13	1,568.26	0 00E+00	5 39E+01	1 08E+02		
Pu-242	3 6329E-07	784 13	1,568.26	0 00E+00	2 85E-04	5 70E-04		
Ra-226	3 8045E-11	784 13	1,568.26	0 00E+00	2 98E-08	5 97E-08		
Ra-228	2 9902E-15	784 13	1,568.26	0 00E+00	2.34E-12	4 69E-12		
Ru-106	1 9055E-01	784 13	1,568.26	0 00E+00	1 49E+02	2 99E+02		
Se-79	1 2936E-05	784 13	1,568.26	0 00E+00	1.01E-02	2 03E-02		
Sn-126	1 1574E-05	784.13	1,568.26	0 00E+00	9 08E-03	1 82E-02		
Sr-90	2 7505E+00	784.13	1,568.26	0 00E+00	2.16E+03	4 31E+03		
Tc-99	4 2239E-04	784.13	1,568.26	0 00E+00	3 31E-01	6 62E-01		
Th-229	1 8848E-12	784 13	1,568.26	0 00E+00	1 48E-09	2.96E-09		
Th-230	1 7042E-08	784 13	1,568.26	0 00E+00	1.34E-05	2.67E-05		
Th-232	7 8132E-15	784 13	1,568.26	0 00E+00	6 13E-12	1.23E-11		
Ti-208	4 4063E-08	784 13	1,568.26	0 00E+00	3 46E-05	6 91E-05		
U-232	1.3151E-07	784 13	1,568.26	0 00E+00	1 03E-04	2 06E-04		
U-233	1.9564E-09	784 13	1,568.26	0 00E+00	1 53E-06	3 07E-06		
U-234	1.8371E-04	784 13	1,568.26	0 00E+00	1 44E-01	2 88E-01		
U-235	-2 7235E-06	784 13	0 00	3.58E-03	1 44E-03	3 58E-03		
U-236	1.5493E-05	784 13	1,568.26	0.00E+00	1.21E-02	2 43E-02		
U-238	-4 2851E-09	784 13	0 00	4 19E-05	3 85E-05	4 19E-05		
Y-90	2 7505E+00	784 13	1,568.26	0 00E+00	2 16E+03	4 31E+03		
Other Radionuclides					4 03E+03	8 07E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LIGHT WATER	LIGHT WATER
Fuel Cladding	ALUM	ALUM
BOL HM Constituents	U	
BOL Enrichment %	93.00002122	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		784 13
Bounding		1 568.26

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	1.40	
Bounding	2.80	

Estimated EOL HM/Given EOL HM

1.05

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-LEU) JAPAN
 SNF ID #: 552
 Fuel Units & Descr: 99 - ASSEMBLY
 Heavy Metal Mass: BOL=94 05kg; EOL=84 645kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2010
 Estimates as of: 2010
 Template: HFBR (Heavy Water, Alum, 10 to 20%, U)
²Template Burnup(MWd): 15
 Template BOL Heavy Metal Mass (MT): 0.00034251
 Template Decay Time: 5 years

