

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TARGET (INDONESIA)
 SNF ID #: 672
 Fuel Units & Descr: 48 - PARTICULATE
 Heavy Metal Mass: BOL=3.97kg ; EOL=3.97kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2010
 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: 5 years

Estimated
 Canister usage:
 18"x10"
 1.33

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	1.9667E-09	74.997	149.995	0.00E+00	1.47E-07	2.95E-07	0.0150	2.950E+13
Am-241	4.9468E-05	74.997	149.995	0.00E+00	3.71E-03	7.42E-03	0.0250	6.291E+12
Am-242m	9.7537E-09	74.997	149.995	0.00E+00	7.32E-07	1.46E-06	0.0375	5.614E+12
Am-243	9.8802E-10	74.997	149.995	0.00E+00	7.41E-08	1.48E-07	0.0575	5.644E+12
C-14	2.3095E-04	74.997	149.995	0.00E+00	1.73E-02	3.46E-02	0.0850	3.577E+12
Cl-36	1.2261E-06	74.997	149.995	0.00E+00	9.20E-05	1.84E-04	0.1250	2.854E+12
Co-60	5.1581E-10	74.997	149.995	0.00E+00	3.87E-08	7.74E-08	0.2250	2.962E+12
Co-60	3.6566E+00	74.997	149.995	0.00E+00	5.48E-07	1.10E-06	0.3750	1.438E+12
Cs-134	7.2063E-02	74.997	149.995	0.00E+00	2.74E+02	5.48E+02	0.7500	1.743E+13
Cs-135	3.0316E-05	74.997	149.995	0.00E+00	5.40E+00	1.08E+01	0.8500	8.438E+11
Cs-137	2.9002E+00	74.997	149.995	0.00E+00	2.27E-03	4.55E-03	1.2500	4.075E+13
Eu-154	7.5025E-03	74.997	149.995	0.00E+00	2.18E+02	4.35E+02	1.7500	1.439E+10
Eu-155	4.6123E-02	74.997	149.995	0.00E+00	5.63E-01	1.13E+00	2.2500	4.117E+10
Fe-55	3.6439E+00	74.997	149.995	0.00E+00	3.46E+00	6.92E+00	2.7500	2.335E+08
H-3	1.3524E-02	74.997	149.995	0.00E+00	2.73E+02	5.47E+02	3.5000	2.579E+07
I-129	7.3195E-07	74.997	149.995	0.00E+00	1.01E+00	2.03E+00	5.0000	5.410E+00
Kr-85	2.8686E-01	74.997	149.995	0.00E+00	5.49E-05	1.10E-04	7.0000	6.050E-01
Np-237	1.1478E-06	74.997	149.995	0.00E+00	2.15E+01	4.30E+01	11.0000	6.841E-02
Pa-231	1.0990E-08	74.997	149.995	0.00E+00	8.61E-05	1.72E-04		
Pb-210	8.0782E-15	74.997	149.995	0.00E+00	8.24E-07	1.65E-06		
Pm-147	3.2097E+00	74.997	149.995	0.00E+00	6.06E-13	1.21E-12		
Pu-238	3.7404E-04	74.997	149.995	0.00E+00	2.41E+02	4.81E+02		
Pu-239	6.6839E-04	74.997	149.995	0.00E+00	2.81E-02	5.61E-02		
Pu-240	8.7121E-05	74.997	149.995	0.00E+00	5.01E-02	1.00E-01		
Pu-241	3.0283E-03	74.997	149.995	0.00E+00	6.53E-03	1.31E-02		
Pu-242	1.9717E-09	74.997	149.995	0.00E+00	2.27E-01	4.54E-01		
Ra-226	7.3527E-14	74.997	149.995	0.00E+00	1.48E-07	2.96E-07		
Ra-228	6.0965E-12	74.997	149.995	0.00E+00	5.51E-12	1.10E-11		
Ru-106	1.6531E-01	74.997	149.995	0.00E+00	4.57E-10	9.14E-10		
Se-79	1.3228E-05	74.997	149.995	0.00E+00	1.24E+01	2.48E+01		
Sn-126	1.1494E-05	74.997	149.995	0.00E+00	9.92E-04	1.98E-03		
Sr-90	2.7854E+00	74.997	149.995	0.00E+00	8.62E-04	1.72E-03		
Tc-99	4.6656E-04	74.997	149.995	0.00E+00	2.09E+02	4.18E+02		
Th-229	2.9368E-12	74.997	149.995	0.00E+00	3.50E-02	7.00E-02		
Th-230	3.2662E-11	74.997	149.995	0.00E+00	2.20E-10	4.41E-10		
Th-232	8.3045E-12	74.997	149.995	0.00E+00	2.45E-09	4.90E-09		
Ti-208	2.6722E-08	74.997	149.995	0.00E+00	6.23E-10	1.25E-09		
U-232	7.7720E-08	74.997	149.995	0.00E+00	2.00E-06	4.01E-06		
U-233	2.9834E-09	74.997	149.995	0.00E+00	5.83E-06	1.17E-05		
U-234	3.5275E-07	74.997	149.995	0.00E+00	2.24E-07	4.47E-07		
U-235	-2.7761E-06	74.997	0.000	4.15E-03	2.65E-05	5.29E-05		
U-236	1.6190E-05	74.997	149.995	0.00E+00	3.94E-03	4.15E-03		
U-238	-2.8547E-09	74.997	0.000	6.89E-04	1.21E-03	2.43E-03		
Y-90	2.7870E+00	74.997	149.995	0.00E+00	6.89E-04	6.89E-04		
Other Radionuclides					2.09E+02	4.18E+02		
					3.95E+02	7.89E+02		

Thermal Power		
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
7.96E+00	1.59E+01	
Total	Total	

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 Pathfinder Template except enrichment and cladding (but substituting Stainless Steel is a good conservative assumption).
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	LIGHT WATER	LIGHT WATER	
BOL HM Constituents:	NONE	SST	
BOL Enrichment %:	UO2	U	
	48.34531901	60 to 100	

Burnup Summary (MWd) ²			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.
	From SFD	Estimated	
Nominal:		74.997	
Bounding:		149.995	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.40		
Bounding:	0.81		
			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: FRR TUBES (AUSTRALIA)
 SNF ID #: 684
 Fuel Units & Descr: 169 - ASSEMBLY
 Heavy Metal Mass: BOL=47.88kg ; EOL=32.65kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2010
 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: 5 years

Estimated
 Canister usage:
 18"x10"
 5.63

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	6.6950E-11	14,025.543	28,051.087	0.00E+00	9.39E-07	1.88E-06	0.0150	5.573E+15
Am-241	4.4557E-03	14,025.543	28,051.087	0.00E+00	6.25E+01	1.25E+02	0.0250	1.187E+15
Am-242m	1.4666E-06	14,025.543	28,051.087	0.00E+00	2.06E-02	4.11E-02	0.0375	1.146E+15
Am-243	3.7151E-05	14,025.543	28,051.087	0.00E+00	5.21E-01	1.04E+00	0.0575	1.093E+15
C-14	2.6513E-08	14,025.543	28,051.087	0.00E+00	3.72E-04	7.44E-04	0.0850	7.162E+14
Ci-36	4.4441E-31	14,025.543	28,051.087	0.00E+00	6.23E-27	1.25E-26	0.1250	6.534E+14
Cm-243	8.2139E-06	14,025.543	28,051.087	0.00E+00	1.15E-01	2.30E-01	0.2250	5.900E+14
Cm-244	8.2625E-03	14,025.543	28,051.087	0.00E+00	1.16E+02	2.32E+02	0.3750	9.286E+12
Co-60	3.4951E-04	14,025.543	28,051.087	0.00E+00	4.90E+00	9.80E+00	0.3500	6.416E+09
Cs-134	1.6409E+00	14,025.543	28,051.087	0.00E+00	2.30E+04	4.60E+04	0.8500	1.635E+15
Cs-135	4.2564E-06	14,025.543	28,051.087	0.00E+00	5.97E-02	1.19E-01	1.2500	2.233E+14
Cs-137	2.8791E+00	14,025.543	28,051.087	0.00E+00	4.04E+04	8.08E+04	1.7500	5.871E+12
Eu-154	1.7388E-01	14,025.543	28,051.087	0.00E+00	2.44E+03	4.88E+03	2.2500	9.286E+12
Eu-155	1.1616E-01	14,025.543	28,051.087	0.00E+00	1.63E+03	3.26E+03	2.7500	5.711E+10
Fe-55	7.3755E-02	14,025.543	28,051.087	0.00E+00	1.03E+03	2.07E+03	3.5000	6.416E+09
H-3	1.0729E-02	14,025.543	28,051.087	0.00E+00	1.50E+02	3.01E+02	5.0000	1.460E+06
I-129	6.6403E-07	14,025.543	28,051.087	0.00E+00	9.31E-03	1.86E-02	7.0000	1.678E+05
Kr-85	2.8487E-01	14,025.543	28,051.087	0.00E+00	4.00E+03	7.99E+03	11.0000	1.925E+04
Np-237	3.1507E-05	14,025.543	28,051.087	0.00E+00	4.42E-01	8.84E-01		
Pa-231	4.1938E-10	14,025.543	28,051.087	0.00E+00	5.88E-06	1.18E-05		
Pb-210	8.4083E-13	14,025.543	28,051.087	0.00E+00	1.18E-08	2.36E-08		
Pm-147	1.2807E+00	14,025.543	28,051.087	0.00E+00	1.80E+04	3.59E+04		
Pu-238	1.7290E-01	14,025.543	28,051.087	0.00E+00	2.43E+03	4.85E+03		
Pu-239	6.9563E-04	14,025.543	28,051.087	0.00E+00	9.76E+00	1.95E+01		
Pu-240	3.6865E-04	14,025.543	28,051.087	0.00E+00	5.17E+00	1.03E+01		
Pu-241	2.7643E-01	14,025.543	28,051.087	0.00E+00	3.88E+03	7.75E+03		
Pu-242	3.0911E-06	14,025.543	28,051.087	0.00E+00	4.34E-02	8.67E-02		
Ra-226	8.6330E-12	14,025.543	28,051.087	0.00E+00	1.21E-07	2.42E-07		
Ra-228	3.1817E-15	14,025.543	28,051.087	0.00E+00	4.46E-11	8.92E-11		
Ru-106	2.1981E-01	14,025.543	28,051.087	0.00E+00	3.08E+03	6.17E+03		
Se-79	1.2339E-05	14,025.543	28,051.087	0.00E+00	1.73E-01	3.46E-01		
Sn-126	1.0194E-05	14,025.543	28,051.087	0.00E+00	1.43E-01	2.86E-01		
Sr-90	2.7242E+00	14,025.543	28,051.087	0.00E+00	3.82E+04	7.64E+04		
Tc-99	3.8056E-04	14,025.543	28,051.087	0.00E+00	5.34E+00	1.07E+01		
Th-229	1.0413E-12	14,025.543	28,051.087	0.00E+00	1.46E-08	2.92E-08		
Th-230	3.9648E-09	14,025.543	28,051.087	0.00E+00	5.56E-05	1.11E-04		
Th-232	8.3536E-15	14,025.543	28,051.087	0.00E+00	1.17E-10	2.34E-10		
Ti-208	4.3888E-08	14,025.543	28,051.087	0.00E+00	6.16E-04	1.23E-03		
U-232	1.3645E-07	14,025.543	28,051.087	0.00E+00	1.91E-03	3.83E-03		
U-233	1.7023E-09	14,025.543	28,051.087	0.00E+00	2.39E-05	4.78E-05		
U-234	4.5389E-05	14,025.543	28,051.087	0.00E+00	6.37E-01	1.27E+00		
U-235	-2.8661E-06	14,025.543	0.000	6.21E-02	2.19E-02	6.21E-02		
U-236	1.6701E-05	14,025.543	28,051.087	0.00E+00	2.34E-01	4.68E-01		
U-238	-9.4194E-09	14,025.543	0.000	6.44E-03	6.30E-03	6.44E-03		
Y-90	2.7248E+00	14,025.543	28,051.087	0.00E+00	3.82E+04	7.64E+04		
Other Radionuclides					7.46E+04	1.49E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.69E+02	1.94E+03
Total	Total

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-ALX	U	
BOL Enrichment %:	60.00000706	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		14,025.543	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		28,051.087	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.67		1.01
Bounding:	1.34		

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 TUBES (AUSTRALIA)
 SNF ID #: 300
 Fuel Units & Descr: 266 - ASSEMBLY
 Heavy Metal Mass: BOL=38.25kg ; EOL=22.02kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2010
 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: 5 years

Estimated
 Canister usage:
 18"x10"
 8.87

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	6.6950E-11	14,945.819	29,891.638	0.00E+00	1.00E-06	2.00E-06	Avg. MeV	
Am-241	4.4557E-03	14,945.819	29,891.638	0.00E+00	6.66E+01	1.33E+02	0.0150	5.939E+15
Am-242m	1.4666E-06	14,945.819	29,891.638	0.00E+00	2.19E-02	4.38E-02	0.0250	1.265E+15
Am-243	3.7151E-05	14,945.819	29,891.638	0.00E+00	5.55E-01	1.11E+00	0.0375	1.222E+15
C-14	2.6513E-08	14,945.819	29,891.638	0.00E+00	3.96E-04	7.93E-04	0.0575	1.165E+15
Cl-36	4.4441E-31	14,945.819	29,891.638	0.00E+00	6.64E-27	1.33E-26	0.0850	7.632E+14
Cm-243	8.2139E-06	14,945.819	29,891.638	0.00E+00	1.23E-01	2.46E-01	0.1250	6.963E+14
Cm-244	8.2625E-03	14,945.819	29,891.638	0.00E+00	1.23E+02	2.47E+02	0.2250	6.287E+14
Co-60	3.4951E-04	14,945.819	29,891.638	0.00E+00	5.22E+00	1.04E+01	0.3750	2.978E+14
Cs-134	1.6409E+00	14,945.819	29,891.638	0.00E+00	2.45E+04	4.91E+04	0.5750	5.698E+15
Cs-135	4.2564E-06	14,945.819	29,891.638	0.00E+00	6.36E-02	1.27E-01	0.8500	1.742E+15
Cs-137	2.8791E+00	14,945.819	29,891.638	0.00E+00	4.30E+04	8.61E+04	1.2500	2.379E+14
Eu-154	1.7388E-01	14,945.819	29,891.638	0.00E+00	2.60E+03	5.20E+03	1.7500	6.256E+12
Eu-155	1.1616E-01	14,945.819	29,891.638	0.00E+00	1.74E+03	3.47E+03	2.2500	9.895E+12
Fe-55	7.3755E-02	14,945.819	29,891.638	0.00E+00	1.10E+03	2.20E+03	2.7500	6.086E+10
H-3	1.0729E-02	14,945.819	29,891.638	0.00E+00	1.60E+02	3.21E+02	3.5000	6.837E+09
I-129	6.6403E-07	14,945.819	29,891.638	0.00E+00	9.92E-03	1.98E-02	5.0000	1.555E+06
Kr-85	2.8487E-01	14,945.819	29,891.638	0.00E+00	4.26E+03	8.52E+03	7.0000	1.788E+05
Np-237	3.1507E-05	14,945.819	29,891.638	0.00E+00	4.71E-01	9.42E-01	11.0000	2.051E+04
Pa-231	4.1938E-10	14,945.819	29,891.638	0.00E+00	6.27E-06	1.25E-05		
Pb-210	8.4083E-13	14,945.819	29,891.638	0.00E+00	1.26E-08	2.51E-08		
Pm-147	1.2807E+00	14,945.819	29,891.638	0.00E+00	1.91E+04	3.83E+04		
Pu-238	1.7290E-01	14,945.819	29,891.638	0.00E+00	2.58E+03	5.17E+03		
Pu-239	6.9563E-04	14,945.819	29,891.638	0.00E+00	1.04E+01	2.08E+01		
Pu-240	3.6865E-04	14,945.819	29,891.638	0.00E+00	5.51E+00	1.10E+01		
Pu-241	2.7643E-01	14,945.819	29,891.638	0.00E+00	4.13E+03	8.26E+03		
Pu-242	3.0911E-06	14,945.819	29,891.638	0.00E+00	4.62E-02	9.24E-02		
Ra-226	8.6330E-12	14,945.819	29,891.638	0.00E+00	1.29E-07	2.58E-07		
Ra-228	3.1817E-15	14,945.819	29,891.638	0.00E+00	4.76E-11	9.51E-11		
Ru-106	2.1981E-01	14,945.819	29,891.638	0.00E+00	3.29E+03	6.57E+03		
Se-79	1.2339E-05	14,945.819	29,891.638	0.00E+00	1.84E-01	3.69E-01		
Sn-126	1.0194E-05	14,945.819	29,891.638	0.00E+00	1.52E-01	3.05E-01		
Sr-90	2.7242E+00	14,945.819	29,891.638	0.00E+00	4.07E+04	8.14E+04		
Tc-99	3.8056E-04	14,945.819	29,891.638	0.00E+00	5.69E+00	1.14E+01		
Th-229	1.0413E-12	14,945.819	29,891.638	0.00E+00	1.56E-08	3.11E-08		
Th-230	3.9648E-09	14,945.819	29,891.638	0.00E+00	5.93E-05	1.19E-04		
Th-232	8.3536E-15	14,945.819	29,891.638	0.00E+00	1.25E-10	2.50E-10		
Tl-208	4.3888E-08	14,945.819	29,891.638	0.00E+00	6.56E-04	1.31E-03		
U-232	1.3645E-07	14,945.819	29,891.638	0.00E+00	2.04E-03	4.08E-03		
U-233	1.7023E-09	14,945.819	29,891.638	0.00E+00	2.54E-05	5.09E-05		
U-234	4.5389E-05	14,945.819	29,891.638	0.00E+00	6.78E-01	1.36E+00		
U-235	-2.8661E-06	14,945.819	0.000	6.61E-02	2.33E-02	6.61E-02		
U-236	1.6701E-05	14,945.819	29,891.638	0.00E+00	2.50E-01	4.99E-01		
U-238	-9.4194E-09	14,945.819	0.000	2.57E-03	2.43E-03	2.57E-03		
Y-90	2.7248E+00	14,945.819	29,891.638	0.00E+00	4.07E+04	8.14E+04		
Other Radionuclides					7.95E+04	1.59E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.03E+03	2.07E+03
Total	Total

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-ALX	U	
BOL Enrichment %:	80.00000311	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		14,945.819	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		29,891.638	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.89		1.02
Bounding:	1.79		

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: FRR TUBES (AUSTRALIA) ¹Fuel decay start date: 2010
 SNF ID #: 299 Estimates as of: 2010
 Fuel Units & Desc.: 289 - ASSEMBLY Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
 Heavy Metal Mass: BOL=289.00kg ; EOL=260.10kg ²Template Burnup(MWd): 15
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00034251
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 9.63

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.7533E-10	27,468.450	54,936.900	0.00E+00	4.82E-06	9.63E-06	Avg. MeV	
Am-241	1.2780E-02	27,468.450	54,936.900	0.00E+00	3.51E+02	7.02E+02	0.0150	9.968E+15
Am-242m	9.5467E-06	27,468.450	54,936.900	0.00E+00	2.62E-01	5.24E-01	0.0250	2.148E+15
Am-243	6.4100E-06	27,468.450	54,936.900	0.00E+00	1.76E-01	3.52E-01	0.0375	1.957E+15
C-14	2.9673E-08	27,468.450	54,936.900	0.00E+00	8.15E-04	1.63E-03	0.0575	1.954E+15
Cl-36	5.9513E-35	27,468.450	54,936.900	0.00E+00	1.63E-30	3.27E-30	0.0850	1.230E+15
Cm-243	3.1807E-06	27,468.450	54,936.900	0.00E+00	8.74E-02	1.75E-01	0.1250	1.027E+15
Cm-244	1.9540E-04	27,468.450	54,936.900	0.00E+00	5.37E+00	1.07E+01	0.2250	1.049E+15
Co-60	1.1753E-04	27,468.450	54,936.900	0.00E+00	3.23E+00	6.46E+00	0.3750	5.088E+14
Cs-134	3.3060E-01	27,468.450	54,936.900	0.00E+00	9.08E+03	1.82E+04	0.5750	7.026E+15
Cs-135	4.8607E-06	27,468.450	54,936.900	0.00E+00	1.34E-01	2.67E-01	0.8500	7.452E+14
Cs-137	2.8607E+00	27,468.450	54,936.900	0.00E+00	7.86E+04	1.57E+05	1.2500	1.647E+14
Eu-154	6.9933E-02	27,468.450	54,936.900	0.00E+00	1.92E+03	3.84E+03	1.7500	7.840E+12
Eu-155	3.3253E-02	27,468.450	54,936.900	0.00E+00	9.13E+02	1.83E+03	2.2500	1.364E+13
Fe-55	7.7267E-02	27,468.450	54,936.900	0.00E+00	2.12E+03	4.24E+03	2.7500	1.233E+11
H-3	1.0827E-02	27,468.450	54,936.900	0.00E+00	2.97E+02	5.95E+02	3.5000	1.462E+10
I-129	7.1600E-07	27,468.450	54,936.900	0.00E+00	1.97E-02	3.93E-02	5.0000	1.430E+05
Kr-85	2.7007E-01	27,468.450	54,936.900	0.00E+00	7.42E+03	1.48E+04	7.0000	1.629E+04
Np-237	3.6327E-06	27,468.450	54,936.900	0.00E+00	9.98E-02	2.00E-01	11.0000	1.861E+03
Pa-231	1.1267E-09	27,468.450	54,936.900	0.00E+00	3.09E-05	6.19E-05		
Pb-210	1.9773E-15	27,468.450	54,936.900	0.00E+00	5.43E-11	1.09E-10		
Pm-147	2.4367E-04	27,468.450	54,936.900	0.00E+00	6.69E+04	1.34E+05		
Pu-238	6.2213E-03	27,468.450	54,936.900	0.00E+00	1.71E+02	3.42E+02		
Pu-239	1.0320E-02	27,468.450	54,936.900	0.00E+00	2.83E+02	5.67E+02		
Pu-240	5.4260E-03	27,468.450	54,936.900	0.00E+00	1.49E+02	2.98E+02		
Pu-241	7.7333E-01	27,468.450	54,936.900	0.00E+00	2.12E+04	4.25E+04		
Pu-242	3.0713E-06	27,468.450	54,936.900	0.00E+00	8.44E-02	1.69E-01		
Ra-226	2.2027E-14	27,468.450	54,936.900	0.00E+00	6.05E-10	1.21E-09		
Ra-228	2.6333E-15	27,468.450	54,936.900	0.00E+00	7.23E-11	1.45E-10		
Ru-106	2.5580E-01	27,468.450	54,936.900	0.00E+00	7.03E+03	1.41E+04		
Se-79	1.2540E-05	27,468.450	54,936.900	0.00E+00	3.44E-01	6.89E-01		
Sn-126	1.1393E-05	27,468.450	54,936.900	0.00E+00	3.13E-01	6.26E-01		
Sr-90	2.6293E+00	27,468.450	54,936.900	0.00E+00	7.22E+04	1.44E+05		
Tc-99	4.3540E-04	27,468.450	54,936.900	0.00E+00	1.20E+01	2.39E+01		
Th-229	1.3653E-13	27,468.450	54,936.900	0.00E+00	3.75E-09	7.50E-09		
Th-230	1.2607E-11	27,468.450	54,936.900	0.00E+00	3.46E-07	6.93E-07		
Th-232	6.7400E-15	27,468.450	54,936.900	0.00E+00	1.85E-10	3.70E-10		
Ti-208	7.4667E-09	27,468.450	54,936.900	0.00E+00	2.05E-04	4.10E-04		
U-232	2.1927E-08	27,468.450	54,936.900	0.00E+00	6.02E-04	1.20E-03		
U-233	1.9920E-10	27,468.450	54,936.900	0.00E+00	5.47E-06	1.09E-05		
U-234	2.2487E-07	27,468.450	54,936.900	0.00E+00	6.18E-03	1.24E-02		
U-235	-2.5341E-06	27,468.450	0.000	1.25E-01	5.53E-02	1.25E-01		
U-236	1.3000E-05	27,468.450	54,936.900	0.00E+00	3.57E-01	7.14E-01		
U-238	-1.4207E-08	27,468.450	0.000	7.77E-02	7.73E-02	7.77E-02		
Y-90	2.6300E+00	27,468.450	54,936.900	0.00E+00	7.22E+04	1.44E+05		
Other Radionuclides					1.30E+05	2.59E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.30E+03	2.60E+03
Total	Total

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.
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	HEAVY WATER	HEAVY WATER	
BOL HM Constituents:	ALUM	ALUM	
BOL Enrichment %:	U-ALX	U	
	20.0000003	10 to 20	

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:		27,468.450	
Bounding:		54,936.900	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	2.17		1.03
Bounding:	4.34		

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 TUBES (DENMARK)
 SNF ID #: 298
 Fuel Units & Descr: 184 - ASSEMBLY
 Heavy Metal Mass: BOL=165.60kg ; EOL=142.62kg
 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"
 6.13

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	1.7533E-10	21,843.202	43,686.404	0.00E+00	3.83E-06	7.66E-06	0.0150	7.926E+15
Am-241	1.2780E-02	21,843.202	43,686.404	0.00E+00	2.79E+02	5.58E+02	0.0250	1.708E+15
Am-242m	9.5467E-06	21,843.202	43,686.404	0.00E+00	2.09E-01	4.17E-01	0.0375	1.556E+15
Am-243	6.4100E-06	21,843.202	43,686.404	0.00E+00	1.40E-01	2.80E-01	0.0575	1.554E+15
C-14	2.9673E-08	21,843.202	43,686.404	0.00E+00	6.48E-04	1.30E-03	0.0850	9.785E+14
Cf-252	5.9513E-35	21,843.202	43,686.404	0.00E+00	1.30E-30	2.60E-30	0.1250	8.170E+14
Cm-243	3.1807E-06	21,843.202	43,686.404	0.00E+00	6.95E-02	1.39E-01	0.2250	8.344E+14
Cm-244	1.9540E-04	21,843.202	43,686.404	0.00E+00	4.27E+00	8.54E+00	0.3750	4.046E+14
Co-60	1.1753E-04	21,843.202	43,686.404	0.00E+00	2.57E+00	5.13E+00	0.5750	5.587E+14
Cs-134	3.3060E-01	21,843.202	43,686.404	0.00E+00	7.22E+03	1.44E+04	0.8500	5.926E+14
Cs-135	4.8607E-06	21,843.202	43,686.404	0.00E+00	1.06E-01	2.12E-01	1.2500	1.310E+14
Cs-137	2.8607E+00	21,843.202	43,686.404	0.00E+00	6.25E+04	1.25E+05	1.7500	6.235E+12
Eu-154	6.9933E-02	21,843.202	43,686.404	0.00E+00	1.53E+03	3.06E+03	2.2500	1.084E+13
Eu-155	3.3253E-02	21,843.202	43,686.404	0.00E+00	7.26E+02	1.45E+03	2.7500	9.808E+10
Fe-55	7.267E-02	21,843.202	43,686.404	0.00E+00	1.69E+03	3.38E+03	3.5000	1.162E+10
H-3	1.0827E-02	21,843.202	43,686.404	0.00E+00	2.36E+02	4.73E+02	5.0000	1.137E+05
I-129	7.1600E-07	21,843.202	43,686.404	0.00E+00	1.56E-02	3.13E-02	7.0000	1.295E+04
Kr-85	2.7007E-01	21,843.202	43,686.404	0.00E+00	5.90E+03	1.18E+04	11.0000	1.479E+03
Np-237	3.6327E-06	21,843.202	43,686.404	0.00E+00	7.93E-02	1.59E-01		
Pa-231	1.1267E-09	21,843.202	43,686.404	0.00E+00	2.46E-05	4.92E-05		
Pb-210	1.9773E-15	21,843.202	43,686.404	0.00E+00	4.32E-11	8.64E-11		
Pm-147	2.4367E+00	21,843.202	43,686.404	0.00E+00	5.32E+04	1.06E+05		
Pu-238	6.2213E-03	21,843.202	43,686.404	0.00E+00	1.36E+02	2.72E+02		
Pu-239	1.0320E-02	21,843.202	43,686.404	0.00E+00	2.25E+02	4.51E+02		
Pu-240	5.4260E-03	21,843.202	43,686.404	0.00E+00	1.19E+02	2.37E+02		
Pu-241	7.7333E-01	21,843.202	43,686.404	0.00E+00	1.69E+04	3.38E+04		
Pu-242	3.0713E-06	21,843.202	43,686.404	0.00E+00	6.71E-02	1.34E-01		
Ra-226	2.2027E-14	21,843.202	43,686.404	0.00E+00	4.81E-10	9.62E-10		
Ra-228	2.6333E-15	21,843.202	43,686.404	0.00E+00	5.75E-11	1.15E-10		
Ru-106	2.5580E-01	21,843.202	43,686.404	0.00E+00	5.59E+03	1.12E+04		
Se-79	1.2540E-05	21,843.202	43,686.404	0.00E+00	2.74E-01	5.48E-01		
Sn-126	1.1393E-05	21,843.202	43,686.404	0.00E+00	2.49E-01	4.98E-01		
Sr-90	2.6293E+00	21,843.202	43,686.404	0.00E+00	5.74E+04	1.15E+05		
Tc-99	4.3540E-04	21,843.202	43,686.404	0.00E+00	9.51E+00	1.90E+01		
Th-229	1.3653E-13	21,843.202	43,686.404	0.00E+00	2.98E-09	5.96E-09		
Th-230	1.2607E-11	21,843.202	43,686.404	0.00E+00	2.75E-07	5.51E-07		
Th-232	6.7400E-15	21,843.202	43,686.404	0.00E+00	1.47E-10	2.94E-10		
Tl-208	7.4667E-09	21,843.202	43,686.404	0.00E+00	1.63E-04	3.26E-04		
U-232	2.1927E-08	21,843.202	43,686.404	0.00E+00	4.79E-04	9.58E-04		
U-233	1.9920E-10	21,843.202	43,686.404	0.00E+00	4.35E-06	8.70E-06		
U-234	2.2487E-07	21,843.202	43,686.404	0.00E+00	4.91E-03	9.82E-03		
U-235	-2.5341E-06	21,843.202	0.000	7.16E-02	1.62E-02	7.16E-02		
U-236	1.3000E-05	21,843.202	43,686.404	0.00E+00	2.84E-01	5.68E-01		
U-238	-1.4207E-08	21,843.202	0.000	4.45E-02	4.42E-02	4.45E-02		
Y-90	2.6300E+00	21,843.202	43,686.404	0.00E+00	5.74E+04	1.15E+05		
Other Radionuclides					1.03E+05	2.06E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.03E+03	2.07E+03
Total	Total

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:	U3Si2	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		21,843.202	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		43,686.404	Bounding burnup assumed to be twice nominal burnup.

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	3.01	
Bounding:	6.02	
		Estimated EOL HM/Given EOL HM
		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 TUBES (DENMARK)
 SNF ID #: 676
 Fuel Units & Descr: 5 - ASSEMBLY
 Heavy Metal Mass: BOL=.64kg ; EOL=.34kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2010
 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: 5 years

Estimated
 Canister usage:
 18"x10"
 0.17

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	6.6950E-11	279.555	559.110	0.00E+00	1.87E-08	3.74E-08	0.0150	1.111E+14
Am-241	4.4557E-03	279.555	559.110	0.00E+00	1.25E+00	2.49E+00	0.0250	2.366E+13
Am-242m	1.4666E-06	279.555	559.110	0.00E+00	4.10E-04	8.20E-04	0.0375	2.285E+13
Am-243	3.7151E-05	279.555	559.110	0.00E+00	1.04E-02	2.08E-02	0.0575	2.179E+13
C-14	2.6513E-08	279.555	559.110	0.00E+00	7.41E-06	1.48E-05	0.0850	1.428E+13
Cl-36	4.4441E-31	279.555	559.110	0.00E+00	1.24E-28	2.48E-28	0.1250	1.302E+13
Cm-243	8.2139E-06	279.555	559.110	0.00E+00	2.30E-03	4.59E-03	0.2250	1.176E+13
Cm-244	8.2625E-03	279.555	559.110	0.00E+00	2.31E+00	4.62E+00	0.3750	5.589E+12
Co-60	3.4951E-04	279.555	559.110	0.00E+00	9.77E-02	1.95E-01	0.5750	1.066E+14
Cs-134	1.6409E+00	279.555	559.110	0.00E+00	4.59E+02	9.17E+02	0.8500	3.259E+13
Cs-135	4.2564E-06	279.555	559.110	0.00E+00	1.19E-03	2.38E-03	1.2500	4.450E+12
Cs-137	2.8791E+00	279.555	559.110	0.00E+00	8.05E+02	1.61E+03	1.7500	1.170E+11
Eu-154	1.7388E-01	279.555	559.110	0.00E+00	4.86E+01	9.72E+01	2.2500	1.851E+11
Eu-155	1.1616E-01	279.555	559.110	0.00E+00	3.25E+01	6.49E+01	2.7500	1.138E+09
Fe-55	7.3755E-02	279.555	559.110	0.00E+00	2.06E+01	4.12E+01	3.5000	1.279E+08
H-3	1.0729E-02	279.555	559.110	0.00E+00	3.00E+00	6.00E+00	5.0000	2.909E+04
I-129	6.6403E-07	279.555	559.110	0.00E+00	1.86E-04	3.71E-04	7.0000	3.345E+03
Kr-85	2.8487E-01	279.555	559.110	0.00E+00	7.96E+01	1.59E+02	11.0000	3.837E+02
Np-237	3.1507E-05	279.555	559.110	0.00E+00	8.81E-03	1.76E-02		
Pa-231	4.1938E-10	279.555	559.110	0.00E+00	1.17E-07	2.34E-07		
Pb-210	8.4083E-13	279.555	559.110	0.00E+00	2.35E-10	4.70E-10		
Pm-147	1.2807E+00	279.555	559.110	0.00E+00	3.58E+02	7.16E+02		
Pu-238	1.7290E-01	279.555	559.110	0.00E+00	4.83E+01	9.67E+01		
Pu-239	6.9563E-04	279.555	559.110	0.00E+00	1.94E-01	3.89E-01		
Pu-240	3.6865E-04	279.555	559.110	0.00E+00	1.03E-01	2.06E-01		
Pu-241	2.7643E-01	279.555	559.110	0.00E+00	7.73E+01	1.55E+02		
Pu-242	3.0911E-06	279.555	559.110	0.00E+00	8.64E-04	1.73E-03		
Ra-226	8.6330E-12	279.555	559.110	0.00E+00	2.41E-09	4.83E-09		
Ra-228	3.1817E-15	279.555	559.110	0.00E+00	8.89E-13	1.78E-12		
Ru-106	2.1981E-01	279.555	559.110	0.00E+00	6.14E+01	1.23E+02		
Se-79	1.2339E-05	279.555	559.110	0.00E+00	3.45E-03	6.90E-03		
Sn-126	1.0194E-05	279.555	559.110	0.00E+00	2.85E-03	5.70E-03		
Sr-90	2.7242E+00	279.555	559.110	0.00E+00	7.62E+02	1.52E+03		
Tc-99	3.8056E-04	279.555	559.110	0.00E+00	1.06E-01	2.13E-01		
Th-229	1.0413E-12	279.555	559.110	0.00E+00	2.91E-10	5.82E-10		
Th-230	3.9648E-09	279.555	559.110	0.00E+00	1.11E-06	2.22E-06		
Th-232	8.3536E-15	279.555	559.110	0.00E+00	2.34E-12	4.67E-12		
Th-208	4.3888E-08	279.555	559.110	0.00E+00	1.23E-05	2.45E-05		
U-232	1.3645E-07	279.555	559.110	0.00E+00	3.81E-05	7.63E-05		
U-233	1.7023E-09	279.555	559.110	0.00E+00	4.76E-07	9.52E-07		
U-234	4.5389E-05	279.555	559.110	0.00E+00	1.27E-02	2.54E-02		
U-235	-2.8661E-06	279.555	0.000	1.29E-03	4.85E-04	1.29E-03		
U-236	1.6701E-05	279.555	559.110	0.00E+00	4.67E-03	9.34E-03		
U-238	-9.4194E-09	279.555	0.000	1.51E-05	1.24E-05	1.51E-05		
Y-90	2.7248E+00	279.555	559.110	0.00E+00	7.62E+02	1.52E+03		
Other Radionuclides					1.49E+03	2.97E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.93E+01	3.86E+01
Total	Total

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-ALX	U	
BOL Enrichment %:	92.99999218	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		279.555	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		559.110	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.00		1.02
Bounding:	2.00		

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 TUBES (DENMARK)
 SNF ID #: 678
 Fuel Units & Descr: 5 - ASSEMBLY
 Heavy Metal Mass: BOL=79kg ; EOL=42kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2010
 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: 5 years

Estimated
 Canister usage:
 18"x10"
 0.17

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	6.6950E-11	338.505	677.011	0.00E+00	2.27E-08	4.53E-08	0.0150	1.345E+14
Am-241	4.4557E-03	338.505	677.011	0.00E+00	1.51E+00	3.02E+00	0.0250	2.865E+13
Am-242m	1.4666E-06	338.505	677.011	0.00E+00	4.96E-04	9.93E-04	0.0375	2.767E+13
Am-243	3.7151E-05	338.505	677.011	0.00E+00	1.26E-02	2.52E-02	0.0575	2.639E+13
C-14	2.6513E-08	338.505	677.011	0.00E+00	8.97E-06	1.79E-05	0.0850	1.729E+13
Cl-36	4.4441E-31	338.505	677.011	0.00E+00	1.50E-28	3.01E-28	0.1250	1.577E+13
Cm-243	8.2139E-06	338.505	677.011	0.00E+00	2.78E-03	5.56E-03	0.2250	1.424E+13
Cm-244	8.2626E-03	338.505	677.011	0.00E+00	2.80E+00	5.59E+00	0.3750	6.744E+12
Co-60	3.4951E-04	338.505	677.011	0.00E+00	1.18E-01	2.37E-01	0.5750	1.291E+14
Cs-134	1.6409E+00	338.505	677.011	0.00E+00	5.55E+02	1.11E+03	0.8500	3.946E+13
Cs-135	4.2564E-06	338.505	677.011	0.00E+00	1.44E-03	2.88E-03	1.2500	5.388E+12
Cs-137	2.8791E+00	338.505	677.011	0.00E+00	9.75E+02	1.95E+03	1.7500	1.417E+11
Eu-154	1.7388E-01	338.505	677.011	0.00E+00	5.89E+01	1.18E+02	2.2500	2.241E+11
Eu-155	1.1616E-01	338.505	677.011	0.00E+00	3.93E+01	7.86E+01	2.7500	1.378E+09
Fe-55	7.3755E-02	338.505	677.011	0.00E+00	2.50E+01	4.99E+01	3.5000	1.549E+08
H-3	1.0729E-02	338.505	677.011	0.00E+00	3.63E+00	7.26E+00	5.0000	3.523E+04
I-129	6.6403E-07	338.505	677.011	0.00E+00	2.25E-04	4.50E-04	7.0000	4.051E+03
Kr-85	2.8487E-01	338.505	677.011	0.00E+00	9.64E+01	1.93E+02	11.0000	4.646E+02
Np-237	3.1507E-05	338.505	677.011	0.00E+00	1.07E-02	2.13E-02		
Pa-231	4.1938E-10	338.505	677.011	0.00E+00	1.42E-07	2.84E-07		
Pb-210	8.4083E-13	338.505	677.011	0.00E+00	2.85E-10	5.69E-10		
Pm-147	1.2807E+00	338.505	677.011	0.00E+00	4.34E+02	8.67E+02		
Pu-238	1.7290E-01	338.505	677.011	0.00E+00	5.85E+01	1.17E+02		
Pu-239	6.9563E-04	338.505	677.011	0.00E+00	2.35E-01	4.71E-01		
Pu-240	3.6865E-04	338.505	677.011	0.00E+00	1.25E-01	2.50E-01		
Pu-241	2.7643E-01	338.505	677.011	0.00E+00	9.36E+01	1.87E+02		
Pu-242	3.0911E-06	338.505	677.011	0.00E+00	1.05E-03	2.09E-03		
Ra-226	8.6330E-12	338.505	677.011	0.00E+00	2.92E-09	5.84E-09		
Ra-228	3.1817E-15	338.505	677.011	0.00E+00	1.08E-12	2.15E-12		
Ru-106	2.1981E-01	338.505	677.011	0.00E+00	7.44E+01	1.49E+02		
Se-79	1.2339E-05	338.505	677.011	0.00E+00	4.18E-03	8.35E-03		
Sn-126	1.0194E-05	338.505	677.011	0.00E+00	3.45E-03	6.90E-03		
Sr-90	2.7242E+00	338.505	677.011	0.00E+00	9.22E+02	1.84E+03		
Tc-99	3.8056E-04	338.505	677.011	0.00E+00	1.29E-01	2.58E-01		
Th-229	1.0413E-12	338.505	677.011	0.00E+00	3.52E-10	7.05E-10		
Th-230	3.9648E-09	338.505	677.011	0.00E+00	1.34E-06	2.68E-06		
Th-232	8.3538E-15	338.505	677.011	0.00E+00	2.83E-12	5.66E-12		
Th-208	4.3888E-08	338.505	677.011	0.00E+00	1.49E-05	2.97E-05		
U-232	1.3645E-07	338.505	677.011	0.00E+00	4.62E-05	9.24E-05		
U-233	1.7023E-09	338.505	677.011	0.00E+00	5.76E-07	1.15E-06		
U-234	4.5389E-05	338.505	677.011	0.00E+00	1.54E-02	3.07E-02		
U-235	-2.8661E-06	338.505	0.000	1.59E-03	6.18E-04	1.59E-03		
U-236	1.6701E-05	338.505	677.011	0.00E+00	5.65E-03	1.13E-02		
U-238	-9.4194E-09	338.505	0.000	1.86E-05	1.54E-05	1.86E-05		
Y-90	2.7248E+00	338.505	677.011	0.00E+00	9.22E+02	1.84E+03		
Other Radionuclides					1.80E+03	3.60E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.34E+01	4.68E+01
Total	Total

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-ALX	U	
BOL Enrichment %:	93.0000949	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		338.505	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		677.011	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.98		1.02
Bounding:	1.96		

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: FRR TUBES (GERMANY)
 SNF ID #: 675
 Fuel Units & Descr: 135 - ASSEMBLY
 Heavy Metal Mass: BOL=151.88kg ; EOL=136.69kg
 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"
 4.50

Radionuclide	m		x _n		b		y _n		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)	Avg. MeV			
Ac-227	1.7533E-10	14,435.184	28,870.368	0.00E+00	2.53E-06	5.06E-06						
Am-241	1.2780E-02	14,435.184	28,870.368	0.00E+00	1.84E+02	3.69E+02					0.0150	5.238E+15
Am-242m	9.5467E-06	14,435.184	28,870.368	0.00E+00	1.38E-01	2.76E-01					0.0250	1.129E+15
Am-243	6.4100E-06	14,435.184	28,870.368	0.00E+00	9.25E-02	1.85E-01					0.0375	1.028E+15
C-14	2.9673E-08	14,435.184	28,870.368	0.00E+00	4.28E-04	8.57E-04					0.0575	1.027E+15
Cl-36	5.9513E-35	14,435.184	28,870.368	0.00E+00	8.59E-31	1.72E-30					0.0850	6.466E+14
Cm-243	3.1807E-06	14,435.184	28,870.368	0.00E+00	4.59E-02	9.18E-02					0.1250	5.399E+14
Cm-244	1.9540E-04	14,435.184	28,870.368	0.00E+00	2.82E+00	5.64E+00					0.2250	5.514E+14
Co-60	1.1753E-04	14,435.184	28,870.368	0.00E+00	1.70E+00	3.39E+00					0.3750	2.674E+14
Cs-134	3.3060E-01	14,435.184	28,870.368	0.00E+00	4.77E+03	9.54E+03					0.5750	3.692E+15
Cs-135	4.8607E-06	14,435.184	28,870.368	0.00E+00	7.02E-02	1.40E-01					0.8500	3.916E+14
Cs-137	2.8607E+00	14,435.184	28,870.368	0.00E+00	4.13E+04	8.26E+04					1.2500	8.655E+13
Eu-154	6.9933E-02	14,435.184	28,870.368	0.00E+00	1.01E+03	2.02E+03					1.7500	4.120E+12
Eu-155	3.3253E-02	14,435.184	28,870.368	0.00E+00	4.80E+02	9.60E+02					2.2500	7.166E+12
Fe-55	7.7267E-02	14,435.184	28,870.368	0.00E+00	1.12E+03	2.23E+03					2.7500	6.482E+10
H-3	1.0827E-02	14,435.184	28,870.368	0.00E+00	1.56E+02	3.13E+02					3.5000	7.681E+09
I-129	7.1600E-07	14,435.184	28,870.368	0.00E+00	1.03E-02	2.07E-02					5.0000	7.516E+04
Kr-85	2.7007E-01	14,435.184	28,870.368	0.00E+00	3.90E+03	7.80E+03					7.0000	8.563E+03
Np-237	3.6327E-06	14,435.184	28,870.368	0.00E+00	5.24E-02	1.05E-01					11.0000	9.781E+02
Pa-231	1.1267E-09	14,435.184	28,870.368	0.00E+00	1.63E-05	3.25E-05						
Pb-210	1.9773E-15	14,435.184	28,870.368	0.00E+00	2.85E-11	5.71E-11						
Pm-147	2.4367E+00	14,435.184	28,870.368	0.00E+00	3.52E+04	7.03E+04						
Pu-238	6.2213E-03	14,435.184	28,870.368	0.00E+00	8.98E+01	1.80E+02						
Pu-239	1.0320E-02	14,435.184	28,870.368	0.00E+00	1.49E+02	2.98E+02						
Pu-240	5.4260E-03	14,435.184	28,870.368	0.00E+00	7.83E+01	1.57E+02						
Pu-241	7.7333E-01	14,435.184	28,870.368	0.00E+00	1.12E+04	2.23E+04						
Pu-242	3.0713E-06	14,435.184	28,870.368	0.00E+00	4.43E-02	8.87E-02						
Ra-226	2.2027E-14	14,435.184	28,870.368	0.00E+00	3.18E-10	6.36E-10						
Ra-228	2.6333E-15	14,435.184	28,870.368	0.00E+00	3.80E-11	7.60E-11						
Ru-106	2.5580E-01	14,435.184	28,870.368	0.00E+00	3.69E+03	7.39E+03						
Se-79	1.2540E-05	14,435.184	28,870.368	0.00E+00	1.81E-01	3.62E-01						
Sn-126	1.1393E-05	14,435.184	28,870.368	0.00E+00	1.64E-01	3.29E-01						
Sr-90	2.6293E+00	14,435.184	28,870.368	0.00E+00	3.80E+04	7.59E+04						
Tc-99	4.3540E-04	14,435.184	28,870.368	0.00E+00	6.29E+00	1.26E+01						
Th-229	1.3653E-13	14,435.184	28,870.368	0.00E+00	1.97E-09	3.94E-09						
Th-230	1.2607E-11	14,435.184	28,870.368	0.00E+00	1.82E-07	3.64E-07						
Th-232	6.7400E-15	14,435.184	28,870.368	0.00E+00	9.73E-11	1.95E-10						
Tl-208	7.4667E-09	14,435.184	28,870.368	0.00E+00	1.08E-04	2.16E-04						
U-232	2.1927E-08	14,435.184	28,870.368	0.00E+00	3.17E-04	6.33E-04						
U-233	1.9920E-10	14,435.184	28,870.368	0.00E+00	2.88E-06	5.75E-06						
U-234	2.2487E-07	14,435.184	28,870.368	0.00E+00	3.25E-03	6.49E-03						
U-235	-2.5341E-06	14,435.184	0.000	6.56E-02	2.91E-02	6.56E-02						
U-236	1.3000E-05	14,435.184	28,870.368	0.00E+00	1.88E-01	3.75E-01						
U-238	-1.4207E-08	14,435.184	0.000	4.08E-02	4.06E-02	4.08E-02						
Y-90	2.6300E+00	14,435.184	28,870.368	0.00E+00	3.80E+04	7.59E+04						
Other Radionuclides					6.82E+04	1.36E+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:	U3SI2	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		14,435.184	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		28,870.368	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	2.17		1.03
Bounding:	4.34		

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 TUBES (GERMANY)
 SNF ID #: 674
 Fuel Units & Descr: 18 - ASSEMBLY
 Heavy Metal Mass: BOL=18.00kg ; EOL=16.20kg
 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"
 0.60

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	1.7533E-10	1,710.837	3,421.673	0.00E+00	3.00E-07	6.00E-07	Avg. MeV	
Am-241	1.2780E-02	1,710.837	3,421.673	0.00E+00	2.19E+01	4.37E+01	0.0150	6.208E+14
Am-242m	9.5467E-06	1,710.837	3,421.673	0.00E+00	1.63E-02	3.27E-02	0.0250	1.338E+14
Am-243	6.4100E-06	1,710.837	3,421.673	0.00E+00	1.10E-02	2.19E-02	0.0375	1.219E+14
C-14	2.9673E-08	1,710.837	3,421.673	0.00E+00	5.08E-05	1.02E-04	0.0575	1.217E+14
Cl-36	5.9513E-35	1,710.837	3,421.673	0.00E+00	1.02E-31	2.04E-31	0.0850	7.664E+13
Cm-243	3.1807E-06	1,710.837	3,421.673	0.00E+00	5.44E-03	1.09E-02	0.1250	6.399E+13
Cm-244	1.9540E-04	1,710.837	3,421.673	0.00E+00	3.34E-01	6.69E-01	0.2250	6.536E+13
Co-60	1.1753E-04	1,710.837	3,421.673	0.00E+00	2.01E-01	4.02E-01	0.3750	3.169E+13
Cs-134	3.3060E-01	1,710.837	3,421.673	0.00E+00	5.66E+02	1.13E+03	0.5750	4.376E+14
Cs-135	4.8607E-06	1,710.837	3,421.673	0.00E+00	8.32E-03	1.66E-02	0.8500	4.641E+13
Cs-137	2.8607E+00	1,710.837	3,421.673	0.00E+00	4.89E+03	9.79E+03	1.2500	1.026E+13
Eu-154	6.9933E-02	1,710.837	3,421.673	0.00E+00	1.20E+02	2.39E+02	1.7500	4.883E+11
Eu-155	3.3253E-02	1,710.837	3,421.673	0.00E+00	5.69E+01	1.14E+02	2.2500	8.493E+11
Fe-55	7.7267E-02	1,710.837	3,421.673	0.00E+00	1.32E+02	2.64E+02	2.7500	7.682E+09
H-3	1.0827E-02	1,710.837	3,421.673	0.00E+00	1.85E+01	3.70E+01	3.5000	9.103E+08
I-129	7.1600E-07	1,710.837	3,421.673	0.00E+00	1.22E-03	2.45E-03	5.0000	8.908E+03
Kr-85	2.7007E-01	1,710.837	3,421.673	0.00E+00	4.62E+02	9.24E+02	7.0000	1.015E+03
Np-237	3.6327E-06	1,710.837	3,421.673	0.00E+00	6.21E-03	1.24E-02	11.0000	1.159E+02
Pa-231	1.1267E-09	1,710.837	3,421.673	0.00E+00	1.93E-06	3.86E-06		
Pb-210	1.9773E-15	1,710.837	3,421.673	0.00E+00	3.38E-12	6.77E-12		
Pm-147	2.4367E+00	1,710.837	3,421.673	0.00E+00	4.17E+03	8.34E+03		
Pu-238	6.2213E-03	1,710.837	3,421.673	0.00E+00	1.06E+01	2.13E+01		
Pu-239	1.0320E-02	1,710.837	3,421.673	0.00E+00	1.77E+01	3.53E+01		
Pu-240	5.4260E-03	1,710.837	3,421.673	0.00E+00	9.28E+00	1.86E+01		
Pu-241	7.7333E-01	1,710.837	3,421.673	0.00E+00	1.32E+03	2.65E+03		
Pu-242	3.0713E-06	1,710.837	3,421.673	0.00E+00	5.25E-03	1.05E-02		
Ra-226	2.2027E-14	1,710.837	3,421.673	0.00E+00	3.77E-11	7.54E-11		
Ra-228	2.6333E-15	1,710.837	3,421.673	0.00E+00	4.51E-12	9.01E-12		
Ru-106	2.5580E-01	1,710.837	3,421.673	0.00E+00	4.38E+02	8.75E+02		
Se-79	1.2540E-05	1,710.837	3,421.673	0.00E+00	2.15E-02	4.29E-02		
Sn-126	1.1393E-05	1,710.837	3,421.673	0.00E+00	1.95E-02	3.90E-02		
Sr-90	2.6293E+00	1,710.837	3,421.673	0.00E+00	4.50E+03	9.00E+03		
Tc-99	4.3540E-04	1,710.837	3,421.673	0.00E+00	7.45E-01	1.49E+00		
Th-229	1.3653E-13	1,710.837	3,421.673	0.00E+00	2.34E-10	4.67E-10		
Th-230	1.2607E-11	1,710.837	3,421.673	0.00E+00	2.16E-08	4.31E-08		
Th-232	6.7400E-15	1,710.837	3,421.673	0.00E+00	1.15E-11	2.31E-11		
Tl-208	7.4667E-09	1,710.837	3,421.673	0.00E+00	1.28E-05	2.55E-05		
U-232	2.1927E-08	1,710.837	3,421.673	0.00E+00	3.75E-05	7.50E-05		
U-233	1.9920E-10	1,710.837	3,421.673	0.00E+00	3.41E-07	6.82E-07		
U-234	2.2487E-07	1,710.837	3,421.673	0.00E+00	3.85E-04	7.69E-04		
U-235	-2.5341E-06	1,710.837	0.000	7.78E-03	3.44E-03	7.78E-03		
U-236	1.3000E-05	1,710.837	3,421.673	0.00E+00	2.22E-02	4.45E-02		
U-238	-1.4207E-08	1,710.837	0.000	4.84E-03	4.82E-03	4.84E-03		
Y-90	2.6300E+00	1,710.837	3,421.673	0.00E+00	4.50E+03	9.00E+03		
Other Radionuclides					8.08E+03	1.62E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.10E+01	1.62E+02
Total	Total

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:	U3Si2	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		1,710.837	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		3,421.673	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	2.17		
Bounding:	4.34		

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 TUBES (GERMANY)
 SNF ID #: 673
 Fuel Units & Descr: 135 - ASSEMBLY
 Heavy Metal Mass: BOL=121.50kg ; EOL=109.35kg
 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"
 4.50

Radionuclide	II. Estimates		x _b	b	y _n	y _b	Gamma Sources	
	m	x _n					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	1.7533E-10	11,548.147	23,096.295	0.00E+00	2.02E-06	4.05E-06	0.0150	4.191E+15
Am-241	1.2780E-02	11,548.147	23,096.295	0.00E+00	1.48E+02	2.95E+02	0.0250	9.029E+14
Am-242m	9.5467E-06	11,548.147	23,096.295	0.00E+00	1.10E-01	2.20E-01	0.0375	8.228E+14
Am-243	6.4100E-06	11,548.147	23,096.295	0.00E+00	7.40E-02	1.48E-01	0.0575	8.214E+14
C-14	2.9673E-08	11,548.147	23,096.295	0.00E+00	3.43E-04	6.85E-04	0.0850	5.173E+14
Cl-36	5.9513E-35	11,548.147	23,096.295	0.00E+00	6.87E-31	1.37E-30	0.1250	4.319E+14
Cm-243	3.1807E-06	11,548.147	23,096.295	0.00E+00	3.67E-02	7.35E-02	0.2250	4.412E+14
Cm-244	1.9540E-04	11,548.147	23,096.295	0.00E+00	2.26E+00	4.51E+00	0.3750	2.139E+14
Co-60	1.1753E-04	11,548.147	23,096.295	0.00E+00	1.36E+00	2.71E+00	0.5750	2.954E+15
Cs-134	3.3060E-01	11,548.147	23,096.295	0.00E+00	3.82E+03	7.64E+03	0.8500	3.133E+14
Cs-135	4.8607E-06	11,548.147	23,096.295	0.00E+00	5.61E-02	1.12E-01	1.2500	6.924E+13
Cs-137	2.8607E+00	11,548.147	23,096.295	0.00E+00	3.30E+04	6.61E+04	1.7500	3.296E+12
Eu-154	6.9933E-02	11,548.147	23,096.295	0.00E+00	8.08E+02	1.62E+03	2.2500	5.739E+12
Eu-155	3.3253E-02	11,548.147	23,096.295	0.00E+00	3.84E+02	7.68E+02	2.7500	5.185E+10
Fe-55	7.7267E-02	11,548.147	23,096.295	0.00E+00	8.92E+02	1.78E+03	3.5000	6.144E+09
H-3	1.0827E-02	11,548.147	23,096.295	0.00E+00	1.25E+02	2.50E+02	5.0000	6.013E+04
I-129	7.1600E-07	11,548.147	23,096.295	0.00E+00	8.27E-03	1.65E-02	7.0000	6.850E+03
Kr-85	2.7007E-01	11,548.147	23,096.295	0.00E+00	3.12E+03	6.24E+03	11.0000	7.825E+02
Np-237	3.6327E-06	11,548.147	23,096.295	0.00E+00	4.20E-02	8.39E-02		
Pa-231	1.1267E-09	11,548.147	23,096.295	0.00E+00	1.30E-05	2.60E-05		
Pb-210	1.9773E-15	11,548.147	23,096.295	0.00E+00	2.28E-11	4.57E-11		
Pm-147	2.4367E+00	11,548.147	23,096.295	0.00E+00	2.81E+04	5.63E+04		
Pu-238	6.2213E-03	11,548.147	23,096.295	0.00E+00	7.18E+01	1.44E+02		
Pu-239	1.0320E-02	11,548.147	23,096.295	0.00E+00	1.19E+02	2.38E+02		
Pu-240	5.4260E-03	11,548.147	23,096.295	0.00E+00	6.27E+01	1.25E+02		
Pu-241	7.7333E-01	11,548.147	23,096.295	0.00E+00	8.93E+03	1.79E+04		
Pu-242	3.0713E-06	11,548.147	23,096.295	0.00E+00	3.55E-02	7.09E-02		
Ra-226	2.2027E-14	11,548.147	23,096.295	0.00E+00	2.54E-10	5.09E-10		
Ra-228	2.6333E-15	11,548.147	23,096.295	0.00E+00	3.04E-11	6.08E-11		
Ru-106	2.5580E-01	11,548.147	23,096.295	0.00E+00	2.95E+03	5.91E+03		
Se-79	1.2540E-05	11,548.147	23,096.295	0.00E+00	1.45E-01	2.90E-01		
Sn-126	1.1393E-05	11,548.147	23,096.295	0.00E+00	1.32E-01	2.63E-01		
Sr-90	2.6293E+00	11,548.147	23,096.295	0.00E+00	3.04E+04	6.07E+04		
Tc-99	4.3540E-04	11,548.147	23,096.295	0.00E+00	5.03E+00	1.01E+01		
Th-229	1.3653E-13	11,548.147	23,096.295	0.00E+00	1.58E-09	3.15E-09		
Th-230	1.2607E-11	11,548.147	23,096.295	0.00E+00	1.46E-07	2.91E-07		
Th-232	6.7400E-15	11,548.147	23,096.295	0.00E+00	7.78E-11	1.56E-10		
Tl-208	7.4667E-09	11,548.147	23,096.295	0.00E+00	8.62E-05	1.72E-04		
U-232	2.1927E-08	11,548.147	23,096.295	0.00E+00	2.53E-04	5.06E-04		
U-233	1.9920E-10	11,548.147	23,096.295	0.00E+00	2.30E-06	4.60E-06		
U-234	2.2487E-07	11,548.147	23,096.295	0.00E+00	2.60E-03	5.19E-03		
U-235	-2.5341E-06	11,548.147	0.000	5.25E-02	2.32E-02	5.25E-02		
U-236	1.3000E-05	11,548.147	23,096.295	0.00E+00	1.50E-01	3.00E-01		
U-238	-1.4207E-08	11,548.147	0.000	3.27E-02	3.25E-02	3.27E-02		
Y-90	2.6300E+00	11,548.147	23,096.295	0.00E+00	3.04E+04	6.07E+04		
Other Radionuclides					5.45E+04	1.09E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.47E+02	1.09E+03
Total	Total

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:	U3SI2	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		11,548.147	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		23,096.295	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	2.17		1.03
Bounding:	4.34		

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 TUBES (GERMANY)
 SNF ID #: 683
 Fuel Units & Descr: 105 - ASSEMBLY
 Heavy Metal Mass: BOL=19.69kg ; EOL=13.39kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2010
 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: 5 years