Estimated
 Canister usage
 18"x10"
 4 13

II. Estimates

	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.7533E-10	8,939 12	17,878 25	0.00E+00	1.57E-06	3.13E-06	Avg. MeV	
Am-241	1.2780E-02	8,939 12	17,878 25	0.00E+00	1.14E+02	2.28E+02	0.0150	3.244E+15
Am-242m	9.5467E-06	8,939 12	17,878 25	0.00E+00	8.53E-02	1.71E-01	0.0250	6.989E+14
Am-243	6.4100E-06	8,939 12	17,878 25	0.00E+00	5.73E-02	1.15E-01	0.0375	6.389E+14
C-14	2.9673E-08	8,939 12	17,878 25	0.00E+00	2.65E-04	5.31E-04	0.0575	6.358E+14
Cl-36	5.9513E-35	8,939 12	17,878 25	0.00E+00	5.32E-31	1.06E-30	0.0850	4.004E+14
Cm-243	3.1807E-06	8,939 12	17,878 25	0.00E+00	2.84E-02	5.69E-02	0.1250	3.344E+14
Cm-244	1.9540E-04	8,939 12	17,878.25	0.00E+00	1.75E+00	3.49E+00	0.2250	3.415E+14
Co-60	1.1753E-04	8,939 12	17,878.25	0.00E+00	1.05E+00	2.10E+00	0.3750	1.656E+14
Cs-134	3.3060E-01	8,939 12	17,878.25	0.00E+00	2.96E+03	5.91E+03	0.5750	2.287E+15
Cs-135	4.8607E-06	8,939 12	17,878.25	0.00E+00	4.35E-02	8.69E-02	0.8500	2.425E+14
Cs-137	2.8607E+00	8,939 12	17,878.25	0.00E+00	2.56E+04	5.11E+04	1.2500	5.360E+13
Eu-154	6.9933E-02	8,939.12	17,878.25	0.00E+00	6.25E+02	1.25E+03	1.7500	2.551E+12
Eu-155	3.3253E-02	8,939.12	17,878.25	0.00E+00	2.97E+02	5.95E+02	2.2500	4.437E+12
Fe-55	7.7267E-02	8,939.12	17,878.25	0.00E+00	6.91E+02	1.38E+03	2.7500	4.014E+10
H-3	1.0827E-02	8,939.12	17,878.25	0.00E+00	9.68E+01	1.94E+02	3.5000	4.755E+09
I-129	7.1600E-07	8,939 12	17,878 25	0.00E+00	6.40E-03	1.28E-02	5.0000	4.655E+04
Kr-85	2.7007E-01	8,939 12	17,878 25	0.00E+00	2.41E+03	4.83E+03	7.0000	5.303E+03
Np-237	3.6327E-06	8,939 12	17,878.25	0.00E+00	3.25E-02	6.49E-02	11.0000	6.057E+02
Pa-231	1.1267E-09	8,939 12	17,878 25	0.00E+00	1.01E-05	2.01E-05		
Pb-210	1.9773E-15	8,939 12	17,878 25	0.00E+00	1.77E-11	3.54E-11		
Pm-147	2.4367E+00	8,939 12	17,878 25	0.00E+00	2.18E+04	4.36E+04		
Pu-238	6.2213E-03	8,939 12	17,878 25	0.00E+00	5.56E+01	1.11E+02		
Pu-239	1.0320E-02	8,939 12	17,878 25	0.00E+00	9.23E+01	1.85E+02		
Pu-240	5.4260E-03	8,939 12	17,878 25	0.00E+00	4.85E+01	9.70E+01		
Pu-241	7.7333E-01	8,939 12	17,878 25	0.00E+00	6.91E+03	1.38E+04		
Pu-242	3.0713E-06	8,939 12	17,878 25	0.00E+00	2.75E-02	5.49E-02		
Ra-226	2.2027E-14	8,939 12	17,878 25	0.00E+00	1.97E-10	3.94E-10		
Ra-228	2.6333E-15	8,939 12	17,878.25	0.00E+00	2.35E-11	4.71E-11		
Ru-106	2.5580E-01	8,939 12	17,878 25	0.00E+00	2.29E+03	4.57E+03		
Se-79	1.2540E-05	8,939.12	17,878.25	0.00E+00	1.12E-01	2.24E-01		
Sn-126	1.1393E-05	8,939.12	17,878.25	0.00E+00	1.02E-01	2.04E-01		
Sr-90	2.6293E+00	8,939.12	17,878.25	0.00E+00	2.35E+04	4.70E+04		
Tc-99	4.3540E-04	8,939.12	17,878.25	0.00E+00	3.89E+00	7.78E+00		
Th-229	1.3653E-13	8,939.12	17,878.25	0.00E+00	1.22E-09	2.44E-09		
Th-230	1.2607E-11	8,939 12	17,878.25	0.00E+00	1.13E-07	2.25E-07		
Th-232	6.7400E-15	8,939 12	17,878.25	0.00E+00	6.02E-11	1.20E-10		
Ti-208	7.4667E-09	8,939 12	17,878.25	0.00E+00	6.67E-05	1.33E-04		
U-232	2.1927E-08	8,939 12	17,878 25	0.00E+00	1.96E-04	3.92E-04		
U-233	1.9920E-10	8,939 12	17,878 25	0.00E+00	1.78E-06	3.56E-06		
U-234	2.2487E-07	8,939 12	17,878 25	0.00E+00	2.01E-03	4.02E-03		
U-235	-2.5341E-06	8,939 12	0.00	4.06E-02	1.80E-02	4.06E-02		
U-236	1.3000E-05	8,939 12	17,878 25	0.00E+00	1.16E-01	2.32E-01		
U-238	-1.4207E-08	8,939 12	0.00	2.53E-02	2.52E-02	2.53E-02		
Y-90	2.6300E+00	8,939 12	17,878 25	0.00E+00	2.35E+04	4.70E+04		
Other Radionuclides					4.22E+04	8.44E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	HEAVY WATER	HEAVY WATER
Fuel Cladding	ALUM	ALUM
BOL HM Constituents	U	U
BOL Enrichment % ¹	20	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		8 939 12
Bounding		17,878.25

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
 Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	2.17	
Bounding	4.34	

Estimated EOL HM/Given EOL HM

1.03

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR MTR-C (UALX-LEU) PORTUGAL
SNF ID # 540
Fuel Units & Descr 9 - ASSEMBLY
Heavy Metal Mass BOL=4.05kg EOL=3.912kg
ROD Storage Site SRS

Fuel decay start date 2010
Estimates as of 2010
Template ATR (Light Water Alum, 60 to 100% U)
*Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 5 years