Estimated
 Canister usage:
 18"x10"
 3.50

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	6.6950E-11	5,802.949	11,605.898	0.00E+00	3.89E-07	7.77E-07	0.0150	2.306E+15
Am-241	4.4557E-03	5,802.949	11,605.898	0.00E+00	2.59E+01	5.17E+01	0.0250	4.912E+14
Am-242m	1.4666E-06	5,802.949	11,605.898	0.00E+00	8.51E-03	1.70E-02	0.0375	4.743E+14
Am-243	3.7151E-05	5,802.949	11,605.898	0.00E+00	2.16E-01	4.31E-01	0.0575	4.523E+14
C-14	2.6513E-08	5,802.949	11,605.898	0.00E+00	1.54E-04	3.08E-04	0.0850	2.963E+14
Cl-36	4.4441E-31	5,802.949	11,605.898	0.00E+00	2.58E-27	5.16E-27	0.1250	2.703E+14
Cr-243	8.2139E-06	5,802.949	11,605.898	0.00E+00	4.77E-02	9.53E-02	0.2250	2.441E+14
Cr-244	8.2625E-03	5,802.949	11,605.898	0.00E+00	4.79E+01	9.59E+01	0.3750	1.156E+14
Co-60	3.4951E-04	5,802.949	11,605.898	0.00E+00	2.03E+00	4.06E+00	0.5750	2.212E+15
Cs-134	1.6409E+00	5,802.949	11,605.898	0.00E+00	9.52E+03	1.90E+04	0.8500	6.784E+14
Cs-135	4.2564E-06	5,802.949	11,605.898	0.00E+00	2.47E-02	4.94E-02	1.2500	9.237E+13
Cs-137	2.8791E+00	5,802.949	11,605.898	0.00E+00	1.67E+04	3.34E+04	1.7500	2.429E+12
Eu-154	1.7388E-01	5,802.949	11,605.898	0.00E+00	1.01E+03	2.02E+03	2.2500	3.842E+12
Eu-155	1.1616E-01	5,802.949	11,605.898	0.00E+00	6.74E+02	1.35E+03	2.7500	2.363E+10
Fe-55	7.3755E-02	5,802.949	11,605.898	0.00E+00	4.28E+02	8.56E+02	3.5000	2.654E+09
H-3	1.0729E-02	5,802.949	11,605.898	0.00E+00	6.23E+01	1.25E+02	5.0000	6.039E+05
I-129	6.6403E-07	5,802.949	11,605.898	0.00E+00	3.85E-03	7.71E-03	7.0000	6.944E+04
Kr-85	2.8487E-01	5,802.949	11,605.898	0.00E+00	1.65E+03	3.31E+03	11.0000	7.965E+03
Np-237	3.1507E-05	5,802.949	11,605.898	0.00E+00	1.83E-01	3.66E-01		
Pa-231	4.1938E-10	5,802.949	11,605.898	0.00E+00	2.43E-06	4.87E-06		
Pb-210	8.4083E-13	5,802.949	11,605.898	0.00E+00	4.88E-09	9.76E-09		
Pm-147	1.2807E+00	5,802.949	11,605.898	0.00E+00	7.43E+03	1.49E+04		
Pu-238	1.7290E-01	5,802.949	11,605.898	0.00E+00	1.00E+03	2.01E+03		
Pu-239	6.9563E-04	5,802.949	11,605.898	0.00E+00	4.04E+00	8.07E+00		
Pu-240	3.6865E-04	5,802.949	11,605.898	0.00E+00	2.14E+00	4.28E+00		
Pu-241	2.7643E-01	5,802.949	11,605.898	0.00E+00	1.60E+03	3.21E+03		
Pu-242	3.0911E-06	5,802.949	11,605.898	0.00E+00	1.79E-02	3.59E-02		
Ra-226	8.6330E-12	5,802.949	11,605.898	0.00E+00	5.01E-08	1.00E-07		
Ra-228	3.1817E-15	5,802.949	11,605.898	0.00E+00	1.85E-11	3.69E-11		
Ru-106	2.1981E-01	5,802.949	11,605.898	0.00E+00	1.28E+03	2.55E+03		
Se-79	1.2339E-05	5,802.949	11,605.898	0.00E+00	7.16E-02	1.43E-01		
Sn-126	1.0194E-05	5,802.949	11,605.898	0.00E+00	5.92E-02	1.18E-01		
Sr-90	2.7242E+00	5,802.949	11,605.898	0.00E+00	1.58E+04	3.16E+04		
Tc-99	3.8056E-04	5,802.949	11,605.898	0.00E+00	2.21E+00	4.42E+00		
Th-229	1.0413E-12	5,802.949	11,605.898	0.00E+00	6.04E-09	1.21E-08		
Th-230	3.9648E-09	5,802.949	11,605.898	0.00E+00	2.30E-05	4.60E-05		
Th-232	8.3536E-15	5,802.949	11,605.898	0.00E+00	4.85E-11	9.70E-11		
Tl-208	4.3888E-08	5,802.949	11,605.898	0.00E+00	2.55E-04	5.09E-04		
U-232	1.3645E-07	5,802.949	11,605.898	0.00E+00	7.92E-04	1.58E-03		
U-233	1.7023E-09	5,802.949	11,605.898	0.00E+00	9.88E-06	1.98E-05		
U-234	4.5389E-05	5,802.949	11,605.898	0.00E+00	2.63E-01	5.27E-01		
U-235	-2.8661E-06	5,802.949	0.000	3.40E-02	1.74E-02	3.40E-02		
U-236	1.6701E-05	5,802.949	11,605.898	0.00E+00	9.69E-02	1.94E-01		
U-238	-9.4194E-09	5,802.949	0.000	1.32E-03	1.27E-03	1.32E-03		
Y-90	2.7248E+00	5,802.949	11,605.898	0.00E+00	1.58E+04	3.16E+04		
Other Radionuclides							3.09E+04	6.17E+04

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.01E+02	8.02E+02
Total	Total

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-ALX	U	
BOL Enrichment %:	80	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		5,802.949	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		11,605.898	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.68		
Bounding:	1.35		

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 TUBES (GERMANY)
 SNF ID #: 685
 Fuel Units & Descr: 130 - ASSEMBLY
 Heavy Metal Mass: BOL=27.63kg ; EOL=18.79kg
 ROD Storage Site: SRS

Fuel decay start date: 2010
 Estimates as of: 2010
 Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
 Template Burnup(MWd): 164.6
 Template BOL Heavy Metal Mass (MT): 0.000377
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 4.33

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	6.6950E-11	8,142.551	16,285.101	0.00E+00	5.45E-07	1.09E-06	0.0150	3.295E+15
Am-241	4.4557E-03	8,142.551	16,285.101	0.00E+00	3.63E+01	7.26E+01	0.0250	6.892E+14
Am-242m	1.4666E-06	8,142.551	16,285.101	0.00E+00	1.19E-02	2.39E-02	0.0375	6.655E+14
Am-243	3.7151E-05	8,142.551	16,285.101	0.00E+00	3.03E-01	6.05E-01	0.0575	6.347E+14
C-14	2.6513E-08	8,142.551	16,285.101	0.00E+00	2.16E-04	4.32E-04	0.0850	4.158E+14
Cl-36	4.4441E-31	8,142.551	16,285.101	0.00E+00	3.62E-27	7.24E-27	0.1250	3.793E+14
Cm-243	8.2139E-06	8,142.551	16,285.101	0.00E+00	6.69E-02	1.34E-01	0.2250	3.425E+14
Cm-244	8.2625E-03	8,142.551	16,285.101	0.00E+00	6.73E+01	1.35E+02	0.3750	1.622E+14
Co-60	3.4951E-04	8,142.551	16,285.101	0.00E+00	2.85E+00	5.69E+00	0.5750	3.104E+15
Cs-134	1.6409E+00	8,142.551	16,285.101	0.00E+00	1.34E+04	2.67E+04	0.8500	9.491E+14
Cs-135	4.2564E-06	8,142.551	16,285.101	0.00E+00	3.47E-02	6.93E-02	1.2500	1.296E+14
Cs-137	2.8791E+00	8,142.551	16,285.101	0.00E+00	2.34E+04	4.69E+04	1.7500	3.408E+12
Eu-154	1.7388E-01	8,142.551	16,285.101	0.00E+00	1.42E+03	2.83E+03	2.2500	5.391E+12
Eu-155	1.1616E-01	8,142.551	16,285.101	0.00E+00	9.46E+02	1.89E+03	2.7500	3.316E+10
Fe-55	7.3755E-02	8,142.551	16,285.101	0.00E+00	6.01E+02	1.20E+03	3.5000	3.725E+09
H-3	1.0729E-02	8,142.551	16,285.101	0.00E+00	8.74E+01	1.75E+02	5.0000	8.473E+05
I-129	6.6403E-07	8,142.551	16,285.101	0.00E+00	5.41E-03	1.08E-02	7.0000	9.744E+04
Kr-85	2.8487E-01	8,142.551	16,285.101	0.00E+00	2.32E+03	4.64E+03	11.0000	1.118E+04
Np-237	3.1507E-05	8,142.551	16,285.101	0.00E+00	2.57E-01	5.13E-01		
Pa-231	4.1938E-10	8,142.551	16,285.101	0.00E+00	3.41E-06	6.83E-06		
Pb-210	8.4083E-13	8,142.551	16,285.101	0.00E+00	6.85E-09	1.37E-08		
Pm-147	1.2807E+00	8,142.551	16,285.101	0.00E+00	1.04E+04	2.09E+04		
Pu-238	1.7290E-01	8,142.551	16,285.101	0.00E+00	1.41E+03	2.82E+03		
Pu-239	6.9563E-04	8,142.551	16,285.101	0.00E+00	5.66E+00	1.13E+01		
Pu-240	3.6865E-04	8,142.551	16,285.101	0.00E+00	3.00E+00	6.00E+00		
Pu-241	2.7643E-01	8,142.551	16,285.101	0.00E+00	2.25E+03	4.50E+03		
Pu-242	3.0911E-06	8,142.551	16,285.101	0.00E+00	2.52E-02	5.03E-02		
Ra-226	8.6330E-12	8,142.551	16,285.101	0.00E+00	7.03E-08	1.41E-07		
Ra-228	3.1817E-15	8,142.551	16,285.101	0.00E+00	2.59E-11	5.18E-11		
Ru-106	2.1981E-01	8,142.551	16,285.101	0.00E+00	1.79E+03	3.58E+03		
Se-79	1.2339E-05	8,142.551	16,285.101	0.00E+00	1.00E-01	2.01E-01		
Sn-126	1.0194E-05	8,142.551	16,285.101	0.00E+00	8.30E-02	1.66E-01		
Sr-90	2.7242E+00	8,142.551	16,285.101	0.00E+00	2.22E+04	4.44E+04		
Tc-99	3.8056E-04	8,142.551	16,285.101	0.00E+00	3.10E+00	6.20E+00		
Th-229	1.0413E-12	8,142.551	16,285.101	0.00E+00	8.48E-09	1.70E-08		
Th-230	3.9648E-09	8,142.551	16,285.101	0.00E+00	3.23E-05	6.46E-05		
Th-232	8.3536E-15	8,142.551	16,285.101	0.00E+00	6.80E-11	1.36E-10		
Tl-208	4.3888E-08	8,142.551	16,285.101	0.00E+00	3.57E-04	7.15E-04		
U-232	1.3645E-07	8,142.551	16,285.101	0.00E+00	1.11E-03	2.22E-03		
U-233	1.7023E-09	8,142.551	16,285.101	0.00E+00	1.39E-05	2.77E-05		
U-234	4.5389E-05	8,142.551	16,285.101	0.00E+00	3.70E-01	7.39E-01		
U-235	-2.8661E-06	8,142.551	0.000	4.78E-02	2.44E-02	4.78E-02		
U-236	1.6701E-05	8,142.551	16,285.101	0.00E+00	1.36E-01	2.72E-01		
U-238	-9.4194E-09	8,142.551	0.000	1.86E-03	1.78E-03	1.86E-03		
Y-90	2.7248E+00	8,142.551	16,285.101	0.00E+00	2.22E+04	4.44E+04		
Other Radionuclides					4.33E+04	8.66E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.63E+02	1.13E+03
Total	Total

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-ALX	U	
BOL Enrichment %:	80	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		8,142.551	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		16,285.101	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.68		1.01
Bounding:	1.35		

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: FSVR
 SNF ID #: 86
 Fuel Units & Descr: 1464 - CARBON COATED PART
 Heavy Metal Mass: BOL=15366.58kg ; EOL=14725.94kg
 ROD Storage Site: FSV

¹Fuel decay start date: 1989
 Estimates as of: 2010
 Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
²Template Burnup(MWd): 1270.275
 Template BOL Heavy Metal Mass (MT): 0.012702752
 Template Decay Time: 20 years

Estimated
 Canister usage:
 18"x15"
 292.80

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	2.8411E-06	605,875.765	1,211,751.530	0.00E+00	1.72E+00	3.44E+00		
Am-241	2.5254E-03	605,875.765	1,211,751.530	0.00E+00	1.53E+03	3.06E+03	0.0150	1.217E+17
Am-242m	2.5664E-06	605,875.765	1,211,751.530	0.00E+00	1.55E+00	3.11E+00	0.0250	2.501E+16
Am-243	4.6132E-05	605,875.765	1,211,751.530	0.00E+00	2.80E+01	5.59E+01	0.0375	2.208E+16
C-14	2.3168E-05	605,875.765	1,211,751.530	0.00E+00	1.40E+01	2.81E+01	0.0575	2.346E+16
Cl-36	1.0667E-06	605,875.765	1,211,751.530	0.00E+00	6.46E-01	1.29E+00	0.0850	1.422E+16
Cm-243	3.6520E-05	605,875.765	1,211,751.530	0.00E+00	2.21E+01	4.43E+01	0.1250	1.012E+16
Cm-244	1.1446E-02	605,875.765	1,211,751.530	0.00E+00	6.94E+03	1.39E+04	0.2250	1.234E+16
Co-60	3.2379E-03	605,875.765	1,211,751.530	0.00E+00	1.96E+03	3.92E+03	0.3750	5.322E+15
Cs-134	5.8964E-03	605,875.765	1,211,751.530	0.00E+00	3.57E+03	7.14E+03	0.5750	8.540E+16
Cs-135	2.4711E-05	605,875.765	1,211,751.530	0.00E+00	1.50E+01	2.99E+01	0.8500	2.227E+15
Cs-137	1.8775E+00	605,875.765	1,211,751.530	0.00E+00	1.14E+06	2.28E+06	1.2500	1.836E+15
Eu-154	5.2619E-02	605,875.765	1,211,751.530	0.00E+00	3.19E+04	6.38E+04	1.7500	6.220E+13
Eu-155	8.4785E-03	605,875.765	1,211,751.530	0.00E+00	5.14E+03	1.03E+04	2.2500	4.492E+09
Fe-55	2.4381E-06	605,875.765	1,211,751.530	0.00E+00	1.48E+00	2.95E+00	2.7500	2.927E+13
H-3	9.0768E-03	605,875.765	1,211,751.530	0.00E+00	5.50E+03	1.10E+04	3.5000	2.084E+08
I-129	1.0092E-06	605,875.765	1,211,751.530	0.00E+00	6.11E-01	1.22E+00	5.0000	8.839E+07
Kr-85	1.0423E-01	605,875.765	1,211,751.530	0.00E+00	6.32E+04	1.26E+05	7.0000	1.017E+07
Np-237	1.2517E-05	605,875.765	1,211,751.530	0.00E+00	7.58E+00	1.52E+01	11.0000	1.167E+06
Pa-231	4.7391E-06	605,875.765	1,211,751.530	0.00E+00	2.87E+00	5.74E+00		
Pb-210	7.3244E-10	605,875.765	1,211,751.530	0.00E+00	4.44E-04	8.88E-04		
Pm-147	7.9747E-03	605,875.765	1,211,751.530	0.00E+00	4.83E+03	9.66E+03		
Pu-238	1.8295E-01	605,875.765	1,211,751.530	0.00E+00	1.11E+05	2.22E+05		
Pu-239	1.3580E-04	605,875.765	1,211,751.530	0.00E+00	8.23E+01	1.65E+02		
Pu-240	2.5601E-04	605,875.765	1,211,751.530	0.00E+00	1.55E+02	3.10E+02		
Pu-241	3.9810E-02	605,875.765	1,211,751.530	0.00E+00	2.41E+04	4.82E+04		
Pu-242	3.8866E-06	605,875.765	1,211,751.530	0.00E+00	2.35E+00	4.71E+00		
Ra-226	1.1163E-09	605,875.765	1,211,751.530	0.00E+00	6.76E-04	1.35E-03		
Ra-228	8.9587E-07	605,875.765	1,211,751.530	0.00E+00	5.43E-01	1.09E+00		
Ru-106	1.0628E-06	605,875.765	1,211,751.530	0.00E+00	6.44E-01	1.29E+00		
Se-79	2.1082E-05	605,875.765	1,211,751.530	0.00E+00	1.28E+01	2.55E+01		
Sn-126	2.2200E-05	605,875.765	1,211,751.530	0.00E+00	1.35E+01	2.69E+01		
Sr-90	1.8098E+00	605,875.765	1,211,751.530	0.00E+00	1.10E+06	2.19E+06		
Tc-99	3.3331E-04	605,875.765	1,211,751.530	0.00E+00	2.02E+02	4.04E+02		
Th-229	5.7665E-06	605,875.765	1,211,751.530	0.00E+00	3.49E+00	6.99E+00		
Th-230	1.2493E-07	605,875.765	1,211,751.530	0.00E+00	7.57E-02	1.51E-01		
Th-232	-6.9673E-08	605,875.765	0.000	1.52E+00	1.48E+00	1.52E+00		
Tl-208	6.8796E-04	605,875.765	1,211,751.530	0.00E+00	4.17E+02	8.34E+02		
U-232	1.8618E-03	605,875.765	1,211,751.530	0.00E+00	1.13E+03	2.26E+03		
U-233	2.0602E-03	605,875.765	1,211,751.530	0.00E+00	1.25E+03	2.50E+03		
U-234	2.7805E-04	605,875.765	1,211,751.530	0.00E+00	1.68E+02	3.37E+02		
U-235	-1.7343E-06	605,875.765	0.000	3.04E+00	1.99E+00	3.04E+00		
U-236	8.6281E-06	605,875.765	1,211,751.530	0.00E+00	5.23E+00	1.05E+01		
U-238	-5.6065E-09	605,875.765	0.000	3.02E-02	2.68E-02	3.02E-02		
Y-90	1.8098E+00	605,875.765	1,211,751.530	0.00E+00	1.10E+06	2.19E+06		
Other Radionuclides					1.09E+06	2.18E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.76E+04	3.52E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	GRAPHITE	GRAPHITE	
Fuel Cladding:	TRISO IN GRAPHI	GRAPHITE	
BOL HM Constituents:	ThC2-UC2	Th and U	
BOL Enrichment %:	93.15000362	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		605,875.765	
Bounding:	722,229.410	1,211,751.530	

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:	0.39	
Bounding:	0.79	1.68

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: FSVR
 SNF ID #: 85
 Fuel Units & Descr: 744 - CARBON COATED PART
 Heavy Metal Mass: BOL=8780.02kg ; EOL=8626.16kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1980
 Estimates as of: 2010
 Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
²Template Burnup(MWd): 1270.275
 Template BOL Heavy Metal Mass (MT): 0.012702752
 Template Decay Time: 25 years

Estimated
 Canister usage:
 18"x15"
 148.80

Radionuclide	II. Estimates		x _b	b	y _n	y _b	Gamma Sources	
	m	x _n					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	3.3583E-06	145,508.600	412,660.865	0.00E+00	4.89E-01	1.39E+00	0.0150	3.674E+16
Am-241	2.8805E-03	145,508.600	412,660.865	0.00E+00	4.19E+02	1.19E+03	0.0250	7.543E+15
Am-242m	2.5089E-06	145,508.600	412,660.865	0.00E+00	3.65E-01	1.04E+00	0.0375	6.621E+15
Am-243	4.6116E-05	145,508.600	412,660.865	0.00E+00	6.71E+00	1.90E+01	0.0575	7.074E+15
C-14	2.3152E-05	145,508.600	412,660.865	0.00E+00	3.37E+00	9.55E+00	0.0850	4.278E+15
Cl-36	1.0667E-06	145,508.600	412,660.865	0.00E+00	1.55E-01	4.40E-01	0.1250	2.978E+15
Cm-243	3.2339E-05	145,508.600	412,660.865	0.00E+00	4.71E+00	1.33E+01	0.2250	3.714E+15
Cm-244	9.4546E-03	145,508.600	412,660.865	0.00E+00	1.38E+03	3.90E+03	0.3750	1.602E+15
Co-60	1.6776E-03	145,508.600	412,660.865	0.00E+00	2.44E+02	6.92E+02	0.5750	2.581E+16
Cs-134	1.0974E-03	145,508.600	412,660.865	0.00E+00	1.60E+02	4.53E+02	0.8500	5.340E+14
Cs-135	2.4711E-05	145,508.600	412,660.865	0.00E+00	3.60E+00	1.02E+01	1.2500	4.217E+14
Cs-137	1.6729E+00	145,508.600	412,660.865	0.00E+00	2.43E+05	6.90E+05	1.7500	1.608E+13
Eu-154	3.5166E-02	145,508.600	412,660.865	0.00E+00	5.12E+03	1.45E+04	2.2500	1.117E+09
Eu-155	4.2148E-03	145,508.600	412,660.865	0.00E+00	6.13E+02	1.74E+03	2.7500	9.502E+12
Fe-55	6.4301E-07	145,508.600	412,660.865	0.00E+00	9.36E-02	2.65E-01	3.5000	5.888E+07
H-3	6.8528E-03	145,508.600	412,660.865	0.00E+00	9.97E+02	2.83E+03	5.0000	2.511E+07
I-129	1.0092E-06	145,508.600	412,660.865	0.00E+00	1.47E-01	4.16E-01	7.0000	2.889E+06
Kr-85	7.5440E-02	145,508.600	412,660.865	0.00E+00	1.10E+04	3.11E+04	11.0000	3.314E+05
Np-237	1.2525E-05	145,508.600	412,660.865	0.00E+00	1.82E+00	5.17E+00		
Pa-231	4.7383E-06	145,508.600	412,660.865	0.00E+00	6.89E-01	1.96E+00		
Pb-210	9.1476E-10	145,508.600	412,660.865	0.00E+00	1.33E-04	3.77E-04		
Pm-147	2.1271E-03	145,508.600	412,660.865	0.00E+00	3.10E+02	8.78E+02		
Pu-238	1.7587E-01	145,508.600	412,660.865	0.00E+00	2.56E+04	7.26E+04		
Pu-239	1.3580E-04	145,508.600	412,660.865	0.00E+00	1.98E+01	5.60E+01		
Pu-240	2.6404E-04	145,508.600	412,660.865	0.00E+00	3.84E+01	1.09E+02		
Pu-241	3.1300E-02	145,508.600	412,660.865	0.00E+00	4.55E+03	1.29E+04		
Pu-242	3.8866E-06	145,508.600	412,660.865	0.00E+00	5.66E-01	1.60E+00		
Ra-226	1.7059E-09	145,508.600	412,660.865	0.00E+00	2.48E-04	7.04E-04		
Ra-228	9.1083E-07	145,508.600	412,660.865	0.00E+00	1.33E-01	3.76E-01		
Ru-106	3.4126E-08	145,508.600	412,660.865	0.00E+00	4.97E-03	1.41E-02		
Se-79	2.1082E-05	145,508.600	412,660.865	0.00E+00	3.07E+00	8.70E+00		
Sn-126	2.2200E-05	145,508.600	412,660.865	0.00E+00	3.23E+00	9.16E+00		
Sr-90	1.6067E+00	145,508.600	412,660.865	0.00E+00	2.34E+05	6.63E+05		
Tc-99	3.3331E-04	145,508.600	412,660.865	0.00E+00	4.85E+01	1.38E+02		
Th-229	7.7062E-06	145,508.600	412,660.865	0.00E+00	1.12E+00	3.18E+00		
Th-230	1.5020E-07	145,508.600	412,660.865	0.00E+00	2.19E-02	6.20E-02		
Th-232	-6.9673E-08	145,508.600	0.000	8.68E-01	8.58E-01	8.68E-01		
Tl-208	6.5584E-04	145,508.600	412,660.865	0.00E+00	9.54E+01	2.71E+02		
U-232	1.7744E-03	145,508.600	412,660.865	0.00E+00	2.58E+02	7.32E+02		
U-233	2.0602E-03	145,508.600	412,660.865	0.00E+00	3.00E+02	8.50E+02		
U-234	2.8285E-04	145,508.600	412,660.865	0.00E+00	4.12E+01	1.17E+02		
U-235	-1.7343E-06	145,508.600	0.000	1.74E+00	1.48E+00	1.74E+00		
U-236	8.6281E-06	145,508.600	412,660.865	0.00E+00	1.26E+00	3.56E+00		
U-238	-5.6065E-09	145,508.600	0.000	1.73E-02	1.65E-02	1.73E-02		
Y-90	1.6067E+00	145,508.600	412,660.865	0.00E+00	2.34E+05	6.63E+05		
Other Radionuclides					2.33E+05	6.61E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.89E+03	1.08E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	GRAPHITE	GRAPHITE	
Fuel Cladding:	TRISO IN GRAPHI	GRAPHITE	
BOL HM Constituents:	ThC2-UC2	Th and U	
BOL Enrichment %:	93.13638737	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		145,508.600	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	412,660.865	291,017.199	Bounding burnup taken directly from SFD (converted to MWd).

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.17		1.00
Bounding:	0.47	0.71	

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: GA HTGR FUEL
 SNF ID #: 89
 Fuel Units & Descr: 2 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=2.16kg ; EOL=2.08kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1996
 Estimates as of: 2010
 Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
²Template Burnup(MWd): 1270.275
 Template BOL Heavy Metal Mass (MT): 0.012702752
 Template Decay Time: 10 years

Estimated
 Canister usage:
 HIC
 1.00

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)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.1295E-06	76.225	152.451	0.00E+00	1.62E-04	3.25E-04	Avg. MeV	
Am-241	1.9169E-03	76.225	152.451	0.00E+00	1.46E-01	2.92E-01	0.0150	1.962E+13
Am-242m	2.6860E-06	76.225	152.451	0.00E+00	2.05E-04	4.09E-04	0.0250	4.081E+12
Am-243	4.6179E-05	76.225	152.451	0.00E+00	3.52E-03	7.04E-03	0.0375	3.658E+12
C-14	2.3192E-05	76.225	152.451	0.00E+00	1.77E-03	3.54E-03	0.0575	3.794E+12
Cl-36	1.0667E-06	76.225	152.451	0.00E+00	8.13E-05	1.63E-04	0.0850	2.327E+12
Cm-243	4.6573E-05	76.225	152.451	0.00E+00	3.55E-03	7.10E-03	0.1250	1.765E+12
Cm-244	1.6784E-02	76.225	152.451	0.00E+00	1.28E+00	2.56E+00	0.2250	2.004E+12
Co-60	1.2060E-02	76.225	152.451	0.00E+00	9.19E-01	1.84E+00	0.3750	8.817E+11
Cs-134	1.7004E-01	76.225	152.451	0.00E+00	1.30E+01	2.59E+01	0.5750	1.477E+13
Cs-135	2.4711E-05	76.225	152.451	0.00E+00	1.88E-03	3.77E-03	0.8500	1.301E+12
Cs-137	2.3656E+00	76.225	152.451	0.00E+00	1.80E+02	3.61E+02	1.2500	5.885E+11
Eu-154	1.1785E-01	76.225	152.451	0.00E+00	8.98E+00	1.80E+01	1.7500	1.445E+10
Eu-155	3.4292E-02	76.225	152.451	0.00E+00	2.61E+00	5.23E+00	2.2500	7.140E+07
Fe-55	3.5071E-05	76.225	152.451	0.00E+00	2.67E-03	5.35E-03	2.7500	4.001E+09
H-3	1.5902E-02	76.225	152.451	0.00E+00	1.21E+00	2.42E+00	3.5000	2.010E+05
I-129	1.0092E-06	76.225	152.451	0.00E+00	7.69E-05	1.54E-04	5.0000	1.605E+04
Kr-85	1.9901E-01	76.225	152.451	0.00E+00	1.52E+01	3.03E+01	7.0000	1.848E+03
Np-237	1.2509E-05	76.225	152.451	0.00E+00	9.54E-04	1.91E-03	11.0000	2.121E+02
Pa-231	4.7399E-06	76.225	152.451	0.00E+00	3.61E-04	7.23E-04		
Pb-210	7.0481E-10	76.225	152.451	0.00E+00	5.37E-08	1.07E-07		
Pm-147	1.1194E-01	76.225	152.451	0.00E+00	8.53E+00	1.71E+01		
Pu-238	1.9799E-01	76.225	152.451	0.00E+00	1.51E+01	3.02E+01		
Pu-239	1.3580E-04	76.225	152.451	0.00E+00	1.04E-02	2.07E-02		
Pu-240	2.4404E-04	76.225	152.451	0.00E+00	1.86E-02	3.72E-02		
Pu-241	6.4427E-02	76.225	152.451	0.00E+00	4.91E+00	9.82E+00		
Pu-242	3.8866E-06	76.225	152.451	0.00E+00	2.96E-04	5.93E-04		
Ra-226	6.3223E-10	76.225	152.451	0.00E+00	4.82E-08	9.64E-08		
Ra-228	8.5178E-07	76.225	152.451	0.00E+00	6.49E-05	1.30E-04		
Ru-106	1.0305E-03	76.225	152.451	0.00E+00	7.85E-02	1.57E-01		
Se-79	2.1082E-05	76.225	152.451	0.00E+00	1.61E-03	3.21E-03		
Sn-126	2.2200E-05	76.225	152.451	0.00E+00	1.69E-03	3.38E-03		
Sr-90	2.2964E+00	76.225	152.451	0.00E+00	1.75E+02	3.50E+02		
Tc-99	3.3331E-04	76.225	152.451	0.00E+00	2.54E-02	5.08E-02		
Th-229	3.8252E-06	76.225	152.451	0.00E+00	2.92E-04	5.83E-04		
Th-230	1.0014E-07	76.225	152.451	0.00E+00	7.63E-06	1.53E-05		
Th-232	-6.9673E-08	76.225	0.000	2.14E-04	2.09E-04	2.14E-04		
Ti-208	7.4724E-04	76.225	152.451	0.00E+00	5.70E-02	1.14E-01		
U-232	2.0499E-03	76.225	152.451	0.00E+00	1.56E-01	3.13E-01		
U-233	2.0610E-03	76.225	152.451	0.00E+00	1.57E-01	3.14E-01		
U-234	2.7293E-04	76.225	152.451	0.00E+00	2.08E-02	4.16E-02		
U-235	-1.7343E-06	76.225	0.000	4.28E-04	2.95E-04	4.28E-04		
U-236	8.6281E-06	76.225	152.451	0.00E+00	6.58E-04	1.32E-03		
U-238	-5.6065E-09	76.225	0.000	4.25E-06	3.83E-06	4.25E-06		
Y-90	2.2964E+00	76.225	152.451	0.00E+00	1.75E+02	3.50E+02		
Other Radionuclides					1.74E+02	3.48E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.90E+00	5.79E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary		Basis for Parameter Differences:
From SFD	Used	
Reactor Moderator:	GRAPHITE	GRAPHITE
Fuel Cladding:	PYROLYTIC CARBON IN	GRAPHITE
BOL HM Constituents:	ThCO-UCO	Th and U
BOL Enrichment %:	92.18943312	60 to 100

Burnup Summary (MWd) ²		Basis for burnup used in estimate:
From SFD	Estimated	
Nominal:	76.225	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	152.451	Bounding burnup assumed to be twice nominal burnup.

Checks		Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	
Bounding:	0.35	1.00
	0.71	

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: GA RERTR
 SNF ID #: 90
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=3.85kg ; EOL=3.07kg
 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:
 HIC
 0.50

Radionuclide	II. Estimates			Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
	m	x _n	x _b				Photon Energy Group	Total Photons/sec (bounding)
	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²				Avg. MeV	
Ac-227	8.5173E-10	744.212	1,488.424	0.00E+00	6.34E-07	1.27E-06		
Am-241	1.8331E-03	744.212	1,488.424	0.00E+00	1.36E+00	2.73E+00	0.0150	2.406E+14
Am-242m	1.4129E-06	744.212	1,488.424	0.00E+00	1.05E-03	2.10E-03	0.0250	5.293E+13
Am-243	1.4774E-07	744.212	1,488.424	0.00E+00	1.10E-04	2.20E-04	0.0375	4.508E+13
C-14	1.2871E-04	744.212	1,488.424	0.00E+00	9.58E-02	1.92E-01	0.0575	4.627E+13
Cl-36	2.8120E-06	744.212	1,488.424	0.00E+00	2.09E-03	4.19E-03	0.0850	2.866E+13
Cm-243	1.7940E-07	744.212	1,488.424	0.00E+00	1.34E-04	2.67E-04	0.1250	2.082E+13
Cm-244	1.6962E-06	744.212	1,488.424	0.00E+00	1.26E-03	2.52E-03	0.2250	2.432E+13
Co-60	1.2839E+00	744.212	1,488.424	0.00E+00	9.56E+02	1.91E+03	0.3750	1.234E+13
Cs-134	9.0541E-02	744.212	1,488.424	0.00E+00	6.74E+01	1.35E+02	0.5750	1.641E+14
Cs-135	3.2195E-05	744.212	1,488.424	0.00E+00	2.40E-02	4.79E-02	0.8500	7.040E+12
Cs-137	2.7564E+00	744.212	1,488.424	0.00E+00	2.05E+03	4.10E+03	1.2500	1.430E+14
Eu-154	1.5368E-02	744.212	1,488.424	0.00E+00	1.14E+01	2.29E+01	1.7500	9.539E+10
Eu-155	2.9293E-02	744.212	1,488.424	0.00E+00	2.18E+01	4.36E+01	2.2500	1.536E+11
Fe-55	7.7158E-01	744.212	1,488.424	0.00E+00	5.74E+02	1.15E+03	2.7500	1.219E+09
H-3	1.1111E-02	744.212	1,488.424	0.00E+00	8.27E+00	1.65E+01	3.5000	1.419E+08
I-129	7.3684E-07	744.212	1,488.424	0.00E+00	5.48E-04	1.10E-03	5.0000	7.823E+02
Kr-85	2.5263E-01	744.212	1,488.424	0.00E+00	1.88E+02	3.76E+02	7.0000	8.854E+01
Np-237	1.2427E-06	744.212	1,488.424	0.00E+00	9.25E-04	1.85E-03	11.0000	1.009E+01
Pa-231	3.8511E-09	744.212	1,488.424	0.00E+00	2.87E-06	5.73E-06		
Pb-210	7.3880E-15	744.212	1,488.424	0.00E+00	5.50E-12	1.10E-11		
Pm-147	2.1023E+00	744.212	1,488.424	0.00E+00	1.56E+03	3.13E+03		
Pu-238	1.0383E-03	744.212	1,488.424	0.00E+00	7.73E-01	1.55E+00		
Pu-239	5.5293E-03	744.212	1,488.424	0.00E+00	4.11E+00	8.23E+00		
Pu-240	2.1278E-03	744.212	1,488.424	0.00E+00	1.58E+00	3.17E+00		
Pu-241	1.0195E-01	744.212	1,488.424	0.00E+00	7.59E+01	1.52E+02		
Pu-242	2.3128E-07	744.212	1,488.424	0.00E+00	1.72E-04	3.44E-04		
Ra-226	5.2782E-14	744.212	1,488.424	0.00E+00	3.93E-11	7.86E-11		
Ra-228	1.9338E-10	744.212	1,488.424	0.00E+00	1.44E-07	2.88E-07		
Ru-106	9.1684E-02	744.212	1,488.424	0.00E+00	6.82E+01	1.36E+02		
Se-79	1.3018E-05	744.212	1,488.424	0.00E+00	9.69E-03	1.94E-02		
Sn-126	1.2167E-05	744.212	1,488.424	0.00E+00	9.05E-03	1.81E-02		
Sr-90	2.6045E+00	744.212	1,488.424	0.00E+00	1.94E+03	3.88E+03		
Tc-99	4.4241E-04	744.212	1,488.424	0.00E+00	3.29E-01	6.58E-01		
Th-229	1.3713E-10	744.212	1,488.424	0.00E+00	1.02E-07	2.04E-07		
Th-230	1.8090E-11	744.212	1,488.424	0.00E+00	1.35E-08	2.69E-08		
Th-232	2.5278E-10	744.212	1,488.424	0.00E+00	1.88E-07	3.76E-07		
Tl-208	1.6947E-08	744.212	1,488.424	0.00E+00	1.26E-05	2.52E-05		
U-232	4.8737E-08	744.212	1,488.424	0.00E+00	3.63E-05	7.25E-05		
U-233	1.2203E-07	744.212	1,488.424	0.00E+00	9.08E-05	1.82E-04		
U-234	1.5925E-07	744.212	1,488.424	0.00E+00	1.19E-04	2.37E-04		
U-235	-2.6194E-06	744.212	0.000	1.65E-03	0.00E+00	1.65E-03		
U-236	1.2693E-05	744.212	1,488.424	0.00E+00	9.45E-03	1.89E-02		
U-238	-3.6331E-08	744.212	0.000	1.04E-03	1.01E-03	1.04E-03		
Y-90	2.6060E+00	744.212	1,488.424	0.00E+00	1.94E+03	3.88E+03		
Other Radionuclides					2.68E+03	5.37E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.33E+01	8.66E+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	This Template was used for the following reasons: This fuel matches on all parameters except cladding (SST is conservative).
Fuel Cladding:	INCOLOY (800H)	SST	
BOL HM Constituents:	U-ZHX	U	
BOL Enrichment %:	19.78706778	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		744.212	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		1,488.424	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	5.67		1.05
Bounding:	11.33		

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: GCRE (1B SERIES)	¹ Fuel decay start date: 1960	Estimated
SNF ID #: 745	Estimates as of: 2010	Canister usage:
Fuel Units & Descr: 69 - 19 ROD ASSEMBLY	Template: Pathfinder (Light Water, SST, 60 to 100%, U)	18"x10"
Heavy Metal Mass: BOL=60.54kg ; EOL=59.86kg	² Template Burnup(MWd): 6.01	2.88
ROD Storage Site: INEEL	Template BOL Heavy Metal Mass (MT): 0.00012882	
	Template Decay Time: 50 years	

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	3.4276E-08	638.771	1,277.541	0.00E+00	2.19E-05	4.38E-05	0.0150	6.662E+13
Am-241	1.1458E-04	638.771	1,277.541	0.00E+00	7.32E-02	1.46E-01	0.0250	1.384E+13
Am-242m	7.9468E-09	638.771	1,277.541	0.00E+00	5.08E-06	1.02E-05	0.0375	1.200E+13
Am-243	9.8386E-10	638.771	1,277.541	0.00E+00	6.28E-07	1.26E-06	0.0575	1.291E+13
C-14	2.2978E-04	638.771	1,277.541	0.00E+00	1.47E-01	2.94E-01	0.0850	7.798E+12
Cl-36	1.2261E-06	638.771	1,277.541	0.00E+00	7.83E-04	1.57E-03	0.1250	5.059E+12
Cm-243	1.7271E-10	638.771	1,277.541	0.00E+00	1.10E-07	2.21E-07	0.2250	6.723E+12
Cm-244	1.3058E-09	638.771	1,277.541	0.00E+00	8.34E-07	1.67E-06	0.2500	6.289E+12
Co-60	9.8636E-03	638.771	1,277.541	0.00E+00	6.30E+00	1.26E+01	0.3750	2.931E+12
Cs-134	1.9617E-08	638.771	1,277.541	0.00E+00	1.25E-05	2.51E-05	0.5750	4.881E+13
Cs-135	3.0316E-05	638.771	1,277.541	0.00E+00	1.94E-02	3.87E-02	0.8500	4.819E+11
Cs-137	1.0263E+00	638.771	1,277.541	0.00E+00	6.56E+02	1.31E+03	1.2500	1.097E+12
Eu-154	2.0017E-04	638.771	1,277.541	0.00E+00	1.28E-01	2.56E-01	1.7500	1.241E+10
Eu-155	8.5957E-05	638.771	1,277.541	0.00E+00	5.49E-02	1.10E-01	2.2500	6.289E+06
Fe-55	2.2646E-05	638.771	1,277.541	0.00E+00	1.45E-02	2.89E-02	2.7500	8.565E-05
H-3	1.0835E-03	638.771	1,277.541	0.00E+00	6.92E-01	1.38E+00	3.5000	8.689E+01
I-129	7.3195E-07	638.771	1,277.541	0.00E+00	4.68E-04	9.35E-04	5.0000	3.597E+01
Kr-85	1.5661E-02	638.771	1,277.541	0.00E+00	1.00E+01	2.00E+01	7.0000	3.986E+00
Np-237	1.1494E-06	638.771	1,277.541	0.00E+00	7.34E-04	1.47E-03	11.0000	4.482E-01
Pa-231	5.8070E-08	638.771	1,277.541	0.00E+00	3.71E-05	7.42E-05		
Pb-210	1.2985E-12	638.771	1,277.541	0.00E+00	8.29E-10	1.66E-09		
Pm-147	2.2196E-05	638.771	1,277.541	0.00E+00	1.42E-02	2.84E-02		
Pu-238	2.6223E-04	638.771	1,277.541	0.00E+00	1.68E-01	3.35E-01		
Pu-239	6.6739E-04	638.771	1,277.541	0.00E+00	4.26E-01	8.53E-01		
Pu-240	8.6705E-05	638.771	1,277.541	0.00E+00	5.54E-02	1.11E-01		
Pu-241	3.4759E-04	638.771	1,277.541	0.00E+00	2.22E-01	4.44E-01		
Pu-242	1.9717E-09	638.771	1,277.541	0.00E+00	1.26E-06	2.52E-06		
Ra-226	3.0000E-12	638.771	1,277.541	0.00E+00	1.92E-09	3.83E-09		
Ra-228	8.3328E-12	638.771	1,277.541	0.00E+00	5.32E-09	1.06E-08		
Ru-106	6.1464E-15	638.771	1,277.541	0.00E+00	3.93E-12	7.85E-12		
Se-79	1.3221E-05	638.771	1,277.541	0.00E+00	8.45E-03	1.69E-02		
Sn-126	1.1491E-05	638.771	1,277.541	0.00E+00	7.34E-03	1.47E-02		
Sr-90	9.5541E-01	638.771	1,277.541	0.00E+00	6.10E+02	1.22E+03		
Tc-99	4.6656E-04	638.771	1,277.541	0.00E+00	2.98E-01	5.96E-01		
Th-229	1.9085E-11	638.771	1,277.541	0.00E+00	1.22E-08	2.44E-08		
Th-230	2.1913E-10	638.771	1,277.541	0.00E+00	1.40E-07	2.80E-07		
Th-232	8.3478E-12	638.771	1,277.541	0.00E+00	5.33E-09	1.07E-08		
Tl-208	1.8752E-08	638.771	1,277.541	0.00E+00	1.20E-05	2.40E-05		
U-232	5.0782E-08	638.771	1,277.541	0.00E+00	3.24E-05	6.49E-05		
U-233	3.2596E-09	638.771	1,277.541	0.00E+00	2.08E-06	4.16E-06		
U-234	3.9817E-07	638.771	1,277.541	0.00E+00	2.54E-04	5.09E-04		
U-235	2.7761E-06	638.771	0.000	1.21E-01	1.19E-01	1.21E-01		
U-236	1.6190E-05	638.771	1,277.541	0.00E+00	1.03E-02	2.07E-02		
U-238	-2.8547E-09	638.771	0.000	1.59E-03	1.58E-03	1.59E-03		
Y-90	9.5557E-01	638.771	1,277.541	0.00E+00	6.10E+02	1.22E+03		
Other Radionuclides					7.79E+02	1.56E+03		

Thermal Power		
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
7.46E+00	1.49E+01	
Total	Total	

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 cladding (SST is conservative).
Fuel Cladding:	HASTELLOY-X	SST	
BOL HM Constituents:	UO2-BaO2	U	
BOL Enrichment %:	92.20234775	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		638.771	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		1,277.541	

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.23	
Bounding:	0.45	
		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: GCRE (1Z SERIES)
 SNF ID #: 916
 Fuel Units & Descr: 3 - 4 CONCENTRIC TUBES
 Heavy Metal Mass: BOL=1.07kg ; EOL=1.02kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1960
 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: 50 years

Estimated
 Canister usage:
 18"x10"
 0.08

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	3.4276E-08	46.193	92.387	0.00E+00	1.58E-06	3.17E-06	Avg. MeV	
Am-241	1.1458E-04	46.193	92.387	0.00E+00	5.29E-03	1.06E-02	0.0150	4.817E+12
Am-242m	7.9468E-09	46.193	92.387	0.00E+00	3.67E-07	7.34E-07	0.0250	1.001E+12
Am-243	9.8386E-10	46.193	92.387	0.00E+00	4.54E-08	9.09E-08	0.0375	8.680E+11
C-14	2.2978E-04	46.193	92.387	0.00E+00	1.06E-02	2.12E-02	0.0575	9.396E+11
Cl-36	1.2261E-06	46.193	92.387	0.00E+00	5.66E-05	1.13E-04	0.0850	5.639E+11
Cm-243	1.7271E-10	46.193	92.387	0.00E+00	7.98E-09	1.60E-08	0.1250	3.658E+11
Cm-244	1.3058E-09	46.193	92.387	0.00E+00	6.03E-08	1.21E-07	0.2250	4.860E+11
Co-60	9.8636E-03	46.193	92.387	0.00E+00	4.56E-01	9.11E-01	0.3750	2.120E+11
Cs-134	1.9617E-08	46.193	92.387	0.00E+00	9.06E-07	1.81E-06	0.5750	3.529E+12
Cs-135	3.0316E-05	46.193	92.387	0.00E+00	1.40E-03	2.80E-03	0.8500	3.485E+10
Cs-137	1.0263E+00	46.193	92.387	0.00E+00	4.74E+01	9.48E+01	1.2500	7.937E+10
Eu-154	2.0017E-04	46.193	92.387	0.00E+00	9.25E-03	1.85E-02	1.7500	8.975E+08
Eu-155	8.5957E-05	46.193	92.387	0.00E+00	3.97E-03	7.94E-03	2.2500	4.548E+05
Fe-55	2.2646E-05	46.193	92.387	0.00E+00	1.05E-03	2.09E-03	2.7500	6.194E+04
H-3	1.0835E-03	46.193	92.387	0.00E+00	5.01E-02	1.00E-01	3.5000	5.571E+00
I-129	7.3195E-07	46.193	92.387	0.00E+00	3.38E-05	6.76E-05	5.0000	2.301E+00
Kr-85	1.5661E-02	46.193	92.387	0.00E+00	7.23E-01	1.45E+00	7.0000	2.543E-01
Np-237	1.1494E-06	46.193	92.387	0.00E+00	5.31E-05	1.06E-04	11.0000	2.855E-02
Pa-231	5.8070E-08	46.193	92.387	0.00E+00	2.68E-06	5.36E-06		
Pb-210	1.2985E-12	46.193	92.387	0.00E+00	6.00E-11	1.20E-10		
Pm-147	2.2196E-05	46.193	92.387	0.00E+00	1.03E-03	2.05E-03		
Pu-238	2.6223E-04	46.193	92.387	0.00E+00	1.21E-02	2.42E-02		
Pu-239	6.6739E-04	46.193	92.387	0.00E+00	3.08E-02	6.17E-02		
Pu-240	8.6705E-05	46.193	92.387	0.00E+00	4.01E-03	8.01E-03		
Pu-241	3.4759E-04	46.193	92.387	0.00E+00	1.61E-02	3.21E-02		
Pu-242	1.9717E-09	46.193	92.387	0.00E+00	9.11E-08	1.82E-07		
Ra-226	3.0000E-12	46.193	92.387	0.00E+00	1.39E-10	2.77E-10		
Ra-228	8.3328E-12	46.193	92.387	0.00E+00	3.85E-10	7.70E-10		
Ru-106	6.1464E-15	46.193	92.387	0.00E+00	2.84E-13	5.68E-13		
Se-79	1.3221E-05	46.193	92.387	0.00E+00	6.11E-04	1.22E-03		
Sn-126	1.1491E-05	46.193	92.387	0.00E+00	5.31E-04	1.06E-03		
Sr-90	9.5541E-01	46.193	92.387	0.00E+00	4.41E+01	8.83E+01		
Tc-99	4.6656E-04	46.193	92.387	0.00E+00	2.16E-02	4.31E-02		
Th-229	1.9085E-11	46.193	92.387	0.00E+00	8.82E-10	1.76E-09		
Th-230	2.1913E-10	46.193	92.387	0.00E+00	1.01E-08	2.02E-08		
Th-232	8.3478E-12	46.193	92.387	0.00E+00	3.86E-10	7.71E-10		
Tl-208	1.8752E-08	46.193	92.387	0.00E+00	8.66E-07	1.73E-06		
U-232	5.0782E-08	46.193	92.387	0.00E+00	2.35E-06	4.69E-06		
U-233	3.2596E-09	46.193	92.387	0.00E+00	1.51E-07	3.01E-07		
U-234	3.9817E-07	46.193	92.387	0.00E+00	1.84E-05	3.68E-05		
U-235	-2.7761E-06	46.193	0.000	2.16E-03	2.03E-03	2.16E-03		
U-236	1.6190E-05	46.193	92.387	0.00E+00	7.48E-04	1.50E-03		
U-238	-2.8547E-09	46.193	0.000	2.27E-05	2.26E-05	2.27E-05		
Y-90	9.5557E-01	46.193	92.387	0.00E+00	4.41E+01	8.83E+01		
Other Radionuclides					5.63E+01	1.13E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.39E-01	1.08E+00
Total	Total

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:	SST (316L)	SST	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	93.67088608	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		46.193	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		92.387	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.93		1.00
Bounding:	1.86		

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: GCRE CAN (1B-8T 1&2)
 SNF ID #: 94
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=91kg ; EOL=.91kg
 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"
 0.08

II. Estimates							Gamma Sources	
	m	x _a	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	2.3344E-08	17.155	34.310	0.00E+00	4.00E-07	8.01E-07		
Am-241	1.1135E-04	17.155	34.310	0.00E+00	1.91E-03	3.82E-03	0.0150	2.561E+12
Am-242m	8.5075E-09	17.155	34.310	0.00E+00	1.46E-07	2.92E-07	0.0250	5.322E+11
Am-243	9.8519E-10	17.155	34.310	0.00E+00	1.69E-08	3.38E-08	0.0375	4.603E+11
C-14	2.3012E-04	17.155	34.310	0.00E+00	3.95E-03	7.90E-03	0.0575	4.961E+11
Cl-36	1.2261E-06	17.155	34.310	0.00E+00	2.10E-05	4.21E-05	0.0850	2.998E+11
Cm-243	2.4875E-10	17.155	34.310	0.00E+00	4.27E-09	8.53E-09	0.1250	1.946E+11
Cm-244	2.3178E-09	17.155	34.310	0.00E+00	3.98E-08	7.95E-08	0.2250	2.581E+11
Co-60	7.0849E-02	17.155	34.310	0.00E+00	1.22E+00	2.43E+00	0.3750	1.125E+11
Cs-134	3.0266E-06	17.155	34.310	0.00E+00	5.19E-05	1.04E-04	0.5750	1.854E+12
Cs-135	3.0316E-05	17.155	34.310	0.00E+00	5.20E-04	1.04E-03	0.8500	1.877E+10
Cs-137	1.4511E+00	17.155	34.310	0.00E+00	2.49E+01	4.98E+01	1.2500	1.865E+11
Eu-154	6.6955E-04	17.155	34.310	0.00E+00	1.15E-02	2.30E-02	1.7500	4.842E+08
Eu-155	6.9850E-04	17.155	34.310	0.00E+00	1.20E-02	2.40E-02	2.2500	1.005E+06
Fe-55	1.2318E-03	17.155	34.310	0.00E+00	2.11E-02	4.23E-02	2.7500	2.905E+04
H-3	2.5141E-03	17.155	34.310	0.00E+00	4.31E-02	8.63E-02	3.5000	2.206E+00
I-129	7.3195E-07	17.155	34.310	0.00E+00	1.26E-05	2.51E-05	5.0000	9.087E-01
Kr-85	4.1281E-02	17.155	34.310	0.00E+00	7.08E-01	1.42E+00	7.0000	1.005E-01
Np-237	1.1489E-06	17.155	34.310	0.00E+00	1.97E-05	3.94E-05	11.0000	1.129E-02
Pa-231	4.5241E-08	17.155	34.310	0.00E+00	7.76E-07	1.55E-06		
Pb-210	6.4476E-13	17.155	34.310	0.00E+00	1.11E-11	2.21E-11		
Pm-147	1.1651E-03	17.155	34.310	0.00E+00	2.00E-02	4.00E-02		
Pu-238	2.9517E-04	17.155	34.310	0.00E+00	5.06E-03	1.01E-02		
Pu-239	6.6772E-04	17.155	34.310	0.00E+00	1.15E-02	2.29E-02		
Pu-240	8.6839E-05	17.155	34.310	0.00E+00	1.49E-03	2.98E-03		
Pu-241	7.1514E-04	17.155	34.310	0.00E+00	1.23E-02	2.45E-02		
Pu-242	1.9717E-09	17.155	34.310	0.00E+00	3.38E-08	6.76E-08		
Ra-226	1.7654E-12	17.155	34.310	0.00E+00	3.03E-11	6.06E-11		
Ra-228	8.2928E-12	17.155	34.310	0.00E+00	1.42E-10	2.85E-10		
Ru-106	1.8419E-10	17.155	34.310	0.00E+00	3.16E-09	6.32E-09		
Se-79	1.3223E-05	17.155	34.310	0.00E+00	2.27E-04	4.54E-04		
Sn-126	1.1493E-05	17.155	34.310	0.00E+00	1.97E-04	3.94E-04		
Sr-90	1.3649E+00	17.155	34.310	0.00E+00	2.34E+01	4.68E+01		
Tc-99	4.6656E-04	17.155	34.310	0.00E+00	8.00E-03	1.60E-02		
Th-229	1.4547E-11	17.155	34.310	0.00E+00	2.50E-10	4.99E-10		
Th-230	1.6617E-10	17.155	34.310	0.00E+00	2.85E-09	5.70E-09		
Th-232	8.3361E-12	17.155	34.310	0.00E+00	1.43E-10	2.86E-10		
Tl-208	2.1664E-08	17.155	34.310	0.00E+00	3.72E-07	7.43E-07		
U-232	5.8669E-08	17.155	34.310	0.00E+00	1.01E-06	2.01E-06		
U-233	3.1847E-09	17.155	34.310	0.00E+00	5.46E-08	1.09E-07		
U-234	3.8769E-07	17.155	34.310	0.00E+00	6.65E-06	1.33E-05		
U-235	-2.7761E-06	17.155	0.000	1.83E-03	1.78E-03	1.83E-03		
U-236	1.6190E-05	17.155	34.310	0.00E+00	2.78E-04	5.55E-04		
U-238	-2.8547E-09	17.155	0.000	2.05E-05	2.05E-05	2.05E-05		
Y-90	1.3652E+00	17.155	34.310	0.00E+00	2.34E+01	4.68E+01		
Other Radionuclides					2.83E+01	5.66E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.00E-01	5.99E-01
Total	Total

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 cladding (SST is conservative).
Fuel Cladding:	NONE	SST	
BOL HM Constituents:	UO2-BeO2	U	
BOL Enrichment %:	93.28193833	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		17.155	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup assumed to be twice nominal burnup.
Bounding:		34.310	

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.40	
Bounding:	0.81	
		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: GCRE PELLETS (1B-7T-1)
 SNF ID #: 95
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=.07kg ; EOL=.07kg
 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"
 0.08

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3344E-08	1.396	2.792	0.00E+00	3.26E-08	6.52E-08	Avg. MeV	
Am-241	1.1135E-04	1.396	2.792	0.00E+00	1.55E-04	3.11E-04	0.0150	2.084E+11
Am-242m	8.5075E-09	1.396	2.792	0.00E+00	1.19E-08	2.38E-08	0.0250	4.331E+10
Am-243	9.8519E-10	1.396	2.792	0.00E+00	1.38E-09	2.75E-09	0.0375	3.746E+10
C-14	2.3012E-04	1.396	2.792	0.00E+00	3.21E-04	6.43E-04	0.0575	4.038E+10
Cl-36	1.2261E-06	1.396	2.792	0.00E+00	1.71E-06	3.42E-06	0.0850	2.440E+10
Cm-243	2.4875E-10	1.396	2.792	0.00E+00	3.47E-10	6.95E-10	0.1250	1.584E+10
Cm-244	2.3178E-09	1.396	2.792	0.00E+00	3.24E-09	6.47E-09	0.2250	2.100E+10
Co-60	7.0849E-02	1.396	2.792	0.00E+00	9.89E-02	1.98E-01	0.3750	9.160E+09
Cs-134	3.0266E-06	1.396	2.792	0.00E+00	4.23E-06	8.45E-06	0.5750	1.509E+11
Cs-135	3.0316E-05	1.396	2.792	0.00E+00	4.23E-05	8.47E-05	0.8500	1.527E+09
Cs-137	1.4511E+00	1.396	2.792	0.00E+00	2.03E+00	4.05E+00	1.2500	1.518E+10
Eu-154	6.6955E-04	1.396	2.792	0.00E+00	9.35E-04	1.87E-03	1.7500	3.941E+07
Eu-155	6.9850E-04	1.396	2.792	0.00E+00	9.75E-04	1.95E-03	2.2500	8.180E+04
Fe-55	1.2318E-03	1.396	2.792	0.00E+00	1.72E-03	3.44E-03	2.7500	2.364E+03
H-3	2.5141E-03	1.396	2.792	0.00E+00	3.51E-03	7.02E-03	3.5000	1.798E-01
I-129	7.3195E-07	1.396	2.792	0.00E+00	1.02E-06	2.04E-06	5.0000	7.405E-02
Kr-85	4.1281E-02	1.396	2.792	0.00E+00	5.76E-02	1.15E-01	7.0000	8.190E-03
Np-237	1.1489E-06	1.396	2.792	0.00E+00	1.60E-06	3.21E-06	11.0000	9.198E-04
Pa-231	4.5241E-08	1.396	2.792	0.00E+00	6.32E-08	1.26E-07		
Pb-210	6.4476E-13	1.396	2.792	0.00E+00	9.00E-13	1.80E-12		
Pm-147	1.1651E-03	1.396	2.792	0.00E+00	1.63E-03	3.25E-03		
Pu-238	2.9517E-04	1.396	2.792	0.00E+00	4.12E-04	8.24E-04		
Pu-239	6.6772E-04	1.396	2.792	0.00E+00	9.32E-04	1.86E-03		
Pu-240	8.6839E-05	1.396	2.792	0.00E+00	1.21E-04	2.42E-04		
Pu-241	7.1514E-04	1.396	2.792	0.00E+00	9.98E-04	2.00E-03		
Pu-242	1.9717E-09	1.396	2.792	0.00E+00	2.75E-09	5.51E-09		
Ra-226	1.7654E-12	1.396	2.792	0.00E+00	2.46E-12	4.93E-12		
Ra-228	8.2928E-12	1.396	2.792	0.00E+00	1.16E-11	2.32E-11		
Ru-106	1.8419E-10	1.396	2.792	0.00E+00	2.57E-10	5.14E-10		
Se-79	1.3223E-05	1.396	2.792	0.00E+00	1.85E-05	3.69E-05		
Sn-126	1.1493E-05	1.396	2.792	0.00E+00	1.60E-05	3.21E-05		
Sr-90	1.3649E+00	1.396	2.792	0.00E+00	1.91E+00	3.81E+00		
Tc-99	4.6656E-04	1.396	2.792	0.00E+00	6.51E-04	1.30E-03		
Th-229	1.4547E-11	1.396	2.792	0.00E+00	2.03E-11	4.06E-11		
Th-230	1.6617E-10	1.396	2.792	0.00E+00	2.32E-10	4.64E-10		
Th-232	8.3361E-12	1.396	2.792	0.00E+00	1.16E-11	2.33E-11		
Tl-208	2.1664E-08	1.396	2.792	0.00E+00	3.02E-08	6.05E-08		
U-232	5.8669E-08	1.396	2.792	0.00E+00	8.19E-08	1.64E-07		
U-233	3.1847E-09	1.396	2.792	0.00E+00	4.45E-09	8.89E-09		
U-234	3.8769E-07	1.396	2.792	0.00E+00	5.41E-07	1.08E-06		
U-235	-2.7761E-06	1.396	0.000	1.49E-04	1.45E-04	1.49E-04		
U-236	1.6190E-05	1.396	2.792	0.00E+00	2.26E-05	4.52E-05		
U-238	-2.8547E-09	1.396	0.000	1.71E-06	1.71E-06	1.71E-06		
Y-90	1.3652E+00	1.396	2.792	0.00E+00	1.91E+00	3.81E+00		
Other Radionuclides					2.30E+00	4.61E+00		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.44E-02	4.88E-02
Total	Total

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 (SST is conservative).
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	NONE	SST	
BOL HM Constituents:	U02-BeO2	U	
BOL Enrichment %:	93.09997294	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		1.396	Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding:		2.792	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.40		0.98
Bounding:	0.81		

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: GE TEST
 SNF ID #: 96
 Fuel Units & Descr: 22 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL = : EOL=45.20kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1972
 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: 35 years