Estimated
Canister usage*
18"x10"
0.38

II. Estimates							Gamma Sources	
	m	x _n	x _b	b	y _n	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	1.4545E-10	130.40	260.81	0.00E+00	1.90E-08	3.79E-08	0.0150	5.032E+13
Am-241	1.1190E-03	130.40	260.81	0.00E+00	1.46E-01	2.92E-01	0.0250	1.084E+13
Am-242m	4.5425E-07	130.40	260.81	0.00E+00	5.92E-05	1.18E-04	0.0375	1.000E+13
Am-243	1.4921E-06	130.40	260.81	0.00E+00	1.95E-04	3.89E-04	0.0575	9.836E+12
C-14	5.7244E-09	130.40	260.81	0.00E+00	7.46E-07	1.49E-06	0.0850	6.271E+12
Cl-36	1.3124E-32	130.40	260.81	0.00E+00	1.71E-30	3.42E-30	0.1250	5.430E+12
Cm-243	2.3676E-07	130.40	260.81	0.00E+00	3.09E-05	6.18E-05	0.2250	5.315E+12
Cm-244	5.2042E-05	130.40	260.81	0.00E+00	6.79E-03	1.36E-02	0.3750	2.573E+12
Co-60	3.8208E-05	130.40	260.81	0.00E+00	4.98E-03	9.97E-03	0.5750	3.534E+13
Cs-134	4.8693E-01	130.40	260.81	0.00E+00	6.35E+01	1.27E+02	0.8500	4.949E+12
Cs-135	3.4477E-06	130.40	260.81	0.00E+00	4.50E-04	8.99E-04	1.2500	9.207E+11
Cs-137	2.8731E+00	130.40	260.81	0.00E+00	3.75E+02	7.49E+02	1.7500	3.861E+10
Eu-154	8.2053E-02	130.40	260.81	0.00E+00	1.07E+01	2.14E+01	2.2500	8.098E+10
Eu-155	3.9134E-02	130.40	260.81	0.00E+00	5.10E+00	1.02E+01	2.7500	4.659E+08
Fe-55	6.7429E-03	130.40	260.81	0.00E+00	8.79E-01	1.76E+00	3.5000	5.167E+07
H-3	1.0599E-02	130.40	260.81	0.00E+00	1.38E+00	2.76E+00	5.0000	1.570E+02
I-129	7.5300E-07	130.40	260.81	0.00E+00	9.82E-05	1.96E-04	7.0000	1.751E+01
Kr-85	2.8595E-01	130.40	260.81	0.00E+00	3.73E+01	7.46E+01	11.0000	1.974E+00
Np-237	9.5479E-06	130.40	260.81	0.00E+00	1.25E-03	2.49E-03		
Pa-231	8.9297E-10	130.40	260.81	0.00E+00	1.16E-07	2.33E-07		
Pb-210	3.7609E-12	130.40	260.81	0.00E+00	4.90E-10	9.81E-10		
Pm-147	2.5452E+00	130.40	260.81	0.00E+00	3.32E+02	6.64E+02		
Pu-238	2.0550E-02	130.40	260.81	0.00E+00	2.68E+00	5.36E+00		
Pu-239	4.2838E-04	130.40	260.81	0.00E+00	5.59E-02	1.12E-01		
Pu-240	2.4401E-04	130.40	260.81	0.00E+00	3.18E-02	6.36E-02		
Pu-241	6.8764E-02	130.40	260.81	0.00E+00	8.97E+00	1.79E+01		
Pu-242	3.6329E-07	130.40	260.81	0.00E+00	4.74E-05	9.47E-05		
Ra-226	3.8045E-11	130.40	260.81	0.00E+00	4.96E-09	9.92E-09		
Ra-228	2.9902E-15	130.40	260.81	0.00E+00	3.90E-13	7.80E-13		
Ru-106	1.9055E-01	130.40	260.81	0.00E+00	2.48E+01	4.97E+01		
Se-79	1.2936E-05	130.40	260.81	0.00E+00	1.69E-03	3.37E-03		
Sn-126	1.1574E-05	130.40	260.81	0.00E+00	1.51E-03	3.02E-03		
Sr-90	2.7505E+00	130.40	260.81	0.00E+00	3.59E+02	7.17E+02		
Tc-99	4.2239E-04	130.40	260.81	0.00E+00	5.51E-02	1.10E-01		
Th-229	1.8848E-12	130.40	260.81	0.00E+00	2.46E-10	4.92E-10		
Th-230	1.7042E-08	130.40	260.81	0.00E+00	2.22E-06	4.44E-06		
Th-232	7.8132E-15	130.40	260.81	0.00E+00	1.02E-12	2.04E-12		
Ti-208	4.4063E-08	130.40	260.81	0.00E+00	5.75E-06	1.15E-05		
U-232	1.3151E-07	130.40	260.81	0.00E+00	1.71E-05	3.43E-05		
U-233	1.9564E-09	130.40	260.81	0.00E+00	2.55E-07	5.10E-07		
U-234	1.8371E-04	130.40	260.81	0.00E+00	2.40E-02	4.79E-02		
U-235	2.7235E-06	130.40	0.00	1.75E-03	1.40E-03	1.75E-03		
U-236	1.5493E-05	130.40	260.81	0.00E+00	2.02E-03	4.04E-03		
U-238	4.2851E-09	130.40	0.00	1.09E-03	1.09E-03	1.09E-03		
Y-90	2.7505E+00	130.40	260.81	0.00E+00	3.59E+02	7.17E+02		
Other Radionuclides					6.71E+02	1.34E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches on all parameters except enrichment.
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	20.0000132	60 to 100	

Burnup Summary (MWd) ²		Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Nominal	From SFD	Estimated
Bounding		130.40
		260.81

Checks		Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/Given Burnup
Bounding	0.10	1.00
	0.20	

*Reactor shutdown, core removal, storage, shipping, or other date confirming that irradiation ceased for fuel

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C1 (UALX-HEU) SWITZERLAND
SNF ID #: 656
Fuel Units & Descr: 7 - MTR TYPE
Heavy Metal Mass: BOL=1 28kg; EOL=0 518kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0 29