Estimated
 Canister usage:
 HIC
 2.00

Radionuclide	II. Estimates			Gamma Sources				
	m	x _n	x _b	b	y _n	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	6.1822E-12	45,119.376	45,119.376	0.00E+00	2.79E-07	2.79E-07	0.0150	1.459E+15
Am-241	1.1066E-01	45,119.376	45,119.376	1.74E+02	5.17E+03	5.17E+03	0.0250	2.932E+14
Am-242m	1.9247E-03	45,119.376	45,119.376	0.00E+00	8.68E+01	8.68E+01	0.0375	3.409E+14
Am-243	1.0740E-04	45,119.376	45,119.376	0.00E+00	4.85E+00	4.85E+00	0.0575	3.352E+14
C-14	2.6042E-05	45,119.376	45,119.376	0.00E+00	1.17E+00	1.17E+00	0.0850	1.633E+14
Cl-36	3.4243E-10	45,119.376	45,119.376	0.00E+00	1.55E-05	1.55E-05	0.1250	1.149E+14
Cm-243	4.0629E-04	45,119.376	45,119.376	0.00E+00	1.83E+01	1.83E+01	0.2250	1.318E+14
Cm-244	1.6024E-03	45,119.376	45,119.376	0.00E+00	7.23E+01	7.23E+01	0.3750	5.711E+13
Co-60	3.4283E-03	45,119.376	45,119.376	0.00E+00	1.55E+02	1.55E+02	0.7500	2.315E+15
Cs-134	1.5565E-03	45,119.376	45,119.376	0.00E+00	7.02E+01	7.02E+01	0.8500	2.418E+13
Cs-135	4.7693E-05	45,119.376	45,119.376	0.00E+00	2.15E+00	2.15E+00	1.2500	2.895E+13
Cs-137	1.4007E+00	45,119.376	45,119.376	0.00E+00	6.32E+04	6.32E+04	1.7500	6.548E+11
Eu-154	1.6184E-02	45,119.376	45,119.376	0.00E+00	7.30E+02	7.30E+02	2.2500	1.296E+08
Eu-155	1.3775E-02	45,119.376	45,119.376	0.00E+00	6.22E+02	6.22E+02	2.7500	7.467E+08
Fe-55	3.8035E-04	45,119.376	45,119.376	0.00E+00	1.72E+01	1.72E+01	3.5000	2.70E+06
H-3	3.8454E-03	45,119.376	45,119.376	0.00E+00	1.74E+02	1.74E+02	5.0000	8.764E+05
I-129	1.2891E-06	45,119.376	45,119.376	0.00E+00	5.82E-02	5.82E-02	7.0000	1.001E+05
Kr-85	2.7858E-02	45,119.376	45,119.376	0.00E+00	1.26E+03	1.26E+03	11.0000	1.145E+04
Np-237	3.7516E-06	45,119.376	45,119.376	0.00E+00	1.69E-01	1.69E-01		
Pa-231	1.2488E-11	45,119.376	45,119.376	0.00E+00	5.63E-07	5.63E-07		
Pb-210	2.4206E-12	45,119.376	45,119.376	0.00E+00	1.09E-07	1.09E-07		
Pm-147	1.5671E-02	45,119.376	45,119.376	0.00E+00	7.07E+02	7.07E+02		
Pu-238	1.4877E-02	45,119.376	45,119.376	0.00E+00	6.71E+02	6.71E+02		
Pu-239	-3.5520E-02	45,119.376	0.000	1.43E+03	0.00E+00	1.43E+03		
Pu-240	2.0690E-02	45,119.376	45,119.376	7.27E+02	1.66E+03	1.66E+03		
Pu-241	-1.4799E-00	45,119.376	0.000	3.26E+04	0.00E+00	3.26E+04		
Pu-242	1.1252E-05	45,119.376	45,119.376	1.94E-01	7.02E-01	7.02E-01		
Ra-226	7.8524E-12	45,119.376	45,119.376	0.00E+00	3.54E-07	3.54E-07		
Ra-228	2.4086E-16	45,119.376	45,119.376	0.00E+00	1.09E-11	1.09E-11		
Ru-106	1.5066E-05	45,119.376	45,119.376	0.00E+00	6.80E-01	6.80E-01		
Se-79	1.0127E-05	45,119.376	45,119.376	0.00E+00	4.57E-01	4.57E-01		
Sn-126	4.3902E-05	45,119.376	45,119.376	0.00E+00	1.98E+00	1.98E+00		
Sr-90	5.0088E-01	45,119.376	45,119.376	0.00E+00	2.26E+04	2.26E+04		
Tc-99	3.9412E-04	45,119.376	45,119.376	0.00E+00	1.78E+01	1.78E+01		
Th-229	2.7219E-12	45,119.376	45,119.376	0.00E+00	1.23E-07	1.23E-07		
Th-230	1.0441E-09	45,119.376	45,119.376	0.00E+00	4.71E-05	4.71E-05		
Th-232	3.1689E-16	45,119.376	45,119.376	0.00E+00	1.43E-11	1.43E-11		
Tl-208	4.6636E-07	45,119.376	45,119.376	0.00E+00	2.10E-02	2.10E-02		
U-232	1.2638E-06	45,119.376	45,119.376	0.00E+00	5.70E-02	5.70E-02		
U-233	5.7451E-10	45,119.376	45,119.376	0.00E+00	2.59E-05	2.59E-05		
U-234	4.3044E-06	45,119.376	45,119.376	0.00E+00	1.94E-01	1.94E-01		
U-235	-7.7765E-09	45,119.376	0.000	2.94E-04	0.00E+00	2.94E-04		
U-236	1.8050E-07	45,119.376	45,119.376	0.00E+00	8.14E-03	8.14E-03		
U-238	-1.7914E-07	45,119.376	0.000	2.14E-02	1.33E-02	2.14E-02		
Y-90	5.0088E-01	45,119.376	45,119.376	0.00E+00	2.26E+04	2.26E+04		
Other Radionuclides					6.39E+04	6.39E+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) and cladding (SST is conservative).
Reactor Moderator:	From SFD: FAST	Used: FAST	
Fuel Cladding:	ZIRC-2	SST	
BOL HM Constituents:	PuO2-UO2	Pu and U	
BOL Enrichment %:		10 to 30	

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:		45,119.376	
Bounding:		45,119.376	

Checks			Estimated EOL HM/Given EOL HM 1.05
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	3.28		
Bounding:	3.28		

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: GENTR
 SNF ID #: 97
 Fuel Units & Descr: 16 - STACKED DISKS
 Heavy Metal Mass: BOL=3.98kg ; EOL=3.98kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2035
 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"
 0.44

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	7.576	15.152	0.00E+00	1.10E-09	2.20E-09	0.0150	2.924E+12
Am-241	1.1190E-03	7.576	15.152	0.00E+00	8.48E-03	1.70E-02	0.0250	6.298E+11
Am-242m	4.5425E-07	7.576	15.152	0.00E+00	3.44E-06	6.88E-06	0.0375	5.812E+11
Am-243	1.4921E-06	7.576	15.152	0.00E+00	1.13E-05	2.26E-05	0.0575	5.714E+11
C-14	5.7244E-09	7.576	15.152	0.00E+00	4.34E-08	8.67E-08	0.0850	3.643E+11
Ci-36	1.3124E-32	7.576	15.152	0.00E+00	9.94E-32	1.99E-31	0.1250	3.155E+11
Cm-243	2.3676E-07	7.576	15.152	0.00E+00	1.79E-06	3.59E-06	0.2250	3.089E+11
Cm-244	5.2042E-05	7.576	15.152	0.00E+00	3.94E-04	7.89E-04	0.3750	1.495E+11
Co-60	3.8208E-05	7.576	15.152	0.00E+00	2.89E-04	5.79E-04	0.5750	2.053E+12
Cs-134	4.8693E-01	7.576	15.152	0.00E+00	3.69E+00	7.38E+00	0.8500	2.875E+11
Cs-135	3.4477E-06	7.576	15.152	0.00E+00	2.61E-05	5.22E-05	1.2500	5.349E+10
Cs-137	2.8731E+00	7.576	15.152	0.00E+00	2.18E+01	4.35E+01	1.7500	2.249E+09
Eu-154	8.2053E-02	7.576	15.152	0.00E+00	6.22E-01	1.24E+00	2.2500	4.705E+09
Eu-155	3.9134E-02	7.576	15.152	0.00E+00	2.96E-01	5.93E-01	2.7500	2.707E+07
Fe-55	6.7429E-03	7.576	15.152	0.00E+00	5.11E-02	1.02E-01	3.5000	3.003E+06
H-3	1.0599E-02	7.576	15.152	0.00E+00	8.03E-02	1.61E-01	5.0000	9.269E+00
I-129	7.5300E-07	7.576	15.152	0.00E+00	5.70E-06	1.14E-05	7.0000	1.034E+01
Kr-85	2.8595E-01	7.576	15.152	0.00E+00	2.17E+00	4.33E+00	11.0000	1.165E-01
Np-237	9.5479E-06	7.576	15.152	0.00E+00	7.23E-05	1.45E-04		
Pa-231	8.9297E-10	7.576	15.152	0.00E+00	6.77E-09	1.35E-08		
Pb-210	3.7609E-12	7.576	15.152	0.00E+00	2.85E-11	5.70E-11		
Pm-147	2.5452E+00	7.576	15.152	0.00E+00	1.93E+01	3.86E+01		
Pu-238	2.0550E-02	7.576	15.152	0.00E+00	1.56E-01	3.11E-01		
Pu-239	4.2838E-04	7.576	15.152	0.00E+00	3.25E-03	6.49E-03		
Pu-240	2.4401E-04	7.576	15.152	0.00E+00	1.85E-03	3.70E-03		
Pu-241	6.8764E-02	7.576	15.152	0.00E+00	5.21E-01	1.04E+00		
Pu-242	3.6329E-07	7.576	15.152	0.00E+00	2.75E-06	5.50E-06		
Ra-226	3.8045E-11	7.576	15.152	0.00E+00	2.88E-10	5.76E-10		
Ra-228	2.9902E-15	7.576	15.152	0.00E+00	2.27E-14	4.53E-14		
Ru-106	1.9055E-01	7.576	15.152	0.00E+00	1.44E+00	2.89E+00		
Se-79	1.2936E-05	7.576	15.152	0.00E+00	9.80E-05	1.96E-04		
Sn-126	1.1574E-05	7.576	15.152	0.00E+00	8.77E-05	1.75E-04		
Sr-90	2.7505E+00	7.576	15.152	0.00E+00	2.08E+01	4.17E+01		
Tc-99	4.2239E-04	7.576	15.152	0.00E+00	3.20E-03	6.40E-03		
Th-229	1.8848E-12	7.576	15.152	0.00E+00	1.43E-11	2.86E-11		
Th-230	1.7042E-08	7.576	15.152	0.00E+00	1.29E-07	2.58E-07		
Th-232	7.8132E-15	7.576	15.152	0.00E+00	5.92E-14	1.18E-13		
Ti-208	4.4063E-08	7.576	15.152	0.00E+00	3.34E-07	6.68E-07		
U-232	1.3151E-07	7.576	15.152	0.00E+00	9.96E-07	1.99E-06		
U-233	1.9564E-09	7.576	15.152	0.00E+00	1.48E-08	2.96E-08		
U-234	1.8371E-04	7.576	15.152	0.00E+00	1.39E-03	2.78E-03		
U-235	-2.7235E-06	7.576	0.000	8.10E-03	8.08E-03	8.10E-03		
U-236	1.5493E-05	7.576	15.152	0.00E+00	1.17E-04	2.35E-04		
U-238	-4.2851E-09	7.576	0.000	8.13E-05	8.13E-05	8.13E-05		
Y-90	2.7505E+00	7.576	15.152	0.00E+00	2.08E+01	4.17E+01		
Other Radionuclides					3.90E+01	7.79E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.84E-01	7.68E-01
Total	Total

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 (1100)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	93.93787575	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		7.576	
Bounding:		15.152	

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:	0.01		
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: GETR FILTERS
 SNF ID #: 98
 Fuel Units & Descr: 70 - FILTERS
 Heavy Metal Mass: BOL=4.54kg ; EOL=4.42kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1977
 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: 25 years

Estimated
 Canister usage:
 HIC
 1.56

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	1.3562E-08	119.026	238.051	0.00E+00	1.61E-06	3.23E-06		
Am-241	1.0168E-04	119.026	238.051	0.00E+00	1.21E-02	2.42E-02	0.0150	2.265E+13
Am-242m	8.9052E-09	119.026	238.051	0.00E+00	1.06E-06	2.12E-06	0.0250	4.706E+12
Am-243	9.8602E-10	119.026	238.051	0.00E+00	1.17E-07	2.35E-07	0.0375	4.062E+12
C-14	2.3045E-04	119.026	238.051	0.00E+00	2.74E-02	5.49E-02	0.0575	4.383E+12
Cl-36	1.2261E-06	119.026	238.051	0.00E+00	1.46E-04	2.92E-04	0.0850	2.650E+12
Cm-243	3.1730E-10	119.026	238.051	0.00E+00	3.78E-08	7.55E-08	0.1250	1.722E+12
Cm-244	3.3977E-09	119.026	238.051	0.00E+00	4.04E-07	8.09E-07	0.2250	2.274E+12
Co-60	2.6373E-01	119.026	238.051	0.00E+00	3.14E+01	6.28E+01	0.3750	9.926E+11
Cs-134	8.7072E-05	119.026	238.051	0.00E+00	1.04E-02	2.07E-02	0.5750	1.621E+13
Cs-135	3.0316E-05	119.026	238.051	0.00E+00	3.61E-03	7.22E-03	0.8500	1.690E+11
Cs-137	1.8286E+00	119.026	238.051	0.00E+00	2.18E+02	4.35E+02	1.2500	4.708E+12
Eu-154	1.4982E-03	119.026	238.051	0.00E+00	1.78E-01	3.57E-01	1.7500	4.355E+09
Eu-155	2.8236E-03	119.026	238.051	0.00E+00	3.36E-01	6.72E-01	2.2500	2.508E+07
Fe-55	1.7687E-02	119.026	238.051	0.00E+00	2.11E+00	4.21E+00	2.7500	2.760E+05
H-3	4.4043E-03	119.026	238.051	0.00E+00	5.24E-01	1.05E+00	3.5000	5.908E+01
I-129	7.3195E-07	119.026	238.051	0.00E+00	8.71E-05	1.74E-04	5.0000	6.231E+00
Kr-85	7.8769E-02	119.026	238.051	0.00E+00	9.38E+00	1.88E+01	7.0000	6.887E-01
Np-237	1.1484E-06	119.026	238.051	0.00E+00	1.37E-04	2.73E-04	11.0000	7.732E-02
Pa-231	3.2396E-08	119.026	238.051	0.00E+00	3.86E-06	7.71E-06		
Pb-210	2.4409E-13	119.026	238.051	0.00E+00	2.91E-11	5.81E-11		
Pm-147	1.6331E-02	119.026	238.051	0.00E+00	1.94E+00	3.89E+00		
Pu-238	3.1947E-04	119.026	238.051	0.00E+00	3.80E-02	7.60E-02		
Pu-239	6.6789E-04	119.026	238.051	0.00E+00	7.95E-02	1.59E-01		
Pu-240	8.6922E-05	119.026	238.051	0.00E+00	1.03E-02	2.07E-02		
Pu-241	1.1567E-03	119.026	238.051	0.00E+00	1.38E-01	2.75E-01		
Pu-242	1.9717E-09	119.026	238.051	0.00E+00	2.35E-07	4.69E-07		
Ra-226	8.6190E-13	119.026	238.051	0.00E+00	1.03E-10	2.05E-10		
Ra-228	8.1498E-12	119.026	238.051	0.00E+00	9.70E-10	1.94E-09		
Ru-106	1.7770E-07	119.026	238.051	0.00E+00	2.12E-05	4.23E-05		
Se-79	1.3225E-05	119.026	238.051	0.00E+00	1.57E-03	3.15E-03		
Sn-126	1.1493E-05	119.026	238.051	0.00E+00	1.37E-03	2.74E-03		
Sr-90	1.7321E+00	119.026	238.051	0.00E+00	2.06E+02	4.12E+02		
Tc-99	4.6656E-04	119.026	238.051	0.00E+00	5.55E-02	1.11E-01		
Th-229	1.0110E-11	119.026	238.051	0.00E+00	1.20E-09	2.41E-09		
Th-230	1.1466E-10	119.026	238.051	0.00E+00	1.36E-08	2.73E-08		
Th-232	8.3245E-12	119.026	238.051	0.00E+00	9.91E-10	1.98E-09		
Tl-208	2.3860E-08	119.026	238.051	0.00E+00	2.84E-06	5.68E-06		
U-232	6.4576E-08	119.026	238.051	0.00E+00	7.69E-06	1.54E-05		
U-233	3.1082E-09	119.026	238.051	0.00E+00	3.70E-07	7.40E-07		
U-234	3.7587E-07	119.026	238.051	0.00E+00	4.47E-05	8.95E-05		
U-235	-2.7761E-06	119.026	0.000	9.14E-03	8.81E-03	9.14E-03		
U-236	1.6190E-05	119.026	238.051	0.00E+00	1.93E-03	3.85E-03		
U-238	-2.8547E-09	119.026	0.000	1.05E-04	1.04E-04	1.05E-04		
Y-90	1.7321E+00	119.026	238.051	0.00E+00	2.06E+02	4.12E+02		
Other Radionuclides					2.42E+02	4.83E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.95E+00	5.91E+00
Total	Total

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 cladding (SST is conservative).
Fuel Cladding:	NONE	SST	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	93.14635987	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		119.026	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		238.051	

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

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: GRR (GREECE)
 SNF ID #: 1069
 Fuel Units & Descr: 46 - MTR TYPE
 Heavy Metal Mass: BOL=7.99kg ; EOL=6.27kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1993
 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"
 1.28

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	1,629.252	3,258.504	0.00E+00	7.47E-07	1.49E-06	Avg. MeV	
Am-241	1.7832E-03	1,629.252	3,258.504	0.00E+00	2.91E+00	5.81E+00	0.0150	3.887E+14
Am-242m	4.3410E-07	1,629.252	3,258.504	0.00E+00	7.07E-04	1.41E-03	0.0250	8.107E+13
Am-243	1.4907E-06	1,629.252	3,258.504	0.00E+00	2.43E-03	4.86E-03	0.0375	7.079E+13
C-14	5.7162E-09	1,629.252	3,258.504	0.00E+00	9.31E-06	1.86E-05	0.0575	7.548E+13
Cl-36	1.3124E-32	1,629.252	3,258.504	0.00E+00	2.14E-29	4.28E-29	0.0850	4.572E+13
Cm-243	1.8568E-07	1,629.252	3,258.504	0.00E+00	3.03E-04	6.05E-04	0.1250	3.134E+13
Cm-244	3.5512E-05	1,629.252	3,258.504	0.00E+00	5.79E-02	1.16E-01	0.2250	3.939E+13
Co-60	1.0261E-05	1,629.252	3,258.504	0.00E+00	1.67E-02	3.34E-02	0.3750	1.725E+13
Cs-134	1.6931E-02	1,629.252	3,258.504	0.00E+00	2.76E+01	5.52E+01	0.5750	2.801E+14
Cs-135	3.4477E-06	1,629.252	3,258.504	0.00E+00	5.62E-03	1.12E-02	0.8500	6.653E+12
Cs-137	2.2800E+00	1,629.252	3,258.504	0.00E+00	3.71E+03	7.43E+03	1.2500	3.361E+12
Eu-154	3.6656E-02	1,629.252	3,258.504	0.00E+00	5.97E+01	1.19E+02	1.7500	1.408E+11
Eu-155	9.6841E-03	1,629.252	3,258.504	0.00E+00	1.58E+01	3.16E+01	2.2500	1.762E+08
Fe-55	4.6977E-04	1,629.252	3,258.504	0.00E+00	7.65E-01	1.53E+00	2.7500	1.059E+07
H-3	6.0485E-03	1,629.252	3,258.504	0.00E+00	9.85E+00	1.97E+01	3.5000	6.731E+05
I-129	7.5300E-07	1,629.252	3,258.504	0.00E+00	1.23E-03	2.45E-03	5.0000	1.557E+03
Kr-85	1.4989E-01	1,629.252	3,258.504	0.00E+00	2.44E+02	4.88E+02	7.0000	1.724E+02
Np-237	9.5534E-06	1,629.252	3,258.504	0.00E+00	1.56E-02	3.11E-02	11.0000	1.936E+01
Pa-231	1.6550E-09	1,629.252	3,258.504	0.00E+00	2.70E-06	5.39E-06		
Pb-210	2.6631E-11	1,629.252	3,258.504	0.00E+00	4.34E-08	8.68E-08		
Pm-147	1.8156E-01	1,629.252	3,258.504	0.00E+00	2.96E+02	5.92E+02		
Pu-238	1.8990E-02	1,629.252	3,258.504	0.00E+00	3.09E+01	6.19E+01		
Pu-239	4.2838E-04	1,629.252	3,258.504	0.00E+00	6.98E-01	1.40E+00		
Pu-240	2.4379E-04	1,629.252	3,258.504	0.00E+00	3.97E-01	7.94E-01		
Pu-241	4.2511E-02	1,629.252	3,258.504	0.00E+00	6.93E+01	1.39E+02		
Pu-242	3.6329E-07	1,629.252	3,258.504	0.00E+00	5.92E-04	1.18E-03		
Ra-226	1.4725E-10	1,629.252	3,258.504	0.00E+00	2.40E-07	4.80E-07		
Ra-228	8.9760E-15	1,629.252	3,258.504	0.00E+00	1.46E-11	2.92E-11		
Ru-106	1.9752E-04	1,629.252	3,258.504	0.00E+00	3.22E-01	6.44E-01		
Se-79	1.2933E-05	1,629.252	3,258.504	0.00E+00	2.11E-02	4.21E-02		
Sn-126	1.1574E-05	1,629.252	3,258.504	0.00E+00	1.89E-02	3.77E-02		
Sr-90	2.1680E+00	1,629.252	3,258.504	0.00E+00	3.53E+03	7.06E+03		
Tc-99	4.2239E-04	1,629.252	3,258.504	0.00E+00	6.88E-01	1.38E+00		
Th-229	3.9270E-12	1,629.252	3,258.504	0.00E+00	6.40E-09	1.28E-08		
Th-230	3.3578E-08	1,629.252	3,258.504	0.00E+00	5.47E-05	1.09E-04		
Th-232	1.5452E-14	1,629.252	3,258.504	0.00E+00	2.52E-11	5.04E-11		
Th-208	4.6705E-08	1,629.252	3,258.504	0.00E+00	7.61E-05	1.52E-04		
U-232	1.3045E-07	1,629.252	3,258.504	0.00E+00	2.13E-04	4.25E-04		
U-233	2.3739E-09	1,629.252	3,258.504	0.00E+00	3.87E-06	7.74E-06		
U-234	1.8423E-04	1,629.252	3,258.504	0.00E+00	3.00E-01	6.00E-01		
U-235	-2.7235E-06	1,629.252	0.00	1.59E-02	1.14E-02	1.59E-02		
U-236	1.5493E-05	1,629.252	3,258.504	0.00E+00	2.52E-02	5.05E-02		
U-238	-4.2851E-09	1,629.252	0.00	2.17E-04	2.10E-04	2.17E-04		
Y-90	2.1686E+00	1,629.252	3,258.504	0.00E+00	3.53E+03	7.07E+03		
Other Radionuclides					3.54E+03	7.09E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.41E+01	8.82E+01
Total	Total

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-ALX	U	
BOL Enrichment %:	91.93720219	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		1,629.252	
Bounding:		3,258.504	

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		
Bounding:	1.30		

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: GRR (GREECE)
 SNF ID #: 440
 Fuel Units & Descr: 108 - MTR TYPE
 Heavy Metal Mass: BOL=18.76kg ; EOL=14.72kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1993
 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"
 3.00

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	3,825.201	7,650.402	0.00E+00	1.75E-06	3.51E-06	Avg. MeV	
Am-241	1.7832E-03	3,825.201	7,650.402	0.00E+00	6.82E+00	1.36E+01	0.0150	9.126E+14
Am-242m	4.3410E-07	3,825.201	7,650.402	0.00E+00	1.66E-03	3.32E-03	0.0250	1.903E+14
Am-243	1.4907E-06	3,825.201	7,650.402	0.00E+00	5.70E-03	1.14E-02	0.0375	1.662E+14
C-14	5.7162E-09	3,825.201	7,650.402	0.00E+00	2.19E-05	4.37E-05	0.0575	1.772E+14
Cl-36	1.3124E-32	3,825.201	7,650.402	0.00E+00	5.02E-29	1.00E-28	0.0850	1.073E+14
Cm-243	1.8568E-07	3,825.201	7,650.402	0.00E+00	7.10E-04	1.42E-03	0.1250	7.359E+13
Cm-244	3.5512E-05	3,825.201	7,650.402	0.00E+00	1.36E-01	2.72E-01	0.2250	9.248E+13
Co-60	1.0261E-05	3,825.201	7,650.402	0.00E+00	3.93E-02	7.85E-02	0.3750	4.051E+13
Cs-134	1.6931E-02	3,825.201	7,650.402	0.00E+00	6.48E+01	1.30E+02	0.5750	6.576E+14
Cs-135	3.4477E-06	3,825.201	7,650.402	0.00E+00	1.32E-02	2.64E-02	0.8500	1.562E+13
Cs-137	2.2800E+00	3,825.201	7,650.402	0.00E+00	8.72E+03	1.74E+04	1.2500	7.891E+12
Eu-154	3.6656E-02	3,825.201	7,650.402	0.00E+00	1.40E+02	2.80E+02	1.7500	3.307E+11
Eu-155	9.6841E-03	3,825.201	7,650.402	0.00E+00	3.70E+01	7.41E+01	2.2500	4.137E+08
Fe-55	4.6977E-04	3,825.201	7,650.402	0.00E+00	1.80E+00	3.59E+00	2.7500	2.486E+07
H-3	6.0485E-03	3,825.201	7,650.402	0.00E+00	2.31E+01	4.63E+01	3.5000	1.580E+06
I-129	7.5300E-07	3,825.201	7,650.402	0.00E+00	2.88E-03	5.76E-03	5.0000	3.655E+03
Kr-85	1.4989E-01	3,825.201	7,650.402	0.00E+00	5.73E+02	1.15E+03	7.0000	4.048E+02
Np-237	9.5534E-06	3,825.201	7,650.402	0.00E+00	3.65E-02	7.31E-02	11.0000	4.545E+01
Pa-231	1.6550E-09	3,825.201	7,650.402	0.00E+00	6.33E-06	1.27E-05		
Pb-210	2.6631E-11	3,825.201	7,650.402	0.00E+00	1.02E-07	2.04E-07		
Pm-147	1.8156E-01	3,825.201	7,650.402	0.00E+00	6.95E+02	1.39E+03		
Pu-238	1.8990E-02	3,825.201	7,650.402	0.00E+00	7.26E+01	1.45E+02		
Pu-239	4.2838E-04	3,825.201	7,650.402	0.00E+00	1.64E+00	3.28E+00		
Pu-240	2.4379E-04	3,825.201	7,650.402	0.00E+00	9.33E-01	1.87E+00		
Pu-241	4.2511E-02	3,825.201	7,650.402	0.00E+00	1.63E+02	3.25E+02		
Pu-242	3.6329E-07	3,825.201	7,650.402	0.00E+00	1.39E-03	2.78E-03		
Ra-226	1.4725E-10	3,825.201	7,650.402	0.00E+00	5.63E-07	1.13E-06		
Ra-228	8.9760E-15	3,825.201	7,650.402	0.00E+00	3.43E-11	6.87E-11		
Ru-106	1.9752E-04	3,825.201	7,650.402	0.00E+00	7.56E-01	1.51E+00		
Se-79	1.2933E-05	3,825.201	7,650.402	0.00E+00	4.95E-02	9.89E-02		
Sn-126	1.1574E-05	3,825.201	7,650.402	0.00E+00	4.43E-02	8.85E-02		
Sr-90	2.1680E+00	3,825.201	7,650.402	0.00E+00	8.29E+03	1.66E+04		
Tc-99	4.2239E-04	3,825.201	7,650.402	0.00E+00	1.62E+00	3.23E+00		
Th-229	3.9270E-12	3,825.201	7,650.402	0.00E+00	1.50E-08	3.00E-08		
Th-230	3.3578E-08	3,825.201	7,650.402	0.00E+00	1.28E-04	2.57E-04		
Th-232	1.5452E-14	3,825.201	7,650.402	0.00E+00	5.91E-11	1.18E-10		
Tl-208	4.6705E-08	3,825.201	7,650.402	0.00E+00	1.79E-04	3.57E-04		
U-232	1.3045E-07	3,825.201	7,650.402	0.00E+00	4.99E-04	9.98E-04		
U-233	2.3739E-09	3,825.201	7,650.402	0.00E+00	9.08E-06	1.82E-05		
U-234	1.8423E-04	3,825.201	7,650.402	0.00E+00	7.05E-01	1.41E+00		
U-235	-2.7235E-06	3,825.201	0.000	3.73E-02	2.69E-02	3.73E-02		
U-236	1.5493E-05	3,825.201	7,650.402	0.00E+00	5.93E-02	1.19E-01		
U-238	-4.2851E-09	3,825.201	0.000	5.08E-04	4.92E-04	5.08E-04		
Y-90	2.1686E+00	3,825.201	7,650.402	0.00E+00	8.30E+03	1.66E+04	Total	Total
Other Radionuclides					8.32E+03	1.66E+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-ALX	U	
BOL Enrichment %:	91.93720219	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		3,825.201	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		7,650.402	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.65		1.02
Bounding:	1.30		

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: GTRR
 SNF ID #: 87
 Fuel Units & Desc: 25 - ASSEMBLY
 Heavy Metal Mass: BOL=5.05kg : EOL=4.47kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1996
 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"
 0.69

Radionuclide	m	x _n	x _p	b	y _n	y _p	Gamma Sources	
							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	1.3262E-10	534.240	1,068.479	0.00E+00	7.09E-08	1.42E-07	0.0150	1.460E+14
Am-241	5.9611E-03	534.240	1,068.479	0.00E+00	3.18E+00	6.37E+00	0.0250	3.044E+13
Am-242m	1.4332E-06	534.240	1,068.479	0.00E+00	7.66E-04	1.53E-03	0.0375	2.754E+13
Am-243	3.7132E-05	534.240	1,068.479	0.00E+00	1.98E-02	3.97E-02	0.0575	2.834E+13
C-14	2.6501E-08	534.240	1,068.479	0.00E+00	1.42E-05	2.83E-05	0.0850	1.756E+13
Cl-36	4.4441E-31	534.240	1,068.479	0.00E+00	2.37E-28	4.75E-28	0.1250	1.318E+13
Cm-243	7.2722E-06	534.240	1,068.479	0.00E+00	3.89E-03	7.77E-03	0.2250	1.482E+13
Cm-244	6.8226E-03	534.240	1,068.479	0.00E+00	3.64E+00	7.29E+00	0.3750	6.547E+12
Co-60	1.8117E-04	534.240	1,068.479	0.00E+00	9.68E-02	1.94E-01	0.8500	1.387E+13
Cs-134	3.0595E-01	534.240	1,068.479	0.00E+00	1.63E+02	3.27E+02	1.2500	3.486E+12
Cs-135	4.2564E-06	534.240	1,068.479	0.00E+00	2.27E-03	4.55E-03	1.7500	1.004E+11
Cs-137	2.5650E+00	534.240	1,068.479	0.00E+00	1.37E+03	2.74E+03	2.2500	4.396E+09
Eu-154	1.1628E-01	534.240	1,068.479	0.00E+00	6.21E+01	1.24E+02	2.7500	6.568E+07
Eu-155	5.7776E-02	534.240	1,068.479	0.00E+00	3.09E+01	6.17E+01	3.5000	7.973E+06
Fe-55	1.9465E-02	534.240	1,068.479	0.00E+00	1.04E+01	2.08E+01	5.0000	4.624E+04
H-3	8.1045E-03	534.240	1,068.479	0.00E+00	4.33E+00	8.66E+00	7.0000	5.315E+03
I-129	6.6403E-07	534.240	1,068.479	0.00E+00	3.55E-04	7.10E-04	11.0000	6.095E+02
Kr-85	2.0620E-01	534.240	1,068.479	0.00E+00	1.10E+02	2.20E+02		
Np-237	3.1513E-05	534.240	1,068.479	0.00E+00	1.68E-02	3.37E-02		
Pa-231	6.0304E-10	534.240	1,068.479	0.00E+00	3.22E-07	6.44E-07		
Pb-210	2.7017E-12	534.240	1,068.479	0.00E+00	1.44E-09	2.89E-09		
Pm-147	3.4210E-01	534.240	1,068.479	0.00E+00	1.83E+02	3.66E+02		
Pu-238	1.6622E-01	534.240	1,068.479	0.00E+00	8.88E+01	1.78E+02		
Pu-239	6.9563E-04	534.240	1,068.479	0.00E+00	3.72E-01	7.43E-01		
Pu-240	3.7169E-04	534.240	1,068.479	0.00E+00	1.99E-01	3.97E-01		
Pu-241	2.1731E-01	534.240	1,068.479	0.00E+00	1.16E+02	2.32E+02		
Pu-242	3.0911E-06	534.240	1,068.479	0.00E+00	1.65E-03	3.30E-03		
Ra-226	1.9435E-11	534.240	1,068.479	0.00E+00	1.04E-08	2.08E-08		
Ra-228	6.1725E-15	534.240	1,068.479	0.00E+00	3.30E-12	6.60E-12		
Ru-106	7.0778E-03	534.240	1,068.479	0.00E+00	3.78E+00	7.56E+00		
Se-79	1.2339E-05	534.240	1,068.479	0.00E+00	6.59E-03	1.32E-02		
Sn-126	1.0194E-05	534.240	1,068.479	0.00E+00	5.45E-03	1.09E-02		
Sr-90	2.4186E+00	534.240	1,068.479	0.00E+00	1.29E+03	2.58E+03		
Tc-99	3.8056E-04	534.240	1,068.479	0.00E+00	2.03E-01	4.07E-01		
Th-229	2.0097E-12	534.240	1,068.479	0.00E+00	1.07E-09	2.15E-09		
Th-230	6.0577E-09	534.240	1,068.479	0.00E+00	3.24E-06	6.47E-06		
Th-232	1.2473E-14	534.240	1,068.479	0.00E+00	6.66E-12	1.33E-11		
Tl-208	4.8791E-08	534.240	1,068.479	0.00E+00	2.61E-05	5.21E-05		
U-232	1.3821E-07	534.240	1,068.479	0.00E+00	7.38E-05	1.48E-04		
U-233	2.3906E-09	534.240	1,068.479	0.00E+00	1.28E-06	2.55E-06		
U-234	4.7697E-05	534.240	1,068.479	0.00E+00	2.55E-02	5.10E-02		
U-235	-2.8661E-06	534.240	0.000	1.02E-02	8.63E-03	1.02E-02		
U-236	1.6701E-05	534.240	1,068.479	0.00E+00	8.92E-03	1.78E-02		
U-238	-9.4194E-09	534.240	0.000	1.18E-04	1.13E-04	1.18E-04		
Y-90	2.4192E+00	534.240	1,068.479	0.00E+00	1.29E+03	2.58E+03		
Other Radionuclides					1.34E+03	2.67E+03		

Thermal Power	
Nominal Output (Watts)	Bounding Heat Output (Watts)
2.11E+01	4.22E+01
Total	Total

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-ALX	U	
BOL Enrichment %:	93.06930693	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		534.240	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		1,068.479	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.24		
Bounding:	0.48		

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: H. B. ROBINSON
 SNF ID #: 99
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=55kg ; EOL=52kg
 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"x15"
 0.04

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	2.3072E-06	25.850	51.699	0.00E+00	5.96E-05	1.19E-04	0.0150	6.381E+13
Am-241	8.4448E+00	25.850	51.699	0.00E+00	2.18E+02	4.37E+02	0.0250	1.261E+13
Am-242m	1.6848E-02	25.850	51.699	0.00E+00	4.36E-01	8.71E-01	0.0375	1.101E+13
Am-243	1.6320E-02	25.850	51.699	0.00E+00	4.22E-01	8.44E-01	0.0575	1.733E+13
C-14	1.2090E-01	25.850	51.699	0.00E+00	3.13E+00	6.25E+00	0.0850	6.763E+12
Cl-36	2.2849E-03	25.850	51.699	0.00E+00	5.91E-02	1.18E-01	0.1250	5.301E+12
Cm-243	8.6624E-04	25.850	51.699	0.00E+00	2.24E-02	4.48E-02	0.2250	5.859E+12
Cm-244	1.6848E-01	25.850	51.699	0.00E+00	4.36E+00	8.71E+00	0.3750	2.506E+12
Co-60	2.8086E+01	25.850	51.699	0.00E+00	7.26E+02	1.45E+03	0.8500	1.557E+12
Cs-134	3.4148E-04	25.850	51.699	0.00E+00	8.83E-03	1.77E-02	1.2500	1.089E+14
Cs-135	4.3976E-04	25.850	51.699	0.00E+00	1.14E-02	2.27E-02	1.7500	4.816E+10
Cs-137	2.1049E+01	25.850	51.699	0.00E+00	5.44E+02	1.09E+03	2.2500	5.709E+08
Eu-154	1.2500E+00	25.850	51.699	0.00E+00	3.23E+01	6.46E+01	2.7500	1.609E+08
Eu-155	6.8986E-02	25.850	51.699	0.00E+00	1.78E+00	3.57E+00	3.5000	1.371E+05
Fe-55	2.9308E-01	25.850	51.699	0.00E+00	7.58E+00	1.52E+01	5.0000	5.817E+04
H-3	2.4311E-01	25.850	51.699	0.00E+00	6.28E+00	1.26E+01	7.0000	6.657E+03
I-129	1.0618E-05	25.850	51.699	0.00E+00	2.74E-04	5.49E-04	11.0000	7.615E+02
Kr-85	5.9882E-01	25.850	51.699	0.00E+00	1.55E+01	3.10E+01		
Np-237	1.5668E-04	25.850	51.699	0.00E+00	4.05E-03	8.10E-03		
Pa-231	2.8656E-06	25.850	51.699	0.00E+00	7.41E-05	1.48E-04		
Pb-210	2.3918E-08	25.850	51.699	0.00E+00	6.18E-07	1.24E-06		
Pm-147	1.6900E-02	25.850	51.699	0.00E+00	4.37E-01	8.74E-01		
Pu-238	-8.6123E-01	25.850	0.000	7.03E+01	4.81E+01	7.03E+01		
Pu-239	-4.8440E-02	25.850	0.000	8.51E+00	7.26E+00	8.51E+00		
Pu-240	-3.0095E-01	25.850	0.000	1.09E+01	3.08E+00	1.09E+01		
Pu-241	-1.0411E+02	25.850	0.000	2.80E+03	1.06E+02	2.80E+03		
Pu-242	-1.1381E-04	25.850	0.000	4.70E-02	4.41E-02	4.70E-02		
Ra-226	6.4400E-08	25.850	51.699	0.00E+00	1.66E-06	3.33E-06		
Ra-228	5.9952E-07	25.850	51.699	0.00E+00	1.55E-05	3.10E-05		
Ru-106	8.5526E-07	25.850	51.699	0.00E+00	2.21E-05	4.42E-05		
Se-79	1.9181E-04	25.850	51.699	0.00E+00	4.96E-03	9.92E-03		
Sn-126	1.6671E-04	25.850	51.699	0.00E+00	4.31E-03	8.62E-03		
Sr-90	1.9799E+01	25.850	51.699	0.00E+00	5.12E+02	1.02E+03		
Tc-99	6.7678E-03	25.850	51.699	0.00E+00	1.75E-01	3.50E-01		
Th-229	1.7488E-06	25.850	51.699	0.00E+00	4.52E-05	9.04E-05		
Th-230	5.8704E-06	25.850	51.699	0.00E+00	1.52E-04	3.03E-04		
Th-232	6.0208E-07	25.850	51.699	0.00E+00	1.56E-05	3.11E-05		
Ti-208	8.7573E-05	25.850	51.699	0.00E+00	2.26E-03	4.53E-03		
U-232	2.3706E-04	25.850	51.699	0.00E+00	6.13E-03	1.23E-02		
U-233	3.6128E-04	25.850	51.699	0.00E+00	9.34E-03	1.87E-02		
U-234	1.2788E-02	25.850	51.699	0.00E+00	3.31E-01	6.61E-01		
U-235	5.7486E-04	25.850	51.699	2.35E-04	1.51E-02	3.00E-02		
U-236	2.3485E-04	25.850	51.699	0.00E+00	6.07E-03	1.21E-02		
U-238	1.1581E-04	25.850	51.699	2.93E-05	3.02E-03	6.02E-03		
Y-90	1.9804E+01	25.850	51.699	0.00E+00	5.12E+02	1.02E+03		
Other Radionuclides					1.59E+03	3.19E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.74E+01	5.40E+01
Total	Total

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 Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	ZIRC-4	SST/Inconel	
BOL HM Constituents:	PuO2-UO2	U, Th, & Pu	
BOL Enrichment %:	2.896564327	0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		25.850	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	16.416	51.699	

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.41	
Bounding:	2.82	3.15

Estimated EOL HM/ Given EOL HM: 31.57

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: H. B. ROBINSON (ASSEMBLY)
 SNF ID #: 383
 Fuel Units & Descr: 1 - ASSEMBLY
 Heavy Metal Mass: BOL=236.25kg ; EOL=229.17kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1974
 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"x15"
 1.00

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	8.7758E-10	6,732.935	13,465.871	0.00E+00	5.91E-06	1.18E-05	0.0150	7.245E+14
Am-241	1.4352E-01	6,732.935	13,465.871	0.00E+00	9.66E+02	1.93E+03	0.0250	1.461E+14
Am-242m	2.8698E-04	6,732.935	13,465.871	0.00E+00	1.93E+00	3.86E+00	0.0375	1.394E+14
Am-243	6.2565E-04	6,732.935	13,465.871	0.00E+00	4.21E+00	8.42E+00	0.0575	1.610E+14
C-14	4.7901E-05	6,732.935	13,465.871	0.00E+00	3.23E-01	6.45E-01	0.0850	8.107E+13
Cl-36	8.0297E-07	6,732.935	13,465.871	0.00E+00	5.41E-03	1.08E-02	0.1250	5.626E+13
Cm-243	2.5081E-04	6,732.935	13,465.871	0.00E+00	1.69E+00	3.38E+00	0.2250	6.952E+13
Cm-244	4.9015E-02	6,732.935	13,465.871	0.00E+00	3.30E+02	6.60E+02	0.3750	2.989E+13
Co-60	2.5581E-03	6,732.935	13,465.871	0.00E+00	1.72E+01	3.44E+01	0.5750	6.953E+14
Cs-134	4.0536E-05	6,732.935	13,465.871	0.00E+00	2.73E-01	5.46E-01	0.8500	9.618E+12
Cs-135	1.4433E-05	6,732.935	13,465.871	0.00E+00	9.72E-02	1.94E-01	1.2500	9.449E+12
Cs-137	1.3979E+00	6,732.935	13,465.871	0.00E+00	9.41E+03	1.88E+04	1.7500	2.830E+11
Eu-154	2.0203E-02	6,732.935	13,465.871	0.00E+00	1.36E+02	2.72E+02	2.2500	4.556E+17
Eu-155	1.7684E-03	6,732.935	13,465.871	0.00E+00	1.19E+01	2.38E+01	2.7500	9.333E+07
Fe-55	4.3136E-05	6,732.935	13,465.871	0.00E+00	2.90E-01	5.81E-01	3.5000	9.613E+06
H-3	2.0769E-02	6,732.935	13,465.871	0.00E+00	1.40E+02	2.80E+02	5.0000	4.109E+05
I-129	9.8288E-07	6,732.935	13,465.871	0.00E+00	6.62E-03	1.32E-02	7.0000	4.736E+05
Kr-85	2.8214E-02	6,732.935	13,465.871	0.00E+00	1.90E+02	3.80E+02	11.0000	5.440E+04
Np-237	1.1218E-05	6,732.935	13,465.871	0.00E+00	7.55E-02	1.51E-01		
Pa-231	1.3036E-09	6,732.935	13,465.871	0.00E+00	8.78E-06	1.76E-05		
Pb-210	8.5078E-11	6,732.935	13,465.871	0.00E+00	5.73E-07	1.15E-06		
Pm-147	3.6531E-04	6,732.935	13,465.871	0.00E+00	2.46E+00	4.92E+00		
Pu-238	7.4564E-02	6,732.935	13,465.871	0.00E+00	5.02E+02	1.00E+03		
Pu-239	1.1623E-02	6,732.935	13,465.871	0.00E+00	7.83E+01	1.57E+02		
Pu-240	1.5132E-02	6,732.935	13,465.871	0.00E+00	1.02E+02	2.04E+02		
Pu-241	9.0036E-01	6,732.935	13,465.871	0.00E+00	6.06E+03	1.21E+04		
Pu-242	6.4260E-05	6,732.935	13,465.871	0.00E+00	4.33E-01	8.65E-01		
Ra-226	2.2804E-10	6,732.935	13,465.871	0.00E+00	1.54E-06	3.07E-06		
Ra-228	5.2713E-12	6,732.935	13,465.871	0.00E+00	3.55E-08	7.10E-08		
Ru-106	6.1160E-10	6,732.935	13,465.871	0.00E+00	4.12E-06	8.24E-06		
Se-79	1.2377E-05	6,732.935	13,465.871	0.00E+00	8.33E-02	1.67E-01		
Sn-126	2.5210E-05	6,732.935	13,465.871	0.00E+00	1.70E-01	3.39E-01		
Sr-90	9.1667E-01	6,732.935	13,465.871	0.00E+00	6.17E+03	1.23E+04		
Tc-99	3.9357E-04	6,732.935	13,465.871	0.00E+00	2.65E+00	5.30E+00		
Th-229	1.2057E-10	6,732.935	13,465.871	0.00E+00	8.12E-07	1.62E-06		
Th-230	2.1043E-08	6,732.935	13,465.871	0.00E+00	1.42E-04	2.83E-04		
Th-232	5.2972E-12	6,732.935	13,465.871	0.00E+00	3.57E-08	7.13E-08		
Ti-208	1.7474E-07	6,732.935	13,465.871	0.00E+00	1.18E-03	2.35E-03		
U-232	4.7368E-07	6,732.935	13,465.871	0.00E+00	3.19E-03	6.38E-03		
U-233	2.5097E-08	6,732.935	13,465.871	0.00E+00	1.69E-04	3.38E-04		
U-234	5.0000E-05	6,732.935	13,465.871	0.00E+00	3.37E-01	6.73E-01		
U-235	-1.4489E-06	6,732.935	0.000	1.48E-02	5.05E-03	1.48E-02		
U-236	7.5824E-06	6,732.935	13,465.871	0.00E+00	5.11E-02	1.02E-01		
U-238	-2.6129E-07	6,732.935	0.000	7.71E-02	7.53E-02	7.71E-02		
Y-90	9.1699E-01	6,732.935	13,465.871	0.00E+00	6.17E+03	1.23E+04		
Other Radionuclides					9.04E+03	1.81E+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:	ZIRC-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	2.900129144	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	6,617.309	6,732.935	
Bounding:		13,465.871	

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	1.02
Bounding:	1.63	

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: H. B. ROBINSON RODS
 SNF ID #: 864
 Fuel Units & Descr: 12 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=25.09kg ; EOL=20.86kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1974
 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:
 HIC
 12.00

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	8.7758E-10	4,021.389	8,042.778	0.00E+00	3.53E-06	7.06E-06	0.0150	4.327E+14
Am-241	1.4352E-01	4,021.389	8,042.778	0.00E+00	5.77E+02	1.15E+03	0.0250	8.727E+13
Am-242m	2.8698E-04	4,021.389	8,042.778	0.00E+00	1.15E+00	2.31E+00	0.0375	8.323E+13
Am-243	6.2565E-04	4,021.389	8,042.778	0.00E+00	2.52E+00	5.03E+00	0.0575	9.616E+13
C-14	4.7901E-05	4,021.389	8,042.778	0.00E+00	1.93E-01	3.85E-01	0.0850	4.842E+13
Cl-36	8.0297E-07	4,021.389	8,042.778	0.00E+00	3.23E-03	6.46E-03	0.1250	3.360E+13
Cr-243	2.5081E-04	4,021.389	8,042.778	0.00E+00	1.01E+00	2.02E+00	0.2250	4.152E+13
Cr-244	4.9015E-02	4,021.389	8,042.778	0.00E+00	1.97E+02	3.94E+02	0.3750	1.785E+14
Co-60	2.5581E-03	4,021.389	8,042.778	0.00E+00	1.03E+01	2.06E+01	0.5750	4.153E+13
Cs-134	4.0536E-05	4,021.389	8,042.778	0.00E+00	1.63E-01	3.26E-01	0.8500	5.745E+12
Cs-135	1.4433E-05	4,021.389	8,042.778	0.00E+00	5.80E-02	1.16E-01	1.2500	5.643E+12
Cs-137	1.3979E+00	4,021.389	8,042.778	0.00E+00	5.62E+03	1.12E+04	1.7500	1.690E+11
Eu-154	2.0203E-02	4,021.389	8,042.778	0.00E+00	8.12E+01	1.62E+02	2.2500	2.721E+07
Eu-155	1.7684E-03	4,021.389	8,042.778	0.00E+00	7.11E+00	1.42E+01	2.7500	5.575E+07
Fe-55	4.3136E-05	4,021.389	8,042.778	0.00E+00	1.73E-01	3.47E-01	3.5000	5.741E+06
H-3	2.0769E-02	4,021.389	8,042.778	0.00E+00	8.35E+01	1.67E+02	5.0000	2.454E+06
I-129	9.8288E-07	4,021.389	8,042.778	0.00E+00	3.95E-03	7.91E-03	7.0000	2.829E+05
Kr-85	2.8214E-02	4,021.389	8,042.778	0.00E+00	1.13E+02	2.27E+02	11.0000	3.249E+04
Np-237	1.1218E-05	4,021.389	8,042.778	0.00E+00	4.51E-02	9.02E-02		
Pa-231	1.3036E-09	4,021.389	8,042.778	0.00E+00	5.24E-06	1.05E-05		
Pb-210	8.5078E-11	4,021.389	8,042.778	0.00E+00	3.42E-07	6.84E-07		
Pm-147	3.6531E-04	4,021.389	8,042.778	0.00E+00	1.47E+00	2.94E+00		
Pu-238	7.4564E-02	4,021.389	8,042.778	0.00E+00	3.00E+02	6.00E+02		
Pu-239	1.1623E-02	4,021.389	8,042.778	0.00E+00	4.67E+01	9.35E+01		
Pu-240	1.5132E-02	4,021.389	8,042.778	0.00E+00	6.09E+01	1.22E+02		
Pu-241	9.0036E-01	4,021.389	8,042.778	0.00E+00	3.62E+03	7.24E+03		
Pu-242	6.4260E-05	4,021.389	8,042.778	0.00E+00	2.58E-01	5.17E-01		
Ra-226	2.2804E-10	4,021.389	8,042.778	0.00E+00	9.17E-07	1.83E-06		
Ra-228	5.2713E-12	4,021.389	8,042.778	0.00E+00	2.12E-08	4.24E-08		
Ru-106	6.1160E-10	4,021.389	8,042.778	0.00E+00	2.46E-06	4.92E-06		
Se-79	1.2377E-05	4,021.389	8,042.778	0.00E+00	4.98E-02	9.95E-02		
Sn-126	2.5210E-05	4,021.389	8,042.778	0.00E+00	1.01E-01	2.03E-01		
Sr-90	9.1667E-01	4,021.389	8,042.778	0.00E+00	3.69E+03	7.37E+03		
Tc-99	3.9357E-04	4,021.389	8,042.778	0.00E+00	1.58E+00	3.17E+00		
Th-229	1.2057E-10	4,021.389	8,042.778	0.00E+00	4.85E-07	9.70E-07		
Th-230	2.1043E-08	4,021.389	8,042.778	0.00E+00	8.46E-05	1.69E-04		
Th-232	5.2972E-12	4,021.389	8,042.778	0.00E+00	2.13E-08	4.26E-08		
Th-208	1.7474E-07	4,021.389	8,042.778	0.00E+00	7.03E-04	1.41E-03		
U-232	4.7368E-07	4,021.389	8,042.778	0.00E+00	1.90E-03	3.81E-03		
U-233	2.5097E-08	4,021.389	8,042.778	0.00E+00	1.01E-04	2.02E-04		
U-234	5.0000E-05	4,021.389	8,042.778	0.00E+00	2.01E-01	4.02E-01		
U-235	-1.4489E-06	4,021.389	0.000	1.57E-03	0.00E+00	1.57E-03		
U-236	7.5824E-06	4,021.389	8,042.778	0.00E+00	3.05E-02	6.10E-02		
U-238	-2.6129E-07	4,021.389	0.000	8.19E-03	7.14E-03	8.19E-03		
Y-90	9.1699E-01	4,021.389	8,042.778	0.00E+00	3.69E+03	7.38E+03		
Other Radionuclides					5.40E+03	1.08E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.25E+01	1.85E+02
Total	Total

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-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	2.899985651	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	702.475	4,021.389	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		8,042.778	Bounding burnup assumed to be twice nominal burnup.

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	4.58	5.72
Bounding:	9.16	
		Estimated EOL HM/ Given EOL HM
		1.10

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: HFBR
 SNF ID #: 102
 Fuel Units & Descr: 220 - 18 CURVED PLATES
 Heavy Metal Mass: BOL=82.72kg ; EOL=58.10kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1977
 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: 25 years

Estimated
 Canister usage:
 18"x10"
 6.11

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	5.4520E-10	22,675.714	45,351.427	0.00E+00	1.24E-05	2.47E-05	0.0150	4.252E+15
Am-241	9.2284E-03	22,675.714	45,351.427	0.00E+00	2.09E+02	4.19E+02	0.0250	8.751E+14
Am-242m	1.3390E-06	22,675.714	45,351.427	0.00E+00	3.04E-02	6.07E-02	0.0375	7.727E+14
Am-243	3.7084E-05	22,675.714	45,351.427	0.00E+00	8.41E-01	1.68E+00	0.0575	8.241E+14
C-14	2.6452E-08	22,675.714	45,351.427	0.00E+00	6.00E-04	1.20E-03	0.0850	4.960E+14
Cl-36	4.4441E-31	22,675.714	45,351.427	0.00E+00	1.01E-26	2.02E-26	0.1250	3.442E+14
Cm-243	5.0498E-06	22,675.714	45,351.427	0.00E+00	1.15E-01	2.29E-01	0.2250	4.281E+14
Cm-244	3.8451E-03	22,675.714	45,351.427	0.00E+00	8.72E+01	1.74E+02	0.3750	1.853E+14
Co-60	2.5225E-05	22,675.714	45,351.427	0.00E+00	5.72E-01	1.14E+00	0.5750	3.073E+15
Cs-134	1.9830E-03	22,675.714	45,351.427	0.00E+00	4.50E+01	8.99E+01	0.8500	6.053E+13
Cs-135	4.2564E-06	22,675.714	45,351.427	0.00E+00	9.65E-02	1.93E-01	1.2500	4.086E+13
Cs-137	1.8141E+00	22,675.714	45,351.427	0.00E+00	4.11E+04	8.23E+04	1.7500	1.691E+12
Eu-154	3.4733E-02	22,675.714	45,351.427	0.00E+00	7.88E+02	1.58E+03	2.2500	9.117E+07
Eu-155	7.1081E-03	22,675.714	45,351.427	0.00E+00	1.61E+02	3.22E+02	2.7500	7.834E+07
Fe-55	3.5790E-04	22,675.714	45,351.427	0.00E+00	8.12E+00	1.62E+01	3.5000	2.690E+06
H-3	3.4945E-03	22,675.714	45,351.427	0.00E+00	7.92E+01	1.58E+02	5.0000	1.140E+06
I-129	6.6403E-07	22,675.714	45,351.427	0.00E+00	1.51E-02	3.01E-02	7.0000	1.308E+05
Kr-85	7.8250E-02	22,675.714	45,351.427	0.00E+00	1.77E+03	3.55E+03	11.0000	1.498E+04
Np-237	3.1567E-05	22,675.714	45,351.427	0.00E+00	7.16E-01	1.43E+00		
Pa-231	1.3372E-09	22,675.714	45,351.427	0.00E+00	3.03E-05	6.06E-05		
Pb-210	3.0644E-11	22,675.714	45,351.427	0.00E+00	6.95E-07	1.39E-06		
Pm-147	6.5188E-03	22,675.714	45,351.427	0.00E+00	1.48E+02	2.96E+02		
Pu-238	1.4769E-01	22,675.714	45,351.427	0.00E+00	3.35E+03	6.70E+03		
Pu-239	6.9502E-04	22,675.714	45,351.427	0.00E+00	1.58E+01	3.15E+01		
Pu-240	3.7928E-04	22,675.714	45,351.427	0.00E+00	8.60E+00	1.72E+01		
Pu-241	1.0565E-01	22,675.714	45,351.427	0.00E+00	2.40E+03	4.79E+03		
Pu-242	3.0911E-06	22,675.714	45,351.427	0.00E+00	7.01E-02	1.40E-01		
Ra-226	1.1081E-10	22,675.714	45,351.427	0.00E+00	2.51E-06	5.03E-06		
Ra-228	2.1185E-14	22,675.714	45,351.427	0.00E+00	4.80E-10	9.61E-10		
Ru-106	2.3621E-07	22,675.714	45,351.427	0.00E+00	5.36E-03	1.07E-02		
Se-79	1.2339E-05	22,675.714	45,351.427	0.00E+00	2.80E-01	5.60E-01		
Sn-126	1.0194E-05	22,675.714	45,351.427	0.00E+00	2.31E-01	4.62E-01		
Sr-90	1.6932E+00	22,675.714	45,351.427	0.00E+00	3.84E+04	7.68E+04		
Tc-99	3.8056E-04	22,675.714	45,351.427	0.00E+00	8.63E+00	1.73E+01		
Th-229	9.1252E-12	22,675.714	45,351.427	0.00E+00	2.07E-07	4.14E-07		
Th-230	1.5407E-08	22,675.714	45,351.427	0.00E+00	3.49E-04	6.99E-04		
Th-232	2.8937E-14	22,675.714	45,351.427	0.00E+00	6.56E-10	1.31E-09		
Tl-208	4.7272E-08	22,675.714	45,351.427	0.00E+00	1.07E-03	2.14E-03		
U-232	1.2855E-07	22,675.714	45,351.427	0.00E+00	2.92E-03	5.83E-03		
U-233	5.1470E-09	22,675.714	45,351.427	0.00E+00	1.17E-04	2.33E-04		
U-234	5.6069E-05	22,675.714	45,351.427	0.00E+00	1.27E+00	2.54E+00		
U-235	-2.8661E-06	22,675.714	0.000	1.66E-01	1.01E-01	1.66E-01		
U-236	1.6701E-05	22,675.714	45,351.427	0.00E+00	3.79E-01	7.57E-01		
U-238	-9.4194E-09	22,675.714	0.000	1.92E-03	1.71E-03	1.92E-03		
Y-90	1.6932E+00	22,675.714	45,351.427	0.00E+00	3.84E+04	7.68E+04		
Other Radionuclides					3.94E+04	7.87E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.88E+02	1.18E+03
Total	Total

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 (6061)	ALUM	
BOL HM Constituents:	U3O8	U	
BOL Enrichment %:	93.08510638	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		22,675.714	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		45,351.427	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.63		1.01
Bounding:	1.26		

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: HFBR
 SNF ID #: 706
 Fuel Units & Descr: 1050 - 18 CURVED PLATES
 Heavy Metal Mass: BOL=394.80kg ; EOL=282.24kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1982
 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: 25 years

Estimated
 Canister usage:
 18"x10"
 29.17

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	5.4520E-10	103,679.354	207,358.707	0.00E+00	5.65E-05	1.13E-04	0.0150	1.944E+16
Am-241	9.2284E-03	103,679.354	207,358.707	0.00E+00	9.57E+02	1.91E+03	0.0250	4.001E+15
Am-242m	1.3390E-06	103,679.354	207,358.707	0.00E+00	1.39E-01	2.78E-01	0.0375	3.533E+15
Am-243	3.7084E-05	103,679.354	207,358.707	0.00E+00	3.84E+00	7.69E+00	0.0575	3.768E+15
C-14	2.6452E-08	103,679.354	207,358.707	0.00E+00	2.74E-03	5.49E-03	0.0850	2.268E+15
Cl-36	4.4441E-31	103,679.354	207,358.707	0.00E+00	4.61E-26	9.22E-26	0.1250	1.574E+15
Cm-243	5.0498E-06	103,679.354	207,358.707	0.00E+00	5.24E-01	1.05E+00	0.2250	1.958E+15
Cm-244	3.8451E-03	103,679.354	207,358.707	0.00E+00	3.99E+02	7.97E+02	0.3750	8.474E+14
Co-60	2.5225E-05	103,679.354	207,358.707	0.00E+00	2.62E+00	5.23E+00	0.5750	1.405E+16
Cs-134	1.9830E-03	103,679.354	207,358.707	0.00E+00	2.06E+02	4.11E+02	0.8500	2.767E+14
Cs-135	4.2564E-06	103,679.354	207,358.707	0.00E+00	4.41E-01	8.83E-01	1.2500	1.868E+14
Cs-137	1.8141E+00	103,679.354	207,358.707	0.00E+00	1.88E+05	3.76E+05	1.7500	7.732E+12
Eu-154	3.4733E-02	103,679.354	207,358.707	0.00E+00	3.60E+03	7.20E+03	2.2500	4.169E+08
Eu-155	7.1081E-03	103,679.354	207,358.707	0.00E+00	7.37E+02	1.47E+03	2.7500	3.582E+08
Fe-55	3.5790E-04	103,679.354	207,358.707	0.00E+00	3.71E+01	7.42E+01	3.5000	1.230E+07
H-3	3.4945E-03	103,679.354	207,358.707	0.00E+00	3.62E+02	7.25E+02	5.0000	5.213E+06
I-129	6.6403E-07	103,679.354	207,358.707	0.00E+00	6.88E-02	1.38E-01	7.0000	5.980E+05
Kr-85	7.8250E-02	103,679.354	207,358.707	0.00E+00	8.11E+03	1.62E+04	11.0000	6.850E+04
Np-237	3.1567E-05	103,679.354	207,358.707	0.00E+00	3.27E+00	6.55E+00		
Pa-231	1.3372E-09	103,679.354	207,358.707	0.00E+00	1.39E-04	2.77E-04		
Pb-210	3.0644E-11	103,679.354	207,358.707	0.00E+00	3.18E-06	6.35E-06		
Pm-147	6.5188E-03	103,679.354	207,358.707	0.00E+00	6.76E+02	1.35E+03		
Pu-238	1.4769E-01	103,679.354	207,358.707	0.00E+00	1.53E+04	3.06E+04		
Pu-239	6.9502E-04	103,679.354	207,358.707	0.00E+00	7.21E+01	1.44E+02		
Pu-240	3.7928E-04	103,679.354	207,358.707	0.00E+00	3.93E+01	7.86E+01		
Pu-241	1.0565E-01	103,679.354	207,358.707	0.00E+00	1.10E+04	2.19E+04		
Pu-242	3.0911E-06	103,679.354	207,358.707	0.00E+00	3.20E-01	6.41E-01		
Ra-226	1.1081E-10	103,679.354	207,358.707	0.00E+00	1.15E-05	2.30E-05		
Ra-228	2.1185E-14	103,679.354	207,358.707	0.00E+00	2.20E-09	4.39E-09		
Ru-106	2.3621E-07	103,679.354	207,358.707	0.00E+00	2.45E-02	4.90E-02		
Se-79	1.2339E-05	103,679.354	207,358.707	0.00E+00	1.28E+00	2.56E+00		
Sn-126	1.0194E-05	103,679.354	207,358.707	0.00E+00	1.06E+00	2.11E+00		
Sr-90	1.6932E+00	103,679.354	207,358.707	0.00E+00	1.76E+05	3.51E+05		
Tc-99	3.8056E-04	103,679.354	207,358.707	0.00E+00	3.95E+01	7.89E+01		
Th-229	9.1252E-12	103,679.354	207,358.707	0.00E+00	9.46E-07	1.89E-06		
Th-230	1.5407E-08	103,679.354	207,358.707	0.00E+00	1.60E-03	3.19E-03		
Th-232	2.8937E-14	103,679.354	207,358.707	0.00E+00	3.00E-09	6.00E-09		
Ti-208	4.7272E-08	103,679.354	207,358.707	0.00E+00	4.90E-03	9.80E-03		
U-232	1.2855E-07	103,679.354	207,358.707	0.00E+00	1.33E-02	2.67E-02		
U-233	5.1470E-09	103,679.354	207,358.707	0.00E+00	5.34E-04	1.07E-03		
U-234	5.6069E-05	103,679.354	207,358.707	0.00E+00	5.81E+00	1.16E+01		
U-235	-2.8661E-06	103,679.354	0.000	7.94E-01	4.97E-01	7.94E-01		
U-236	1.6701E-05	103,679.354	207,358.707	0.00E+00	1.73E+00	3.46E+00		
U-238	-9.4194E-09	103,679.354	0.000	9.18E-03	8.20E-03	9.18E-03		
Y-90	1.6932E+00	103,679.354	207,358.707	0.00E+00	1.76E+05	3.51E+05		
Other Radionuclides					1.80E+05	3.60E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.69E+03	5.38E+03
Total	Total