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 4545E-10	721 25	1 211 81	0 00E+00	1 05E-07	1 76E-07	Avg MeV	
Am-241	1 1190E-03	721 25	1 211 81	0 00E+00	8 07E-01	1 36E+00	0 0150	2 338E+14
Am-242m	4 5425E-07	721 25	1 211 81	0 00E+00	3 28E-04	5 50E-04	0 0250	5 037E+13
Am-243	1 4921E-06	721 25	1 211 81	0 00E+00	1 08E-03	1 81E-03	0 0375	4 648E+13
C-14	5 7244E-09	721 25	1 211 81	0 00E+00	4 13E-06	6 94E-06	0 0575	4 570E+13
Cl-36	1 3124E-32	721 25	1 211 81	0 00E+00	9 47E-30	1 59E-29	0 0850	2 913E+13
Cm-243	2 3676E-07	721 25	1 211 81	0 00E+00	1 71E-04	2 87E-04	0 1250	2 523E+13
Cm-244	5 2042E-05	721 25	1 211 81	0 00E+00	3 75E-02	6 31E-02	0 2250	2 469E+13
Co-60	3 8208E-05	721 25	1 211 81	0 00E+00	2 76E-02	4 63E-02	0 3750	1 195E+13
Cs-134	4 8693E-01	721 25	1 211 81	0 00E+00	3 51E+02	5 90E+02	0 5750	1 642E+14
Cs-135	3 4477E-06	721 25	1 211 81	0 00E+00	2 49E-03	4 18E-03	0 8500	2 299E+13
Cs-137	2 8731E+00	721 25	1 211 81	0 00E+00	2 07E+03	3 48E+03	1 2500	4 278E+12
Eu-154	8 2053E-02	721 25	1 211 81	0 00E+00	5 92E+01	9 94E+01	1 7500	1 794E+11
Eu-155	3 9134E-02	721 25	1 211 81	0 00E+00	2 82E+01	4 74E+01	2 2500	3 763E+11
Fe-55	6 7429E-03	721 25	1 211 81	0 00E+00	4 86E+00	8 17E+00	2 7500	2 165E+09
H-3	1 0599E-02	721 25	1 211 81	0 00E+00	7 64E+00	1 28E+01	3 5000	2 401E+08
I-129	7 5300E-07	721 25	1 211 81	0 00E+00	5 43E-04	9 12E-04	5 0000	7 178E+02
Kr-85	2 8595E-01	721 25	1 211 81	0 00E+00	2 06E+02	3 47E+02	7 0000	8 001E+01
Np-237	9 5479E-06	721 25	1 211 81	0 00E+00	6 89E-03	1 16E-02	11 0000	9 019E+00
Pa-231	8 9297E-10	721 25	1 211 81	0 00E+00	6 44E-07	1 08E-06		
Pb-210	3 7609E-12	721 25	1 211 81	0 00E+00	2 71E-09	4 56E-09		
Pm-147	2 5452E+00	721 25	1 211 81	0 00E+00	1 84E+03	3 08E+03		
Pu-238	2 0550E-02	721 25	1 211 81	0 00E+00	1 48E+01	2 49E+01		
Pu-239	4 2838E-04	721 25	1 211 81	0 00E+00	3 09E-01	5 19E-01		
Pu-240	2 4401E-04	721 25	1 211 81	0 00E+00	1 76E-01	2 96E-01		
Pu-241	6 8764E-02	721 25	1 211 81	0 00E+00	4 96E+01	8 33E+01		
Pu-242	3 6329E-07	721 25	1 211 81	0 00E+00	2 62E-04	4 40E-04		
Ra-226	3 8045E-11	721 25	1 211 81	0 00E+00	2 74E-08	4 61E-08		
Ra-228	2 9902E-15	721 25	1 211 81	0 00E+00	2 16E-12	3 62E-12		
Ru-106	1 9055E-01	721 25	1 211 81	0 00E+00	1 37E+02	2 31E+02		
Se-79	1 2936E-05	721 25	1 211 81	0 00E+00	9 33E-03	1 57E-02		
Sn-126	1 1574E-05	721 25	1 211 81	0 00E+00	8 35E-03	1 40E-02		
Sr-90	2 7505E+00	721 25	1 211 81	0 00E+00	1 98E+03	3 33E+03		
Tc-99	4 2239E-04	721 25	1 211 81	0 00E+00	3 05E-01	5 12E-01		
Th-229	1 8848E-12	721 25	1 211 81	0 00E+00	1 36E-09	2 28E-09		
Th-230	1 7042E-08	721 25	1 211 81	0 00E+00	1 23E-05	2 07E-05		
Th-232	7 8132E-15	721 25	1 211 81	0 00E+00	5 64E-12	9 47E-12		
Th-208	4 4063E-08	721 25	1 211 81	0 00E+00	3 18E-05	5 34E-05		
U-232	1 3151E-07	721 25	1 211 81	0 00E+00	9 49E-05	1 59E-04		
U-233	1 9564E-09	721 25	1 211 81	0 00E+00	1 41E-06	2 37E-06		
U-234	1 8371E-04	721 25	1 211 81	0 00E+00	1 33E-01	2 23E-01		
U-235	-2 7235E-06	721 25	0 00	2 57E-03	6 07E-04	2 57E-03		
U-236	1 5493E-05	721 25	1 211 81	0 00E+00	1 12E-02	1 88E-02		
U-238	-4 2851E-09	721 25	0 00	3 01E-05	2 70E-05	3 01E-05		
Y-90	2 7505E+00	721 25	1 211 81	0 00E+00	1 98E+03	3 33E+03		
Other Radionuclides					3 71E+03	6 23E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LIGHT WATER	LIGHT WATER
Fuel Cladding	ALUM	ALUM
BOL HM Constituents	U	U
BOL Enrichment %	92.9999987	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		721 25
Bounding		1 211 81

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	1 79	
Bounding	3 01	

Estimated EOL HM/Given EOL HM

1 09

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C2 (U3Si2 LEU) TURKEY

SNF ID #: 527

Fuel Units & Descr: 9 - ASSEMBLY

Heavy Metal Mass BOL=13.95kg EOL=12.276kg

ROD Storage Site SRS

Fuel decay start date 2010

Estimates as of 2010

Template ATR (Light Water, Alum, 60 to 100%, U)

Template Burnup(MWd) 367.2

Template BOL Heavy Metal Mass (MT) 0.00116689

Template Decay Time 5 years

Estimated

Canister usage

18"x10"