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 (6061)	ALUM	
BOL HM Constituents:	UO8	U	
BOL Enrichment %:	93.08510638	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		103,679.354	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		207,358.707	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.60		1.01
Bounding:	1.20		

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: HFBR
 SNF ID #: 961
 Fuel Units & Descr: 20 - 18 CURVED PLATES
 Heavy Metal Mass: BOL=7.52kg ; EOL=5.28kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1977
 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: 25 years

Estimated
 Canister usage:
 18"x10"
 0.56

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	5.4520E-10	2,061.429	4,122.857	0.00E+00	1.12E-06	2.25E-06	0.0150	3.865E+14
Am-241	9.2284E-03	2,061.429	4,122.857	0.00E+00	1.90E+01	3.80E+01	0.0250	7.955E+13
Am-242m	1.3390E-06	2,061.429	4,122.857	0.00E+00	2.76E-03	5.52E-03	0.0375	7.025E+13
Am-243	3.7084E-05	2,061.429	4,122.857	0.00E+00	7.64E-02	1.53E-01	0.0575	7.492E+13
C-14	2.6452E-08	2,061.429	4,122.857	0.00E+00	5.45E-05	1.09E-04	0.0850	4.509E+13
Cf-252	4.4441E-31	2,061.429	4,122.857	0.00E+00	9.16E-28	1.83E-27	0.1250	3.129E+13
Cm-243	5.0498E-06	2,061.429	4,122.857	0.00E+00	1.04E-02	2.08E-02	0.2250	3.892E+13
Cm-244	3.8451E-03	2,061.429	4,122.857	0.00E+00	7.93E+00	1.59E+01	0.3750	1.685E+13
Co-60	2.5225E-05	2,061.429	4,122.857	0.00E+00	5.20E-02	1.04E-01	0.8500	5.502E+12
Cs-134	1.9830E-03	2,061.429	4,122.857	0.00E+00	4.09E+00	8.18E+00	1.2500	3.714E+12
Cs-135	4.2564E-06	2,061.429	4,122.857	0.00E+00	8.77E-03	1.75E-02	1.7500	1.537E+11
Cs-137	1.8141E+00	2,061.429	4,122.857	0.00E+00	3.74E+03	7.48E+03	2.2500	8.288E+06
Eu-154	3.4739E-02	2,061.429	4,122.857	0.00E+00	7.16E+01	1.43E+02	2.7500	7.122E+06
Eu-155	7.1081E-03	2,061.429	4,122.857	0.00E+00	1.47E+01	2.93E+01	3.5000	2.446E+05
Fe-55	3.5790E-04	2,061.429	4,122.857	0.00E+00	7.38E-01	1.48E+00	5.0000	1.037E+05
H-3	3.4945E-03	2,061.429	4,122.857	0.00E+00	7.20E+00	1.44E+01	7.0000	1.189E+04
I-129	6.6403E-07	2,061.429	4,122.857	0.00E+00	1.37E-03	2.74E-03	11.0000	1.362E+03
Kr-85	7.8250E-02	2,061.429	4,122.857	0.00E+00	1.61E+02	3.23E+02		
Np-237	3.1567E-05	2,061.429	4,122.857	0.00E+00	6.51E-02	1.30E-01		
Pa-231	1.3372E-09	2,061.429	4,122.857	0.00E+00	2.76E-06	5.51E-06		
Pb-210	3.0644E-11	2,061.429	4,122.857	0.00E+00	6.32E-08	1.26E-07		
Pm-147	6.5188E-03	2,061.429	4,122.857	0.00E+00	1.34E+01	2.69E+01		
Pu-238	1.4769E-01	2,061.429	4,122.857	0.00E+00	3.04E+02	6.09E+02		
Pu-239	6.9502E-04	2,061.429	4,122.857	0.00E+00	1.43E+00	2.87E+00		
Pu-240	3.7928E-04	2,061.429	4,122.857	0.00E+00	7.82E-01	1.56E+00		
Pu-241	1.0565E-01	2,061.429	4,122.857	0.00E+00	2.18E+02	4.36E+02		
Pu-242	3.0911E-06	2,061.429	4,122.857	0.00E+00	6.37E-03	1.27E-02		
Ra-226	1.1081E-10	2,061.429	4,122.857	0.00E+00	2.28E-07	4.57E-07		
Ra-228	2.1185E-14	2,061.429	4,122.857	0.00E+00	4.37E-11	8.73E-11		
Ru-106	2.3621E-07	2,061.429	4,122.857	0.00E+00	4.87E-04	9.74E-04		
Se-79	1.2339E-05	2,061.429	4,122.857	0.00E+00	2.54E-02	5.09E-02		
Sn-126	1.0194E-05	2,061.429	4,122.857	0.00E+00	2.10E-02	4.20E-02		
Sr-90	1.6932E+00	2,061.429	4,122.857	0.00E+00	3.49E+03	6.98E+03		
Tc-99	3.8056E-04	2,061.429	4,122.857	0.00E+00	7.84E-01	1.57E+00		
Th-229	9.1252E-12	2,061.429	4,122.857	0.00E+00	1.88E-08	3.76E-08		
Th-230	1.5407E-08	2,061.429	4,122.857	0.00E+00	3.18E-05	6.35E-05		
Th-232	2.8937E-14	2,061.429	4,122.857	0.00E+00	5.97E-11	1.19E-10		
Tl-208	4.7272E-08	2,061.429	4,122.857	0.00E+00	9.74E-05	1.95E-04		
U-232	1.2855E-07	2,061.429	4,122.857	0.00E+00	2.65E-04	5.30E-04		
U-233	5.1470E-09	2,061.429	4,122.857	0.00E+00	1.06E-05	2.12E-05		
U-234	5.6069E-05	2,061.429	4,122.857	0.00E+00	1.16E-01	2.31E-01		
U-235	-2.8661E-06	2,061.429	0.000	1.51E-02	9.22E-03	1.51E-02		
U-236	1.6701E-05	2,061.429	4,122.857	0.00E+00	3.44E-02	6.89E-02		
U-238	-9.4194E-09	2,061.429	0.000	1.75E-04	1.55E-04	1.75E-04		
Y-90	1.6932E+00	2,061.429	4,122.857	0.00E+00	3.49E+03	6.98E+03		
Other Radionuclides					3.58E+03	7.16E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.35E+01	1.07E+02
Total	Total

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 (6061)	ALUM	
BOL HM Constituents:	U3O8	U	
BOL Enrichment %:	93.08510638	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		2,061.429	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,122.857	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.63		1.01
Bounding:	1.26		

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: HFEF FISSION CHAMBERS
 SNF ID #: 894
 Fuel Units & Descr: 1 - UNKNOWN
 Heavy Metal Mass: BOL= ; EOL=24.35kg
 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"
 0.01

II. Estimates	m	x _m	x _b	b	y _n	y _b	Gamma Sources	
							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	1.9744E-09	23,240.106	23,240.106	0.00E+00	4.59E-05	4.59E-05		
Am-241	2.8150E-03	23,240.106	23,240.106	0.00E+00	6.54E+01	6.54E+01	0.0150	2.636E+15
Am-242m	1.3501E-06	23,240.106	23,240.106	0.00E+00	3.14E-02	3.14E-02	0.0250	5.510E+14
Am-243	1.4761E-07	23,240.106	23,240.106	0.00E+00	3.43E-03	3.43E-03	0.0375	4.757E+14
C-14	1.2854E-04	23,240.106	23,240.106	0.00E+00	2.99E+00	2.99E+00	0.0575	5.104E+14
Cl-36	2.8120E-06	23,240.106	23,240.106	0.00E+00	6.54E-02	6.54E-02	0.0850	3.087E+14
Cm-243	1.4075E-07	23,240.106	23,240.106	0.00E+00	3.27E-03	3.27E-03	0.1250	2.022E+14
Cm-244	1.1570E-06	23,240.106	23,240.106	0.00E+00	2.69E-02	2.69E-02	0.2250	2.643E+14
Co-60	3.4481E-01	23,240.106	23,240.106	0.00E+00	8.01E+03	8.01E+03	0.3750	1.172E+14
Cs-134	3.1474E-03	23,240.106	23,240.106	0.00E+00	7.31E+01	7.31E+01	0.5750	1.901E+15
Cs-135	3.2195E-05	23,240.106	23,240.106	0.00E+00	7.48E-01	7.48E-01	0.8500	2.405E+13
Cs-137	2.1880E+00	23,240.106	23,240.106	0.00E+00	5.08E+04	5.08E+04	1.2500	6.028E+14
Eu-154	6.8647E-03	23,240.106	23,240.106	0.00E+00	1.60E+02	1.60E+02	1.7500	5.744E+11
Eu-155	7.2481E-03	23,240.106	23,240.106	0.00E+00	1.68E+02	1.68E+02	2.2500	3.625E+09
Fe-55	5.3744E-02	23,240.106	23,240.106	0.00E+00	1.25E+03	1.25E+03	2.7500	4.108E+07
H-3	6.3414E-03	23,240.106	23,240.106	0.00E+00	1.47E+02	1.47E+02	3.5000	2.326E+06
I-129	7.3684E-07	23,240.106	23,240.106	0.00E+00	1.71E-02	1.71E-02	5.0000	1.212E+04
Kr-85	1.3236E-01	23,240.106	23,240.106	0.00E+00	3.08E+03	3.08E+03	7.0000	1.370E+03
Np-237	1.2504E-06	23,240.106	23,240.106	0.00E+00	2.91E-02	2.91E-02	11.0000	1.559E+02
Pa-231	5.9774E-09	23,240.106	23,240.106	0.00E+00	1.39E-04	1.39E-04		
Pb-210	3.3534E-14	23,240.106	23,240.106	0.00E+00	7.79E-10	7.79E-10		
Pm-147	1.5002E-01	23,240.106	23,240.106	0.00E+00	3.49E+03	3.49E+03		
Pu-238	9.5970E-04	23,240.106	23,240.106	0.00E+00	2.23E+01	2.23E+01		
Pu-239	5.5278E-03	23,240.106	23,240.106	0.00E+00	1.28E+02	1.28E+02		
Pu-240	2.1248E-03	23,240.106	23,240.106	0.00E+00	4.94E+01	4.94E+01		
Pu-241	6.3023E-02	23,240.106	23,240.106	0.00E+00	1.46E+03	1.46E+03		
Pu-242	2.3128E-07	23,240.106	23,240.106	0.00E+00	5.37E-03	5.37E-03		
Ra-226	1.6346E-13	23,240.106	23,240.106	0.00E+00	3.80E-09	3.80E-09		
Ra-228	2.3173E-10	23,240.106	23,240.106	0.00E+00	5.39E-06	5.39E-06		
Ru-106	9.5038E-05	23,240.106	23,240.106	0.00E+00	2.21E+00	2.21E+00		
Se-79	1.3017E-05	23,240.106	23,240.106	0.00E+00	3.03E-01	3.03E-01		
Sn-126	1.2165E-05	23,240.106	23,240.106	0.00E+00	2.83E-01	2.83E-01		
Sr-90	2.0541E+00	23,240.106	23,240.106	0.00E+00	4.77E+04	4.77E+04		
Tc-99	4.4241E-04	23,240.106	23,240.106	0.00E+00	1.03E+01	1.03E+01		
Th-229	2.5218E-10	23,240.106	23,240.106	0.00E+00	5.86E-06	5.86E-06		
Th-230	3.3654E-11	23,240.106	23,240.106	0.00E+00	7.82E-07	7.82E-07		
Th-232	2.5278E-10	23,240.106	23,240.106	0.00E+00	5.87E-06	5.87E-06		
Ti-208	1.6511E-08	23,240.106	23,240.106	0.00E+00	3.84E-04	3.84E-04		
U-232	4.4722E-08	23,240.106	23,240.106	0.00E+00	1.04E-03	1.04E-03		
U-233	1.2209E-07	23,240.106	23,240.106	0.00E+00	2.84E-03	2.84E-03		
U-234	1.8662E-07	23,240.106	23,240.106	0.00E+00	4.34E-03	4.34E-03		
U-235	-2.6194E-06	23,240.106	0.000	2.10E-02	0.00E+00	2.10E-02		
U-236	1.2693E-05	23,240.106	23,240.106	0.00E+00	2.95E-01	2.95E-01		
U-238	-3.6331E-08	23,240.106	0.000	1.31E-02	1.22E-02	1.31E-02		
Y-90	2.0541E+00	23,240.106	23,240.106	0.00E+00	4.77E+04	4.77E+04		
Other Radionuclides					5.03E+04	5.03E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.09E+02	7.09E+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	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 %:	U METAL	U	
		10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:	23,240.106	23,240.106	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks		
Nominal:	Bumup Multiplier	Estimated Burnup/ Given Burnup
Bounding:	14.00	14.00
		Estimated EOL HM/ Given EOL HM
		1.78

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: HFIR (INNER) 1 Fuel decay start date: 1986
 SNF ID #: 1083 Estimates as of: 2010
 Fuel Units & Descr: 59 - 171 CURVED PLATES Template: ATR (Light Water, Alum., 60 to 100%, U)
 Heavy Metal Mass: BOL=162.19kg ; EOL=125.22kg 2 Template Burnup(MWd): 367.2
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated
 Canister usage:
 18"x10"
 19.67

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	6.6313E-10	37,303.930	74,607.860	0.00E+00	2.47E-05	4.95E-05	0.0150	7.875E+15
Am-241	2.0060E-03	37,303.930	74,607.860	0.00E+00	7.48E+01	1.50E+02	0.0250	1.638E+15
Am-242m	4.2429E-07	37,303.930	74,607.860	0.00E+00	1.58E-02	3.17E-02	0.0375	1.428E+15
Am-243	1.4899E-06	37,303.930	74,607.860	0.00E+00	5.56E-02	1.11E-01	0.0575	1.530E+15
C-14	5.7135E-09	37,303.930	74,607.860	0.00E+00	2.13E-04	4.26E-04	0.0850	9.245E+14
Cl-36	1.3124E-32	37,303.930	74,607.860	0.00E+00	4.90E-28	9.79E-28	0.1250	6.256E+14
Cm-243	1.6443E-07	37,303.930	74,607.860	0.00E+00	6.13E-03	1.23E-02	0.2250	7.977E+14
Cm-244	2.9330E-05	37,303.930	74,607.860	0.00E+00	1.09E+00	2.19E+00	0.3750	3.472E+14
Co-60	5.3186E-06	37,303.930	74,607.860	0.00E+00	1.98E-01	3.97E-01	0.5750	5.664E+14
Cs-134	3.1563E-03	37,303.930	74,607.860	0.00E+00	1.18E+02	2.35E+02	0.8500	9.576E+13
Cs-135	3.4477E-06	37,303.930	74,607.860	0.00E+00	1.29E-01	2.57E-01	1.2500	5.468E+13
Cs-137	2.0313E+00	37,303.930	74,607.860	0.00E+00	7.58E+04	1.52E+05	1.7500	2.510E+12
Eu-154	2.4513E-02	37,303.930	74,607.860	0.00E+00	9.14E+02	1.83E+03	2.2500	2.202E+08
Eu-155	4.8175E-03	37,303.930	74,607.860	0.00E+00	1.80E+02	3.59E+02	2.7500	1.245E+08
Fe-55	1.2397E-04	37,303.930	74,607.860	0.00E+00	4.62E+00	9.25E+00	3.5000	5.719E+05
H-3	4.5697E-03	37,303.930	74,607.860	0.00E+00	1.70E+02	3.41E+02	5.0000	3.233E+04
I-129	7.5300E-07	37,303.930	74,607.860	0.00E+00	2.81E-02	5.62E-02	7.0000	3.569E+03
Kr-85	1.0850E-01	37,303.930	74,607.860	0.00E+00	4.05E+03	8.09E+03	11.0000	4.000E+02
Np-237	9.5561E-06	37,303.930	74,607.860	0.00E+00	3.56E-01	7.13E-01		
Pa-231	2.0359E-09	37,303.930	74,607.860	0.00E+00	7.59E-05	1.52E-04		
Pb-210	4.9728E-11	37,303.930	74,607.860	0.00E+00	1.86E-06	3.71E-06		
Pm-147	4.8502E-02	37,303.930	74,607.860	0.00E+00	1.81E+03	3.62E+03		
Pu-238	1.8254E-02	37,303.930	74,607.860	0.00E+00	6.81E+02	1.36E+03		
Pu-239	4.2810E-04	37,303.930	74,607.860	0.00E+00	1.60E+01	3.19E+01		
Pu-240	2.4368E-04	37,303.930	74,607.860	0.00E+00	9.09E+00	1.82E+01		
Pu-241	3.3415E-02	37,303.930	74,607.860	0.00E+00	1.25E+03	2.49E+03		
Pu-242	3.6329E-07	37,303.930	74,607.860	0.00E+00	1.36E-02	2.71E-02		
Ra-226	2.2854E-10	37,303.930	74,607.860	0.00E+00	8.53E-06	1.71E-05		
Ra-228	1.2426E-14	37,303.930	74,607.860	0.00E+00	4.64E-10	9.27E-10		
Ru-106	6.3589E-06	37,303.930	74,607.860	0.00E+00	2.37E-01	4.74E-01		
Se-79	1.2933E-05	37,303.930	74,607.860	0.00E+00	4.82E-01	9.65E-01		
Sn-126	1.1574E-05	37,303.930	74,607.860	0.00E+00	4.32E-01	8.64E-01		
Sr-90	1.9248E+00	37,303.930	74,607.860	0.00E+00	7.18E+04	1.44E+05		
Tc-99	4.2239E-04	37,303.930	74,607.860	0.00E+00	1.58E+01	3.15E+01		
Th-229	5.0953E-12	37,303.930	74,607.860	0.00E+00	1.90E-07	3.80E-07		
Th-230	4.1885E-08	37,303.930	74,607.860	0.00E+00	1.56E-03	3.12E-03		
Th-232	1.9270E-14	37,303.930	74,607.860	0.00E+00	7.19E-10	1.44E-09		
Tl-208	4.6024E-08	37,303.930	74,607.860	0.00E+00	1.72E-03	3.43E-03		
U-232	1.2582E-07	37,303.930	74,607.860	0.00E+00	4.69E-03	9.39E-03		
U-233	2.5825E-09	37,303.930	74,607.860	0.00E+00	9.63E-05	1.93E-04		
U-234	1.8450E-04	37,303.930	74,607.860	0.00E+00	6.88E+00	1.38E+01		
U-235	-2.7235E-06	37,303.930	0.000	3.26E-01	2.25E-01	3.26E-01		
U-236	1.5493E-05	37,303.930	74,607.860	0.00E+00	5.78E-01	1.16E+00		
U-238	-4.2851E-09	37,303.930	0.000	3.74E-03	3.58E-03	3.74E-03		
Y-90	1.9254E+00	37,303.930	74,607.860	0.00E+00	7.18E+04	1.44E+05		
Other Radionuclides					7.21E+04	1.44E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.89E+02	1.78E+03
Total	Total

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 (6061)	ALUM	
BOL HM Constituents:	U3O8	U	
BOL Enrichment %:	93.1408311	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	37,303.930	35,010.739	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.
Bounding:		74,607.860	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.73	0.94	
Bounding:	1.46		

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: HFIR (INNER) 1 Fuel decay start date: 1986
 SNF ID #: 103 Estimates as of: 2010
 Fuel Units & Descr: 437 - 171 CURVED PLATES Template: ATR (Light Water, Alum., 60 to 100%, U)
 Heavy Metal Mass: BOL=1201.31kg ; EOL=929.37kg 2 Template Burnup(MWd): 367.2
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated
 Canister usage:
 18"x10"
 145.67

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	6.6313E-10	276,301.990	552,603.980	0.00E+00	1.83E-04	3.66E-04	0.0150	5.833E+16
Am-241	2.0060E-03	276,301.990	552,603.980	0.00E+00	5.54E+02	1.11E+03	0.0250	1.213E+16
Am-242m	4.2429E-07	276,301.990	552,603.980	0.00E+00	1.17E-01	2.34E-01	0.0375	1.058E+16
Am-243	1.4899E-06	276,301.990	552,603.980	0.00E+00	4.12E-01	8.23E-01	0.0575	1.133E+16
C-14	5.7135E-09	276,301.990	552,603.980	0.00E+00	1.58E-03	3.16E-03	0.0850	6.848E+15
Cl-36	1.3124E-32	276,301.990	552,603.980	0.00E+00	3.63E-27	7.25E-27	0.1250	4.634E+15
Cm-243	1.6443E-07	276,301.990	552,603.980	0.00E+00	4.54E-02	9.09E-02	0.2250	5.909E+15
Cm-244	2.9330E-05	276,301.990	552,603.980	0.00E+00	8.10E+00	1.62E+01	0.3750	2.572E+15
Co-60	5.3186E-06	276,301.990	552,603.980	0.00E+00	1.47E+00	2.94E+00	0.5750	4.196E+16
Cs-134	3.1563E-03	276,301.990	552,603.980	0.00E+00	8.72E+02	1.74E+03	0.8500	7.093E+14
Cs-135	3.4477E-06	276,301.990	552,603.980	0.00E+00	9.53E-01	1.91E+00	1.2500	4.050E+14
Cs-137	2.0313E+00	276,301.990	552,603.980	0.00E+00	5.61E+05	1.12E+06	1.7500	1.859E+13
Eu-154	2.4513E-02	276,301.990	552,603.980	0.00E+00	6.77E+03	1.35E+04	2.2500	1.631E+09
Eu-155	4.8175E-03	276,301.990	552,603.980	0.00E+00	1.33E+03	2.66E+03	2.7500	9.218E+08
Fe-55	1.2397E-04	276,301.990	552,603.980	0.00E+00	3.43E+01	6.85E+01	3.5000	4.236E+06
H-3	4.5697E-03	276,301.990	552,603.980	0.00E+00	1.26E+03	2.53E+03	5.0000	2.394E+05
I-129	7.5300E-07	276,301.990	552,603.980	0.00E+00	2.08E-01	4.16E-01	7.0000	2.644E+04
Kr-85	1.0850E-01	276,301.990	552,603.980	0.00E+00	3.00E+04	6.00E+04	11.0000	2.963E+03
Np-237	9.5561E-06	276,301.990	552,603.980	0.00E+00	2.64E+00	5.28E+00		
Pu-231	2.0359E-09	276,301.990	552,603.980	0.00E+00	5.63E-04	1.13E-03		
Pu-238	4.9728E-11	276,301.990	552,603.980	0.00E+00	1.37E-05	2.75E-05		
Pu-239	4.8502E-02	276,301.990	552,603.980	0.00E+00	1.34E+04	2.68E+04		
Pu-240	1.8254E-02	276,301.990	552,603.980	0.00E+00	5.04E+03	1.01E+04		
Pu-241	4.2810E-04	276,301.990	552,603.980	0.00E+00	1.18E+02	2.37E+02		
Pu-242	2.4368E-04	276,301.990	552,603.980	0.00E+00	6.73E+01	1.35E+02		
Pu-243	3.3415E-02	276,301.990	552,603.980	0.00E+00	9.23E+03	1.85E+04		
Pu-244	3.6329E-07	276,301.990	552,603.980	0.00E+00	1.00E-01	2.01E-01		
Ra-226	2.2854E-10	276,301.990	552,603.980	0.00E+00	6.31E-05	1.26E-04		
Ra-228	1.2426E-14	276,301.990	552,603.980	0.00E+00	3.43E-09	6.87E-09		
Ru-106	6.3589E-06	276,301.990	552,603.980	0.00E+00	1.76E+00	3.51E+00		
Se-79	1.2933E-05	276,301.990	552,603.980	0.00E+00	3.57E+00	7.15E+00		
Sn-126	1.1574E-05	276,301.990	552,603.980	0.00E+00	3.20E+00	6.40E+00		
Sr-90	1.9248E+00	276,301.990	552,603.980	0.00E+00	5.32E+05	1.06E+06		
Tc-99	4.2239E-04	276,301.990	552,603.980	0.00E+00	1.17E+02	2.33E+02		
Th-229	5.0953E-12	276,301.990	552,603.980	0.00E+00	1.41E-06	2.82E-06		
Th-230	4.1885E-08	276,301.990	552,603.980	0.00E+00	1.16E-02	2.31E-02		
Th-232	1.9270E-14	276,301.990	552,603.980	0.00E+00	5.32E-09	1.06E-08		
Ti-208	4.6024E-08	276,301.990	552,603.980	0.00E+00	1.27E-02	2.54E-02		
U-232	1.2582E-07	276,301.990	552,603.980	0.00E+00	3.48E-02	6.95E-02		
U-233	2.5825E-09	276,301.990	552,603.980	0.00E+00	7.14E-04	1.43E-03		
U-234	1.8450E-04	276,301.990	552,603.980	0.00E+00	5.10E+01	1.02E+02		
U-235	-2.7235E-06	276,301.990	0.000	2.42E+00	1.67E+00	2.42E+00		
U-236	1.5493E-05	276,301.990	552,603.980	0.00E+00	4.28E+00	8.56E+00		
U-238	-4.2851E-09	276,301.990	0.000	2.77E-02	2.65E-02	2.77E-02		
Y-90	1.9254E+00	276,301.990	552,603.980	0.00E+00	5.32E+05	1.06E+06		
Other Radionuclides					5.34E+05	1.07E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.59E+03	1.32E+04
Total	Total

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 (6061)	ALUM	
BOL HM Constituents:	U3O8	U	
BOL Enrichment %:	93.1408311	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	276,301.990	257,537.285	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		552,603.980	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.73	0.93	
Bounding:	1.46		

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: HFIR (OUTER) ¹Fuel decay start date: 1996
 SNF ID #: 707 Estimates as of: 2010
 Fuel Units & Descr: 59 - 369 CURVED PLATES Template: ATR (Light Water, Alum., 60 to 100%, U)
 Heavy Metal Mass: BOL=424.68kg ; EOL=351.81kg ²Template Burnup(MWd): 367.2
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated
Canister usage:
24"x10"
19.67

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	6.6313E-10	97,675.503	195,351.006	0.00E+00	6.48E-05	1.30E-04	0.0150	2.062E+16
Am-241	2.0060E-03	97,675.503	195,351.006	0.00E+00	1.96E+02	3.92E+02	0.0250	4.288E+15
Am-242m	4.2429E-07	97,675.503	195,351.006	0.00E+00	4.14E-02	8.29E-02	0.0375	3.740E+15
Am-243	1.4899E-06	97,675.503	195,351.006	0.00E+00	1.46E-01	2.91E-01	0.0575	4.006E+15
C-14	5.7135E-09	97,675.503	195,351.006	0.00E+00	5.58E-04	1.12E-03	0.0850	2.421E+15
Cl-36	1.3124E-32	97,675.503	195,351.006	0.00E+00	1.28E-27	2.56E-27	0.1250	1.638E+15
Cm-243	1.6443E-07	97,675.503	195,351.006	0.00E+00	1.61E-02	3.21E-02	0.2250	2.089E+15
Cm-244	2.9330E-05	97,675.503	195,351.006	0.00E+00	2.86E+00	5.73E+00	0.3750	9.092E+14
Co-60	5.3186E-06	97,675.503	195,351.006	0.00E+00	5.19E-01	1.04E+00	0.5750	1.483E+16
Cs-134	3.1563E-03	97,675.503	195,351.006	0.00E+00	3.08E+02	6.17E+02	0.8500	2.507E+14
Cs-135	3.4477E-06	97,675.503	195,351.006	0.00E+00	3.37E-01	6.74E-01	1.2500	1.432E+14
Cs-137	2.0313E+00	97,675.503	195,351.006	0.00E+00	1.98E+05	3.97E+05	1.7500	6.573E+12
Eu-154	2.4513E-02	97,675.503	195,351.006	0.00E+00	2.39E+03	4.79E+03	2.2500	5.766E+08
Eu-155	4.8175E-03	97,675.503	195,351.006	0.00E+00	4.71E+02	9.41E+02	2.7500	3.259E+08
Fe-55	1.2397E-04	97,675.503	195,351.006	0.00E+00	1.21E+01	2.42E+01	3.5000	1.498E+06
H-3	4.5697E-03	97,675.503	195,351.006	0.00E+00	4.46E+02	8.93E+02	5.0000	8.464E+04
I-129	7.5300E-07	97,675.503	195,351.006	0.00E+00	7.35E-02	1.47E-01	7.0000	9.346E+03
Kr-85	1.0850E-01	97,675.503	195,351.006	0.00E+00	1.06E+04	2.12E+04	11.0000	1.047E+02
Np-237	9.5561E-06	97,675.503	195,351.006	0.00E+00	9.33E-01	1.87E+00		
Pa-231	2.0359E-09	97,675.503	195,351.006	0.00E+00	1.99E-04	3.98E-04		
Pb-210	4.9728E-11	97,675.503	195,351.006	0.00E+00	4.86E-06	9.71E-06		
Pm-147	4.8502E-02	97,675.503	195,351.006	0.00E+00	4.74E+03	9.47E+03		
Pu-238	1.8254E-02	97,675.503	195,351.006	0.00E+00	1.78E+03	3.57E+03		
Pu-239	4.2810E-04	97,675.503	195,351.006	0.00E+00	4.18E+01	8.36E+01		
Pu-240	2.4368E-04	97,675.503	195,351.006	0.00E+00	2.38E+01	4.76E+01		
Pu-241	3.3415E-02	97,675.503	195,351.006	0.00E+00	3.26E+03	6.53E+03		
Pu-242	3.6329E-07	97,675.503	195,351.006	0.00E+00	3.55E-02	7.10E-02		
Ra-226	2.2854E-10	97,675.503	195,351.006	0.00E+00	2.23E-05	4.46E-05		
Ra-228	1.2426E-14	97,675.503	195,351.006	0.00E+00	1.21E-09	2.43E-09		
Ru-106	6.3589E-06	97,675.503	195,351.006	0.00E+00	6.21E-01	1.24E+00		
Sa-79	1.2933E-05	97,675.503	195,351.006	0.00E+00	1.26E+00	2.53E+00		
Sn-126	1.1574E-05	97,675.503	195,351.006	0.00E+00	1.13E+00	2.26E+00		
Sr-90	1.9248E+00	97,675.503	195,351.006	0.00E+00	1.88E+05	3.76E+05		
Tc-99	4.2239E-04	97,675.503	195,351.006	0.00E+00	4.13E+01	8.25E+01		
Th-229	5.0953E-12	97,675.503	195,351.006	0.00E+00	4.98E-07	9.95E-07		
Th-230	4.1885E-08	97,675.503	195,351.006	0.00E+00	4.09E-03	8.18E-03		
Th-232	1.9270E-14	97,675.503	195,351.006	0.00E+00	1.88E-09	3.76E-09		
Tl-208	4.6024E-08	97,675.503	195,351.006	0.00E+00	4.50E-03	8.99E-03		
U-232	1.2582E-07	97,675.503	195,351.006	0.00E+00	1.23E-02	2.46E-02		
U-233	2.5825E-09	97,675.503	195,351.006	0.00E+00	2.52E-04	5.04E-04		
U-234	1.8450E-04	97,675.503	195,351.006	0.00E+00	1.80E+01	3.60E+01		
U-235	-2.7235E-06	97,675.503	0.000	8.55E-01	5.89E-01	8.55E-01		
U-236	1.5493E-05	97,675.503	195,351.006	0.00E+00	1.51E+00	3.03E+00		
U-238	-4.2851E-09	97,675.503	0.000	9.79E-03	9.37E-03	9.79E-03		
Y-90	1.9254E+00	97,675.503	195,351.006	0.00E+00	1.88E+05	3.76E+05		
Other Radionuclides					1.89E+05	3.78E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.33E+03	4.66E+03
Total	Total