0.38

Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	1.585.31	3,170.62	0.00E+00	2.31E-07	4.61E-07	Avg MeV	
Am-241	1.1190E-03	1.585.31	3,170.62	0.00E+00	1.77E+00	3.55E+00	0.0150	6.117E+14
Am-242m	4.5425E-07	1.585.31	3,170.62	0.00E+00	7.20E-04	1.44E-03	0.0250	1.318E+14
Am-243	1.4921E-06	1.585.31	3,170.62	0.00E+00	2.37E-03	4.73E-03	0.0375	1.216E+14
C-14	5.7244E-09	1.585.31	3,170.62	0.00E+00	9.07E-06	1.81E-05	0.0575	1.196E+14
Cl-36	1.3124E-32	1.585.31	3,170.62	0.00E+00	2.08E-29	4.16E-29	0.0850	7.623E+13
Cm-243	2.3676E-07	1.585.31	3,170.62	0.00E+00	3.75E-04	7.51E-04	0.1250	6.601E+13
Cm-244	5.2042E-05	1.585.31	3,170.62	0.00E+00	8.25E-02	1.65E-01	0.2250	6.461E+13
Co-60	3.8208E-05	1.585.31	3,170.62	0.00E+00	6.06E-02	1.21E-01	0.3750	3.127E+13
Cs-134	4.8693E-01	1.585.31	3,170.62	0.00E+00	7.72E+02	1.54E+03	0.5750	4.296E+14
Cs-135	3.4477E-06	1.585.31	3,170.62	0.00E+00	5.47E-03	1.09E-02	0.8500	6.016E+13
Cs-137	2.8731E+00	1.585.31	3,170.62	0.00E+00	4.55E+03	9.11E+03	1.2500	1.119E+13
Eu-154	8.2053E-02	1.585.31	3,170.62	0.00E+00	1.30E+02	2.60E+02	1.7500	4.694E+11
Eu-155	3.9134E-02	1.585.31	3,170.62	0.00E+00	6.20E+01	1.24E+02	2.2500	9.845E+11
Fe-55	6.7429E-03	1.585.31	3,170.62	0.00E+00	1.07E+01	2.14E+01	2.7500	5.664E+09
H-3	1.0599E-02	1.585.31	3,170.62	0.00E+00	1.68E+01	3.36E+01	3.5000	6.282E+08
I-129	7.5300E-07	1.585.31	3,170.62	0.00E+00	1.19E-03	2.39E-03	5.0000	1.886E+03
Kr-85	2.8595E-01	1.585.31	3,170.62	0.00E+00	4.53E+02	9.07E+02	7.0000	2.103E+02
Np-237	9.5479E-06	1.585.31	3,170.62	0.00E+00	1.51E-02	3.03E-02	11.0000	2.371E+01
Pa-231	8.9297E-10	1.585.31	3,170.62	0.00E+00	1.42E-06	2.83E-06		
Pb-210	3.7609E-12	1.585.31	3,170.62	0.00E+00	5.96E-09	1.19E-08		
Pm-147	2.5452E+00	1.585.31	3,170.62	0.00E+00	4.03E+03	8.07E+03		
Pu-238	2.0550E-02	1.585.31	3,170.62	0.00E+00	3.26E+01	6.52E+01		
Pu-239	4.2838E-04	1.585.31	3,170.62	0.00E+00	6.79E-01	1.36E+00		
Pu-240	2.4401E-04	1.585.31	3,170.62	0.00E+00	3.87E-01	7.74E-01		
Pu-241	6.8764E-02	1.585.31	3,170.62	0.00E+00	1.09E+02	2.18E+02		
Pu-242	3.6329E-07	1.585.31	3,170.62	0.00E+00	5.76E-04	1.15E-03		
Ra-226	3.8045E-11	1.585.31	3,170.62	0.00E+00	6.03E-08	1.21E-07		
Ra-228	2.9902E-15	1.585.31	3,170.62	0.00E+00	4.74E-12	9.48E-12		
Ru-106	1.9055E-01	1.585.31	3,170.62	0.00E+00	3.02E+02	6.04E+02		
Se-79	1.2936E-05	1.585.31	3,170.62	0.00E+00	2.05E-02	4.10E-02		
Sn-126	1.1574E-05	1.585.31	3,170.62	0.00E+00	1.83E-02	3.67E-02		
Sr-90	2.7505E+00	1.585.31	3,170.62	0.00E+00	4.36E+03	8.72E+03		
Tc-99	4.2239E-04	1.585.31	3,170.62	0.00E+00	6.70E-01	1.34E+00		
Th-229	1.8848E-12	1.585.31	3,170.62	0.00E+00	2.99E-09	5.98E-09		
Th-230	1.7042E-08	1.585.31	3,170.62	0.00E+00	2.70E-05	5.40E-05		
Th-232	7.8132E-15	1.585.31	3,170.62	0.00E+00	1.24E-11	2.48E-11		
Ti-208	4.4063E-08	1.585.31	3,170.62	0.00E+00	6.99E-05	1.40E-04		
U-232	1.3151E-07	1.585.31	3,170.62	0.00E+00	2.08E-04	4.17E-04		
U-233	1.9564E-09	1.585.31	3,170.62	0.00E+00	3.10E-06	6.20E-06		
U-234	1.8371E-04	1.585.31	3,170.62	0.00E+00	2.91E-01	5.82E-01		
U-235	2.7235E-06	1.585.31	0.00	6.03E-03	1.71E-03	6.03E-03		
U-236	1.5493E-05	1.585.31	3,170.62	0.00E+00	2.46E-02	4.91E-02		
U-238	4.2851E-09	1.585.31	0.00	3.75E-03	3.74E-03	3.75E-03		
Y-90	2.7505E+00	1.585.31	3,170.62	0.00E+00	4.36E+03	8.72E+03		
Other Radionuclides					8.15E+03	1.63E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons
BOL HM Constituents	ALUM	ALUM	This fuel matches on all parameters except enrichment
BOL Enrichment %	U	U	
	20.0000077	60 to 100	
Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal		1.585.31	Nominal burnup calculated from the heavy metal mass destroyed
Bounding		3.170.62	Bounding burnup assumed to be twice nominal burnup
Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.36		1.01
Bounding	0.72		

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C2 (UALX-HEU) SWITZERLAND
SNF ID #: 657
Fuel Units & Descr: 11 - MTR TYPE
Heavy Metal Mass: BOL=2 461kg; EOL=0 995kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0 46

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CvMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 4545E-10	1,387 57	2,330 33	0 00E+00	2 02E-07	3 39E-07	Avg MeV	
Am-241	1 1190E-03	1,387 57	2,330 33	0 00E+00	1 55E+00	2 61E+00	0 0150	4 496E+14
Am-242m	4 5425E-07	1,387 57	2,330 33	0 00E+00	6 30E-04	1 06E-03	0 0250	9 686E+13
Am-243	1 4921E-06	1,387 57	2,330 33	0 00E+00	2 07E-03	3 48E-03	0 0375	8 938E+13
C-14	5 7244E-09	1,387 57	2,330 33	0 00E+00	7 94E-06	1 33E-05	0 0575	8 788E+13
Cl-36	1 3124E-32	1,387 57	2,330 33	0 00E+00	1 82E-29	3 06E-29	0 0850	5 603E+13
Cm-243	2 3676E-07	1,387 57	2,330 33	0 00E+00	3 29E-04	5 52E-04	0 1250	4 852E+13
Cm-244	5 2042E-05	1,387 57	2,330 33	0 00E+00	7 22E-02	1 21E-01	0 2250	4 749E+13
Co-60	3 8208E-05	1,387 57	2,330 33	0 00E+00	5 30E-02	8 90E-02	0 3750	2 299E+13
Cs-134	4 8693E-01	1,387 57	2,330 33	0 00E+00	6 76E+02	1 13E+03	0 5750	3 157E+14
Cs-135	3 4477E-06	1,387 57	2,330 33	0 00E+00	4 78E-03	8 03E-03	0 8500	4 422E+13
Cs-137	2 8731E+00	1,387 57	2,330 33	0 00E+00	3 99E+03	6 70E+03	1 2500	8 226E+12
Eu-154	8 2053E-02	1,387 57	2,330 33	0 00E+00	1 14E+02	1 91E+02	1 7500	3 450E+11
Eu-155	3 9134E-02	1,387 57	2,330 33	0 00E+00	5 43E+01	9 12E+01	2 2500	7 236E+11
Fe-55	6 7429E-03	1,387 57	2,330 33	0 00E+00	9 36E+00	1 57E+01	2 7500	4 183E+09
H-3	1 0599E-02	1,387 57	2,330 33	0 00E+00	1 47E+01	2 47E+01	3 5000	4 617E+08
I-129	7 5300E-07	1,387 57	2,330 33	0 00E+00	1 04E-03	1 75E-03	5 0000	1 380E+03
Kr-85	2 8595E-01	1,387 57	2,330 33	0 00E+00	3 97E+02	6 66E+02	7 0000	1 539E+02
Np-237	9 5479E-06	1,387 57	2,330 33	0 00E+00	1 32E-02	2 22E-02	11 0000	1 734E+01
Pa-231	8 9297E-10	1,387 57	2,330 33	0 00E+00	1 24E-06	2 08E-06		
Pb-210	3 7609E-12	1,387 57	2,330 33	0 00E+00	5 22E-09	8 76E-09		
Pm-147	2 5452E+00	1,387 57	2,330 33	0 00E+00	3 53E+03	5 93E+03		
Pu-238	2 0550E-02	1,387 57	2,330 33	0 00E+00	2 85E+01	4 79E+01		
Pu-239	4 2838E-04	1,387 57	2,330 33	0 00E+00	5 94E-01	9 98E-01		
Pu-240	2 4401E-04	1,387 57	2,330 33	0 00E+00	3 39E-01	5 69E-01		
Pu-241	6 8764E-02	1,387 57	2,330 33	0 00E+00	9 54E+01	1 60E+02		
Pu-242	3 6329E-07	1,387 57	2,330 33	0 00E+00	5 04E-04	8 47E-04		
Ra-226	3 8045E-11	1,387 57	2,330 33	0 00E+00	5 28E-08	8 87E-08		
Ra-228	2 9902E-15	1,387 57	2,330 33	0 00E+00	4 15E-12	6 97E-12		
Ru-106	1 9055E-01	1,387 57	2,330 33	0 00E+00	2 64E+02	4 44E+02		
Se-79	1 2936E-05	1,387 57	2,330 33	0 00E+00	1 79E-02	3 01E-02		
Sn-126	1 1574E-05	1,387 57	2,330 33	0 00E+00	1 61E-02	2 70E-02		
Sr-90	2 7505E+00	1,387 57	2,330 33	0 00E+00	3 82E+03	6 41E+03		
Tc-99	4 2239E-04	1,387 57	2,330 33	0 00E+00	5 86E-01	9 84E-01		
Th-229	1 8848E-12	1,387 57	2,330 33	0 00E+00	2 62E-09	4 39E-09		
Th-230	1 7042E-08	1,387 57	2,330 33	0 00E+00	2 36E-05	3 97E-05		
Th-232	7 8132E-15	1,387 57	2,330 33	0 00E+00	1 08E-11	1 82E-11		
Ti-208	4 4063E-08	1,387 57	2,330 33	0 00E+00	6 11E-05	1 03E-04		
U-232	1 3151E-07	1,387 57	2,330 33	0 00E+00	1 82E-04	3 06E-04		
U-233	1 9564E-09	1,387 57	2,330 33	0 00E+00	2 71E-06	4 56E-06		
U-234	1 8371E-04	1,387 57	2,330 33	0 00E+00	2 55E-01	4 28E-01		
U-235	-2 7235E-06	1,387 57	0 00	4 95E-03	1 17E-03	4 95E-03		
U-236	1 5493E-05	1,387 57	2,330 33	0 00E+00	2 15E-02	3 61E-02		
U-238	-4 2851E-09	1,387 57	0 00	5 79E-05	5 19E-05	5 79E-05		
Y-90	2 7505E+00	1,387 57	2,330 33	0 00E+00	3 82E+03	6 41E+03		
Other Radionuclides					7 14E+03	1 20E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding	ALUM	ALUM
BOL HM Constituents	U	U
BOL Enrichment %	93 00001006	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		1,387 57
Bounding		2,330 33

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	1 79	
Bounding	3 01	

Estimated EOL HM/Given EOL HM

1 09

¹Reactor shutdown, core removal storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-O (UALX-HEU) TURKEY
 SNF ID #: 642
 Fuel Units & Descr: 2 - MTR TYPE
 Heavy Metal Mass: BOL=0.366kg EOL=0.196kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2010
 Estimates as of: 2010
 Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 5 years

Estimated
 Canister usage
 18"x10"
 0.08

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	160.99	321.99	0.00E+00	2.34E-08	4.68E-08	Avg MeV	
Am-241	1.1190E-03	160.99	321.99	0.00E+00	1.80E-01	3.60E-01	0.0150	6.212E+13
Am-242m	4.5425E-07	160.99	321.99	0.00E+00	7.31E-05	1.46E-04	0.0250	1.338E+13
Am-243	1.4921E-06	160.99	321.99	0.00E+00	2.40E-04	4.80E-04	0.0375	1.235E+13
C-14	5.7244E-09	160.99	321.99	0.00E+00	9.22E-07	1.84E-06	0.0575	1.214E+13
Cl-36	1.3124E-32	160.99	321.99	0.00E+00	2.11E-30	4.23E-30	0.0850	7.741E+12
Cm-243	2.3676E-07	160.99	321.99	0.00E+00	3.81E-05	7.62E-05	0.1250	6.704E+12
Cm-244	5.2042E-05	160.99	321.99	0.00E+00	8.38E-03	1.68E-02	0.2250	6.561E+12
Co-60	3.8208E-05	160.99	321.99	0.00E+00	6.15E-03	1.23E-02	0.3750	3.176E+12
Cs-134	4.8693E-01	160.99	321.99	0.00E+00	7.84E+01	1.57E+02	0.5750	4.363E+13
Cs-135	3.4477E-06	160.99	321.99	0.00E+00	5.55E-04	1.11E-03	0.8500	6.109E+12
Cs-137	2.8731E+00	160.99	321.99	0.00E+00	4.63E+02	9.25E+02	1.2500	1.137E+12
Eu-154	8.2053E-02	160.99	321.99	0.00E+00	1.32E+01	2.64E+01	1.7500	4.767E+10
Eu-155	3.9134E-02	160.99	321.99	0.00E+00	6.30E+00	1.26E+01	2.2500	9.997E+10
Fe-55	6.7429E-03	160.99	321.99	0.00E+00	1.09E+00	2.17E+00	2.7500	5.752E+08
H-3	1.0599E-02	160.99	321.99	0.00E+00	1.71E+00	3.41E+00	3.5000	6.379E+07
I-129	7.5300E-07	160.99	321.99	0.00E+00	1.21E-04	2.42E-04	5.0000	1.907E+02
Kr-85	2.8595E-01	160.99	321.99	0.00E+00	4.60E+01	9.21E+01	7.0000	2.126E+01
Np-237	9.5479E-06	160.99	321.99	0.00E+00	1.54E-03	3.07E-03	11.0000	2.396E+00
Pa-231	8.9297E-10	160.99	321.99	0.00E+00	1.44E-07	2.88E-07		
Pb-210	3.7609E-12	160.99	321.99	0.00E+00	6.05E-10	1.21E-09		
Pm-147	2.5452E+00	160.99	321.99	0.00E+00	4.10E+02	8.20E+02		
Pu-238	2.0550E-02	160.99	321.99	0.00E+00	3.31E+00	6.62E+00		
Pu-239	4.2838E-04	160.99	321.99	0.00E+00	6.90E-02	1.38E-01		
Pu-240	2.4401E-04	160.99	321.99	0.00E+00	3.93E-02	7.86E-02		
Pu-241	6.8764E-02	160.99	321.99	0.00E+00	1.11E+01	2.21E+01		
Pu-242	3.6329E-07	160.99	321.99	0.00E+00	5.85E-05	1.17E-04		
Ra-226	3.8045E-11	160.99	321.99	0.00E+00	6.12E-09	1.22E-08		
Ra-228	2.9902E-15	160.99	321.99	0.00E+00	4.81E-13	9.63E-13		
Ru-106	1.9055E-01	160.99	321.99	0.00E+00	3.07E+01	6.14E+01		
Se-79	1.2936E-05	160.99	321.99	0.00E+00	2.08E-03	4.17E-03		
Sn-126	1.1574E-05	160.99	321.99	0.00E+00	1.86E-03	3.73E-03		
Sr-90	2.7505E+00	160.99	321.99	0.00E+00	4.43E+02	8.86E+02		
Tc-99	4.2239E-04	160.99	321.99	0.00E+00	6.80E-02	1.36E-01		
Th-229	1.8848E-12	160.99	321.99	0.00E+00	3.03E-10	6.07E-10		
Th-230	1.7042E-08	160.99	321.99	0.00E+00	2.74E-06	5.49E-06		
Th-232	7.8132E-15	160.99	321.99	0.00E+00	1.26E-12	2.52E-12		
Ti-208	4.4063E-08	160.99	321.99	0.00E+00	7.09E-06	1.42E-05		
U-232	1.3151E-07	160.99	321.99	0.00E+00	2.12E-05	4.23E-05		
U-233	1.9564E-09	160.99	321.99	0.00E+00	3.15E-07	6.30E-07		
U-234	1.8371E-04	160.99	321.99	0.00E+00	2.96E-02	5.92E-02		
U-235	-2.7235E-06	160.99	0.00	7.35E-04	2.96E-04	7.35E-04		
U-236	1.5493E-05	160.99	321.99	0.00E+00	2.49E-03	4.99E-03		
U-238	-4.2851E-09	160.99	0.00	8.60E-06	7.91E-06	8.60E-06		
Y-90	2.7505E+00	160.99	321.99	0.00E+00	4.43E+02	8.86E+02		
Other Radionuclides					8.28E+02	1.66E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents	U	U
BOL Enrichment %	92.9999987	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		160.99
Bounding		321.99

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed
 Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	1.40	
Bounding	2.80	

Estimated EOL HM/Given EOL HM

1.05

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-O (UALX-LEU) PORTUGAL
SNF ID #: 541
Fuel Units & Descr: 3 - ASSEMBLY
Heavy Metal Mass: BOL=1.35kg; EOL=1.35kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.13

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	25.57	51.14	0.00E+00	3.72E-09	7.44E-09	Avg MeV	
Am-241	1.1190E-03	25.57	51.14	0.00E+00	2.86E-02	5.72E-02	0.0150	9.866E+12
Am-242m	4.5425E-07	25.57	51.14	0.00E+00	1.16E-05	2.32E-05	0.0250	2.125E+12
Am-243	1.4921E-06	25.57	51.14	0.00E+00	3.82E-05	7.63E-05	0.0375	1.961E+12
C-14	5.7244E-09	25.57	51.14	0.00E+00	1.46E-07	2.93E-07	0.0575	1.929E+12
Cl-36	1.3124E-32	25.57	51.14	0.00E+00	3.36E-31	6.71E-31	0.0850	1.230E+12
Cm-243	2.3676E-07	25.57	51.14	0.00E+00	6.05E-06	1.21E-05	0.1250	1.065E+12
Cm-244	5.2042E-05	25.57	51.14	0.00E+00	1.33E-03	2.66E-03	0.2250	1.042E+12
Co-60	3.8208E-05	25.57	51.14	0.00E+00	9.77E-04	1.95E-03	0.3750	5.044E+11
Cs-134	4.8693E-01	25.57	51.14	0.00E+00	1.25E+01	2.49E+01	0.5750	6.929E+12
Cs-135	3.4477E-06	25.57	51.14	0.00E+00	8.82E-05	1.76E-04	0.8500	9.703E+11
Cs-137	2.8731E+00	25.57	51.14	0.00E+00	7.35E+01	1.47E+02	1.2500	1.805E+11
Eu-154	8.2053E-02	25.57	51.14	0.00E+00	2.10E+00	4.20E+00	1.7500	7.570E+09
Eu-155	3.9134E-02	25.57	51.14	0.00E+00	1.00E+00	2.00E+00	2.2500	1.588E+10
Fe-55	6.7429E-03	25.57	51.14	0.00E+00	1.72E-01	3.45E-01	2.7500	9.135E+07
H-3	1.0599E-02	25.57	51.14	0.00E+00	2.71E-01	5.42E-01	3.5000	1.013E+07
I-129	7.5300E-07	25.57	51.14	0.00E+00	1.93E-05	3.85E-05	5.0000	3.113E+01
Kr-85	2.8595E-01	25.57	51.14	0.00E+00	7.31E+00	1.46E+01	7.0000	3.473E+00
Np-237	9.5479E-06	25.57	51.14	0.00E+00	2.44E-04	4.88E-04	11.0000	3.917E-01
Pa-231	8.9297E-10	25.57	51.14	0.00E+00	2.28E-08	4.57E-08		
Pb-210	3.7609E-12	25.57	51.14	0.00E+00	9.62E-11	1.92E-10		
Pm-147	2.5452E+00	25.57	51.14	0.00E+00	6.51E+01	1.30E+02		
Pu-238	2.0550E-02	25.57	51.14	0.00E+00	5.25E-01	1.05E+00		
Pu-239	4.2838E-04	25.57	51.14	0.00E+00	1.10E-02	2.19E-02		
Pu-240	2.4401E-04	25.57	51.14	0.00E+00	6.24E-03	1.25E-02		
Pu-241	6.8764E-02	25.57	51.14	0.00E+00	1.76E+00	3.52E+00		
Pu-242	3.6329E-07	25.57	51.14	0.00E+00	9.29E-06	1.86E-05		
Ra-226	3.8045E-11	25.57	51.14	0.00E+00	9.73E-10	1.95E-09		
Ra-228	2.9902E-15	25.57	51.14	0.00E+00	7.65E-14	1.53E-13		
Ru-106	1.9055E-01	25.57	51.14	0.00E+00	4.87E+00	9.74E+00		
Se-79	1.2936E-05	25.57	51.14	0.00E+00	3.31E-04	6.62E-04		
Sn-126	1.1574E-05	25.57	51.14	0.00E+00	2.96E-04	5.92E-04		
Sr-90	2.7505E+00	25.57	51.14	0.00E+00	7.03E+01	1.41E+02		
Tc-99	4.2239E-04	25.57	51.14	0.00E+00	1.08E-02	2.16E-02		
Th-229	1.8848E-12	25.57	51.14	0.00E+00	4.82E-11	9.64E-11		
Th-230	1.7042E-08	25.57	51.14	0.00E+00	4.36E-07	8.72E-07		
Th-232	7.8132E-15	25.57	51.14	0.00E+00	2.00E-13	4.00E-13		
Ti-208	4.4063E-08	25.57	51.14	0.00E+00	1.13E-06	2.25E-06		
U-232	1.3151E-07	25.57	51.14	0.00E+00	3.36E-06	6.73E-06		
U-233	1.9564E-09	25.57	51.14	0.00E+00	5.00E-08	1.00E-07		
U-234	1.8371E-04	25.57	51.14	0.00E+00	4.70E-03	9.39E-03		
U-235	-2.7235E-06	25.57	0.00	5.83E-04	5.14E-04	5.83E-04		
U-236	1.5493E-05	25.57	51.14	0.00E+00	3.96E-04	7.92E-04		
U-238	-4.2851E-09	25.57	0.00	3.63E-04	3.63E-04	3.63E-04		
Y-90	2.7505E+00	25.57	51.14	0.00E+00	7.03E+01	1.41E+02		
Other Radionuclides					1.32E+02	2.63E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.0000132	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		25.57
Bounding		51.14

Basis for burnup used in estimate:

Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.06	
Bounding	0.12	

Estimated EOL HM/Given EOL HM

0.98

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)