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 (6061)	ALUM	
BOL HM Constituents:	U3O8	U	
BOL Enrichment %:	93.14083004	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	97,675.503	69,004.569	
Bounding:		195,351.006	

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:	0.73	0.71
Bounding:	1.46	

Estimated EOL HM/ Given EOL HM: 0.93

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: HFIR (OUTER) ¹Fuel decay start date: 1986
 SNF ID #: 1084 Estimates as of: 2010
 Fuel Units & Descr: 437 - 369 CURVED PLATES Template: ATR (Light Water, Alum., 60 to 100%, U)
 Heavy Metal Mass: BOL=3145.48kg ; EOL=2610.33kg ²Template Burnup(MWd): 367.2
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated
 Canister usage:
 24"x10"
 145.67

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	723,460.929	1,446,921.858	0.00E+00	4.80E-04	9.59E-04	0.0150	1.527E+17
Am-241	2.0060E-03	723,460.929	1,446,921.858	0.00E+00	1.45E+03	2.90E+03	0.0250	3.176E+16
Am-242m	4.2429E-07	723,460.929	1,446,921.858	0.00E+00	3.07E-01	6.14E-01	0.0375	2.770E+16
Am-243	1.4899E-06	723,460.929	1,446,921.858	0.00E+00	1.08E+00	2.16E+00	0.0575	2.967E+16
C-14	5.7135E-09	723,460.929	1,446,921.858	0.00E+00	4.13E-03	8.27E-03	0.0850	1.793E+16
Cl-36	1.3124E-32	723,460.929	1,446,921.858	0.00E+00	9.49E-27	1.90E-26	0.1250	1.213E+16
Cm-243	1.6443E-07	723,460.929	1,446,921.858	0.00E+00	1.19E-01	2.38E-01	0.2250	1.547E+16
Cm-244	2.9330E-05	723,460.929	1,446,921.858	0.00E+00	2.12E+01	4.24E+01	0.3750	6.734E+15
Co-60	5.3186E-06	723,460.929	1,446,921.858	0.00E+00	3.85E+00	7.70E+00	0.5750	1.099E+17
Cs-134	3.1563E-03	723,460.929	1,446,921.858	0.00E+00	2.28E+03	4.57E+03	0.8500	1.857E+15
Cs-135	3.4477E-06	723,460.929	1,446,921.858	0.00E+00	2.49E+00	4.99E+00	1.2500	1.061E+15
Cs-137	2.0313E+00	723,460.929	1,446,921.858	0.00E+00	1.47E+06	2.94E+06	1.7500	4.868E+13
Eu-154	2.4513E-02	723,460.929	1,446,921.858	0.00E+00	1.77E+04	3.55E+04	2.2500	4.271E+09
Eu-155	4.8175E-03	723,460.929	1,446,921.858	0.00E+00	3.49E+03	6.97E+03	2.7500	2.414E+09
Fe-55	1.2397E-04	723,460.929	1,446,921.858	0.00E+00	8.97E+01	1.79E+02	3.5000	1.109E+07
H-3	4.5697E-03	723,460.929	1,446,921.858	0.00E+00	3.31E+03	6.61E+03	5.0000	6.269E+05
I-129	7.5300E-07	723,460.929	1,446,921.858	0.00E+00	5.45E-01	1.09E+00	7.0000	6.922E+04
Kr-85	1.0850E-01	723,460.929	1,446,921.858	0.00E+00	7.85E+04	1.57E+05	11.0000	7.758E+03
Np-237	9.5561E-06	723,460.929	1,446,921.858	0.00E+00	6.91E+00	1.38E+01		
Pa-231	2.0359E-09	723,460.929	1,446,921.858	0.00E+00	1.47E-03	2.95E-03		
Pb-210	4.9728E-11	723,460.929	1,446,921.858	0.00E+00	3.60E-05	7.20E-05		
Pm-147	4.8502E-02	723,460.929	1,446,921.858	0.00E+00	3.51E+04	7.02E+04		
Pu-238	1.8254E-02	723,460.929	1,446,921.858	0.00E+00	1.32E+04	2.64E+04		
Pu-239	4.2810E-04	723,460.929	1,446,921.858	0.00E+00	3.10E+02	6.19E+02		
Pu-240	2.4368E-04	723,460.929	1,446,921.858	0.00E+00	1.76E+02	3.53E+02		
Pu-241	3.3415E-02	723,460.929	1,446,921.858	0.00E+00	2.42E+04	4.83E+04		
Pu-242	3.6329E-07	723,460.929	1,446,921.858	0.00E+00	2.63E-01	5.26E-01		
Ra-226	2.2854E-10	723,460.929	1,446,921.858	0.00E+00	1.65E-04	3.31E-04		
Ra-228	1.2426E-14	723,460.929	1,446,921.858	0.00E+00	8.99E-09	1.80E-08		
Ru-106	6.3589E-06	723,460.929	1,446,921.858	0.00E+00	4.60E+00	9.20E+00		
Se-79	1.2933E-05	723,460.929	1,446,921.858	0.00E+00	9.36E+00	1.87E+01		
Sn-126	1.1574E-05	723,460.929	1,446,921.858	0.00E+00	8.37E+00	1.67E+01		
Sr-90	1.9248E+00	723,460.929	1,446,921.858	0.00E+00	1.39E+06	2.79E+06		
Tc-99	4.2239E-04	723,460.929	1,446,921.858	0.00E+00	3.06E+02	6.11E+02		
Th-229	5.0953E-12	723,460.929	1,446,921.858	0.00E+00	3.69E-06	7.37E-06		
Th-230	4.1885E-08	723,460.929	1,446,921.858	0.00E+00	3.03E-02	6.06E-02		
Th-232	1.9270E-14	723,460.929	1,446,921.858	0.00E+00	1.39E-08	2.79E-08		
Th-208	4.6024E-08	723,460.929	1,446,921.858	0.00E+00	3.33E-02	6.66E-02		
U-232	1.2582E-07	723,460.929	1,446,921.858	0.00E+00	9.10E-02	1.82E-01		
U-233	2.5825E-09	723,460.929	1,446,921.858	0.00E+00	1.87E-03	3.74E-03		
U-234	1.8450E-04	723,460.929	1,446,921.858	0.00E+00	1.33E+02	2.67E+02		
U-235	-2.7235E-06	723,460.929	0.000	6.33E+00	4.36E+00	6.33E+00		
U-236	1.5493E-05	723,460.929	1,446,921.858	0.00E+00	1.12E+01	2.24E+01		
U-238	-4.2851E-09	723,460.929	0.000	7.25E-02	6.94E-02	7.25E-02		
Y-90	1.9254E+00	723,460.929	1,446,921.858	0.00E+00	1.39E+06	2.79E+06		
Other Radionuclides					1.40E+06	2.80E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.72E+04	3.45E+04
Total	Total

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 (6061)	ALUM	
BOL HM Constituents:	U3O8	U	
BOL Enrichment %:	93.14083004	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	723,460.929	506,797.621	
Bounding:		1,446,921.858	

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:	0.73	0.70
Bounding:	1.46	

Estimated EOL HM/ Given EOL HM: 0.93

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: HIFAR (AUSTRALIA)
 SNF ID #: 680
 Fuel Units & Descr: 240 - 12 CURVED PLATES
 Heavy Metal Mass: BOL=45.19kg ; EOL=33.62kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1998
 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
³Template Decay Time: 10 years

Estimated
 Canister usage:
 18"x10"
 6.67

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma-Sources	
							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	1.3262E-10	10,655.320	21,310.639	0.00E+00	1.41E-06	2.83E-06	0.0150	2.913E+15
Am-241	5.9611E-03	10,655.320	21,310.639	0.00E+00	6.35E+01	1.27E+02	0.0250	6.071E+14
Am-242m	1.4332E-06	10,655.320	21,310.639	0.00E+00	1.53E-02	3.05E-02	0.0375	5.493E+14
Am-243	3.7132E-05	10,655.320	21,310.639	0.00E+00	3.96E-01	7.91E-01	0.0575	5.653E+14
C-14	2.6501E-08	10,655.320	21,310.639	0.00E+00	2.82E-04	5.65E-04	0.0850	3.502E+14
Cf-252	4.4441E-31	10,655.320	21,310.639	0.00E+00	4.74E-27	9.47E-27	1.2500	2.623E+14
Cm-243	7.2722E-06	10,655.320	21,310.639	0.00E+00	7.75E-02	1.55E-01	0.2250	2.956E+14
Cm-244	6.8226E-03	10,655.320	21,310.639	0.00E+00	7.27E+01	1.45E+02	0.3750	1.306E+14
Co-60	1.8117E-04	10,655.320	21,310.639	0.00E+00	1.93E+00	3.86E+00	0.5750	2.359E+15
Cs-134	3.0595E-01	10,655.320	21,310.639	0.00E+00	3.26E+03	6.52E+03	0.8500	2.767E+14
Cs-135	4.2564E-06	10,655.320	21,310.639	0.00E+00	4.54E-02	9.07E-02	1.2500	6.953E+13
Cs-137	2.5650E+00	10,655.320	21,310.639	0.00E+00	2.73E+04	5.47E+04	1.7500	2.003E+12
Eu-154	1.1628E-01	10,655.320	21,310.639	0.00E+00	1.24E+03	2.48E+03	2.2500	8.767E+10
Eu-155	5.7776E-02	10,655.320	21,310.639	0.00E+00	6.16E+02	1.23E+03	2.7500	1.310E+09
Fe-55	1.9465E-02	10,655.320	21,310.639	0.00E+00	2.07E+02	4.15E+02	3.5000	1.590E+08
H-3	8.1045E-03	10,655.320	21,310.639	0.00E+00	8.64E+01	1.73E+02	5.0000	9.223E+05
I-129	6.6403E-07	10,655.320	21,310.639	0.00E+00	7.08E-03	1.42E-02	7.0000	1.060E+05
Kr-85	2.0620E-01	10,655.320	21,310.639	0.00E+00	2.20E+03	4.39E+03	11.0000	1.216E+04
Np-237	3.1513E-05	10,655.320	21,310.639	0.00E+00	3.36E-01	6.72E-01		
Pa-231	6.0304E-10	10,655.320	21,310.639	0.00E+00	6.43E-06	1.29E-05		
Pb-210	2.7017E-12	10,655.320	21,310.639	0.00E+00	2.88E-08	5.76E-08		
Pm-147	3.4210E-01	10,655.320	21,310.639	0.00E+00	3.65E+03	7.29E+03		
Pu-238	1.6622E-01	10,655.320	21,310.639	0.00E+00	1.77E+03	3.54E+03		
Pu-239	6.9563E-04	10,655.320	21,310.639	0.00E+00	7.41E+00	1.48E+01		
Pu-240	3.7169E-04	10,655.320	21,310.639	0.00E+00	3.96E+00	7.92E+00		
Pu-241	2.1731E-01	10,655.320	21,310.639	0.00E+00	2.32E+03	4.63E+03		
Pu-242	3.0911E-06	10,655.320	21,310.639	0.00E+00	3.29E-02	6.59E-02		
Ra-226	1.9435E-11	10,655.320	21,310.639	0.00E+00	2.07E-07	4.14E-07		
Ra-228	6.1725E-15	10,655.320	21,310.639	0.00E+00	6.58E-11	1.32E-10		
Ru-106	7.0778E-03	10,655.320	21,310.639	0.00E+00	7.54E+01	1.51E+02		
Se-79	1.2339E-05	10,655.320	21,310.639	0.00E+00	1.31E-01	2.63E-01		
Sn-126	1.0194E-05	10,655.320	21,310.639	0.00E+00	1.09E-01	2.17E-01		
Sr-90	2.4186E+00	10,655.320	21,310.639	0.00E+00	2.58E+04	5.15E+04		
Tc-99	3.8056E-04	10,655.320	21,310.639	0.00E+00	4.05E+00	8.11E+00		
Th-229	2.0097E-12	10,655.320	21,310.639	0.00E+00	2.14E-08	4.28E-08		
Th-230	6.0577E-09	10,655.320	21,310.639	0.00E+00	6.45E-05	1.29E-04		
Th-232	1.2473E-14	10,655.320	21,310.639	0.00E+00	1.33E-10	2.66E-10		
Ti-208	4.8791E-08	10,655.320	21,310.639	0.00E+00	5.20E-04	1.04E-03		
U-232	1.3821E-07	10,655.320	21,310.639	0.00E+00	1.47E-03	2.95E-03		
U-233	2.3906E-09	10,655.320	21,310.639	0.00E+00	2.55E-05	5.09E-05		
U-234	4.7697E-05	10,655.320	21,310.639	0.00E+00	5.08E-01	1.02E+00		
U-235	2.8661E-06	10,655.320	0.000	7.80E-02	4.74E-02	7.80E-02		
U-236	1.6701E-05	10,655.320	21,310.639	0.00E+00	1.78E-01	3.56E-01		
U-238	9.4194E-09	10,655.320	0.000	3.06E-03	2.96E-03	3.06E-03		
Y-90	2.4192E+00	10,655.320	21,310.639	0.00E+00	2.58E+04	5.16E+04		
Other Radionuclides					2.67E+04	5.33E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.20E+02	8.41E+02
Total	Total

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-ALX	U	
BOL Enrichment %:	79.82556621	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		10,655.320	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		21,310.639	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.54		1.01
Bounding:	1.08		

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: HOR (NETHERLANDS)
 SNF ID #: 713
 Fuel Units & Descr: 33 - ASSEMBLY
 Heavy Metal Mass: BOL=6.55kg ; EOL=4.01kg
 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"
 1.38

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)		
Ac-227	6.6313E-10	2,406.376	4,812.753	0.00E+00	1.60E-06	3.19E-06	Avg. MeV	
Am-241	2.0060E-03	2,406.376	4,812.753	0.00E+00	4.83E+00	9.65E+00	0.0150	5.080E+14
Am-242m	4.2429E-07	2,406.376	4,812.753	0.00E+00	1.02E-03	2.04E-03	0.0250	1.056E+14
Am-243	1.4899E-06	2,406.376	4,812.753	0.00E+00	3.59E-03	7.17E-03	0.0375	9.215E+13
C-14	5.7135E-09	2,406.376	4,812.753	0.00E+00	1.37E-05	2.75E-05	0.0575	9.869E+13
Cl-36	1.3124E-32	2,406.376	4,812.753	0.00E+00	3.16E-29	6.32E-29	0.0850	5.964E+13
Cm-243	1.6443E-07	2,406.376	4,812.753	0.00E+00	3.96E-04	7.91E-04	0.1250	4.036E+13
Cm-244	2.9330E-05	2,406.376	4,812.753	0.00E+00	7.06E-02	1.41E-01	0.2250	5.146E+13
Co-60	5.3186E-06	2,406.376	4,812.753	0.00E+00	1.28E-02	2.56E-02	0.3750	2.240E+13
Cs-134	3.1563E-03	2,406.376	4,812.753	0.00E+00	7.60E+00	1.52E+01	0.5750	3.654E+14
Cs-135	3.4477E-06	2,406.376	4,812.753	0.00E+00	8.30E-03	1.66E-02	0.8500	6.177E+12
Cs-137	2.0313E+00	2,406.376	4,812.753	0.00E+00	4.89E+03	9.78E+03	1.2500	3.528E+12
Eu-154	2.4513E-02	2,406.376	4,812.753	0.00E+00	5.90E+01	1.18E+02	1.7500	1.619E+11
Eu-155	4.8175E-03	2,406.376	4,812.753	0.00E+00	1.16E+01	2.32E+01	2.2500	1.421E+07
Fe-55	1.2397E-04	2,406.376	4,812.753	0.00E+00	2.98E-01	5.97E-01	2.7500	8.028E+06
H-3	4.5697E-03	2,406.376	4,812.753	0.00E+00	1.10E+01	2.20E+01	3.5000	3.689E+04
I-129	7.5300E-07	2,406.376	4,812.753	0.00E+00	1.81E-03	3.62E-03	5.0000	2.085E+03
Kr-85	1.0850E-01	2,406.376	4,812.753	0.00E+00	2.61E+02	5.22E+02	7.0000	2.302E+01
Np-237	9.5561E-06	2,406.376	4,812.753	0.00E+00	2.30E-02	4.60E-02	11.0000	2.580E+02
Pa-231	2.0359E-09	2,406.376	4,812.753	0.00E+00	4.90E-06	9.80E-06		
Pb-210	4.9728E-11	2,406.376	4,812.753	0.00E+00	1.20E-07	2.39E-07		
Pm-147	4.8502E-02	2,406.376	4,812.753	0.00E+00	1.17E+02	2.33E+02		
Pu-238	1.8254E-02	2,406.376	4,812.753	0.00E+00	4.39E+01	8.79E+01		
Pu-239	4.2810E-04	2,406.376	4,812.753	0.00E+00	1.03E+00	2.06E+00		
Pu-240	2.4368E-04	2,406.376	4,812.753	0.00E+00	5.86E-01	1.17E+00		
Pu-241	3.3415E-02	2,406.376	4,812.753	0.00E+00	8.04E+01	1.61E+02		
Pu-242	3.6329E-07	2,406.376	4,812.753	0.00E+00	8.74E-04	1.75E-03		
Ra-226	2.2854E-10	2,406.376	4,812.753	0.00E+00	5.50E-07	1.10E-06		
Ra-228	1.2426E-14	2,406.376	4,812.753	0.00E+00	2.99E-11	5.98E-11		
Ru-106	6.3589E-06	2,406.376	4,812.753	0.00E+00	1.53E-02	3.06E-02		
Se-79	1.2933E-05	2,406.376	4,812.753	0.00E+00	3.11E-02	6.22E-02		
Sn-126	1.1574E-05	2,406.376	4,812.753	0.00E+00	2.79E-02	5.57E-02		
Sr-90	1.9248E+00	2,406.376	4,812.753	0.00E+00	4.63E+03	9.26E+03		
Tc-99	4.2239E-04	2,406.376	4,812.753	0.00E+00	1.02E+00	2.03E+00		
Th-229	5.0953E-12	2,406.376	4,812.753	0.00E+00	1.23E-08	2.45E-08		
Th-230	4.1885E-08	2,406.376	4,812.753	0.00E+00	1.01E-04	2.02E-04		
Th-232	1.9270E-14	2,406.376	4,812.753	0.00E+00	4.64E-11	9.27E-11		
Th-208	4.6024E-08	2,406.376	4,812.753	0.00E+00	1.11E-04	2.22E-04		
U-232	1.2582E-07	2,406.376	4,812.753	0.00E+00	3.03E-04	6.06E-04		
U-233	2.5825E-09	2,406.376	4,812.753	0.00E+00	6.21E-06	1.24E-05		
U-234	1.8450E-04	2,406.376	4,812.753	0.00E+00	4.44E-01	8.88E-01		
U-235	-2.7235E-06	2,406.376	0.000	1.32E-02	6.63E-03	1.32E-02		
U-236	1.5493E-05	2,406.376	4,812.753	0.00E+00	3.73E-02	7.46E-02		
U-238	-4.2851E-09	2,406.376	0.000	1.51E-04	1.41E-04	1.51E-04		
Y-90	1.9254E+00	2,406.376	4,812.753	0.00E+00	4.63E+03	9.27E+03		
Other Radionuclides					4.65E+03	9.31E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.74E+01	1.15E+02
Total	Total

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-ALX	U	
BOL Enrichment %:	93.13082871	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		2,406.376	
Bounding:		4,812.753	

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:	1.17	
Bounding:	2.33	

Estimated EOL HM/Given EOL HM: 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: HTGR (PEACH BOTTOM SCRAP)
 SNF ID #: 935
 Fuel Units & Descr: 21 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=18.72kg ; EOL=16.34kg
 ROD Storage Sits: INEEL

¹Fuel decay start date: 1967
 Estimates as of: 2010
 Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
²Template Burnup(MWd): 1270.275
 Template BOL Heavy Metal Mass (MT): 0.012702752
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x15"
 1.62

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	3.8818E-06	2,252.151	4,504.302	0.00E+00	8.74E-03	1.75E-02	0.0150	3.161E+14
Am-241	3.1387E-03	2,252.151	4,504.302	0.00E+00	7.07E+00	1.41E+01	0.0250	6.475E+13
Am-242m	2.3971E-06	2,252.151	4,504.302	0.00E+00	5.40E-03	1.08E-02	0.0375	5.643E+13
Am-243	4.6069E-05	2,252.151	4,504.302	0.00E+00	1.04E-01	2.08E-01	0.0575	6.070E+13
C-14	2.3121E-05	2,252.151	4,504.302	0.00E+00	5.21E-02	1.04E-01	0.0850	3.665E+13
Cl-36	1.0667E-06	2,252.151	4,504.302	0.00E+00	2.40E-03	4.80E-03	0.1250	2.472E+13
Cm-243	2.5357E-05	2,252.151	4,504.302	0.00E+00	5.71E-02	1.14E-01	0.2250	3.179E+13
Cm-244	6.4458E-03	2,252.151	4,504.302	0.00E+00	1.45E+01	2.90E+01	0.3750	1.374E+13
Co-60	4.5014E-04	2,252.151	4,504.302	0.00E+00	1.01E+00	2.03E+00	0.5750	2.231E+14
Cs-134	3.8086E-05	2,252.151	4,504.302	0.00E+00	8.58E-02	1.72E-01	0.8500	3.525E+12
Cs-135	2.4711E-05	2,252.151	4,504.302	0.00E+00	5.57E-02	1.11E-01	1.2500	2.273E+12
Cs-137	1.3273E+00	2,252.151	4,504.302	0.00E+00	2.99E+03	5.98E+03	1.7500	1.080E+11
Eu-154	1.5705E-02	2,252.151	4,504.302	0.00E+00	3.54E+01	7.07E+01	2.2500	7.954E+06
Eu-155	1.0415E-03	2,252.151	4,504.302	0.00E+00	2.35E+00	4.69E+00	2.7500	9.415E+10
Fe-55	4.4707E-08	2,252.151	4,504.302	0.00E+00	1.01E-04	2.01E-04	3.5000	4.498E+05
H-3	3.9094E-03	2,252.151	4,504.302	0.00E+00	8.80E+00	1.76E+01	5.0000	1.918E+05
I-129	1.0092E-06	2,252.151	4,504.302	0.00E+00	2.27E-03	4.55E-03	7.0000	2.204E+04
Kr-85	3.9519E-02	2,252.151	4,504.302	0.00E+00	8.90E+01	1.78E+02	11.0000	2.527E+03
Np-237	1.2541E-05	2,252.151	4,504.302	0.00E+00	2.82E-02	5.65E-02		
Pa-231	4.7376E-06	2,252.151	4,504.302	0.00E+00	1.07E-02	2.13E-02		
Pb-210	1.4194E-09	2,252.151	4,504.302	0.00E+00	3.20E-06	6.39E-06		
Pm-147	1.5146E-04	2,252.151	4,504.302	0.00E+00	3.41E-01	6.82E-01		
Pu-238	1.6248E-01	2,252.151	4,504.302	0.00E+00	3.66E+02	7.32E+02		
Pu-239	1.3580E-04	2,252.151	4,504.302	0.00E+00	3.06E-01	6.12E-01		
Pu-240	2.7136E-04	2,252.151	4,504.302	0.00E+00	6.11E-01	1.22E+00		
Pu-241	1.9342E-02	2,252.151	4,504.302	0.00E+00	4.36E+01	8.71E+01		
Pu-242	3.8866E-06	2,252.151	4,504.302	0.00E+00	8.75E-03	1.75E-02		
Ra-226	2.7923E-09	2,252.151	4,504.302	0.00E+00	6.29E-06	1.26E-05		
Ra-228	9.1791E-07	2,252.151	4,504.302	0.00E+00	2.07E-03	4.13E-03		
Ru-106	3.5205E-11	2,252.151	4,504.302	0.00E+00	7.93E-08	1.59E-07		
Se-79	2.1082E-05	2,252.151	4,504.302	0.00E+00	4.75E-02	9.50E-02		
Sn-126	2.2192E-05	2,252.151	4,504.302	0.00E+00	5.00E-02	1.00E-01		
Sr-90	1.2667E+00	2,252.151	4,504.302	0.00E+00	2.85E+03	5.71E+03		
Tc-99	3.3331E-04	2,252.151	4,504.302	0.00E+00	7.51E-01	1.50E+00		
Th-229	1.0612E-05	2,252.151	4,504.302	0.00E+00	2.39E-02	4.78E-02		
Th-230	1.8878E-07	2,252.151	4,504.302	0.00E+00	4.25E-04	8.50E-04		
Th-232	-6.9673E-08	2,252.151	0.000	1.85E-03	1.69E-03	1.85E-03		
Tl-208	5.9530E-04	2,252.151	4,504.302	0.00E+00	1.34E+00	2.68E+00		
U-232	1.6115E-03	2,252.151	4,504.302	0.00E+00	3.63E+00	7.26E+00		
U-233	2.0602E-03	2,252.151	4,504.302	0.00E+00	4.64E+00	9.28E+00		
U-234	2.8939E-04	2,252.151	4,504.302	0.00E+00	6.52E-01	1.30E+00		
U-235	-1.7343E-06	2,252.151	0.000	3.70E-03	0.00E+00	3.70E-03		
U-236	8.6281E-06	2,252.151	4,504.302	0.00E+00	1.94E-02	3.89E-02		
U-238	-5.6065E-09	2,252.151	0.000	3.68E-05	2.42E-05	3.68E-05		
Y-90	1.2667E+00	2,252.151	4,504.302	0.00E+00	2.85E+03	5.71E+03		
Other Radionuclides					2.87E+03	5.74E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.80E+01	9.59E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	GRAPHITE	GRAPHITE	
Fuel Cladding:	BISO IN GRAPHIT	GRAPHITE	
BOL HM Constituents:	Th-UC	Th and U	
BOL Enrichment %:	80.23127938	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	1,239.494	2,252.151	
Bounding:	1,361.222	4,504.302	

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:	1.20	1.82	
Bounding:	2.41	3.31	

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: HTRE (ANP)
 SNF ID #: 105
 Fuel Units & Descr: 13 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=4.55kg ; EOL=4.04kg
 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"
 0.36

II. Estimates

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	2.3344E-08	482.620	965.241	0.00E+00	1.13E-05	2.25E-05	0.0150	7.204E+13
Am-241	1.1135E-04	482.620	965.241	0.00E+00	5.37E-02	1.07E-01	0.0250	1.497E+13
Am-242m	8.5075E-09	482.620	965.241	0.00E+00	4.11E-06	8.21E-06	0.0375	1.295E+13
Am-243	9.8519E-10	482.620	965.241	0.00E+00	4.75E-07	9.51E-07	0.0575	1.396E+13
C-14	2.3012E-04	482.620	965.241	0.00E+00	1.11E-01	2.22E-01	0.0850	8.434E+12
Cl-36	1.2261E-06	482.620	965.241	0.00E+00	5.92E-04	1.18E-03	0.1250	5.476E+12
Cm-243	2.4875E-10	482.620	965.241	0.00E+00	1.20E-07	2.40E-07	0.2250	7.259E+12
Cm-244	2.3178E-09	482.620	965.241	0.00E+00	1.12E-06	2.24E-06	0.3750	3.166E+12
Co-60	7.0849E-02	482.620	965.241	0.00E+00	3.42E+01	6.84E+01	0.5750	5.216E+13
Cs-134	3.0266E-06	482.620	965.241	0.00E+00	1.46E-03	2.92E-03	0.8500	5.280E+11
Cs-135	3.0316E-05	482.620	965.241	0.00E+00	1.46E-02	2.93E-02	1.2500	5.248E+12
Cs-137	1.4511E+00	482.620	965.241	0.00E+00	7.00E+02	1.40E+03	1.7500	1.362E+10
Eu-154	6.6955E-04	482.620	965.241	0.00E+00	3.23E-01	6.46E-01	2.2500	2.827E+07
Eu-155	6.9850E-04	482.620	965.241	0.00E+00	3.37E-01	6.74E-01	2.7500	8.173E+05
Fe-55	1.2318E-03	482.620	965.241	0.00E+00	5.94E-01	1.19E+00	3.5000	5.812E+01
H-3	2.5141E-03	482.620	965.241	0.00E+00	1.21E+00	2.43E+00	5.0000	2.391E+01
I-129	7.3195E-07	482.620	965.241	0.00E+00	3.53E-04	7.07E-04	7.0000	2.640E+00
Kr-85	4.1281E-02	482.620	965.241	0.00E+00	1.99E+01	3.98E+01	11.0000	2.963E-01
Np-237	1.1489E-06	482.620	965.241	0.00E+00	5.54E-04	1.11E-03		
Pa-231	4.5241E-08	482.620	965.241	0.00E+00	2.18E-05	4.37E-05		
Pb-210	6.4476E-13	482.620	965.241	0.00E+00	3.11E-10	6.22E-10		
Pm-147	1.1651E-03	482.620	965.241	0.00E+00	5.62E-01	1.12E+00		
Pu-238	2.9517E-04	482.620	965.241	0.00E+00	1.42E-01	2.85E-01		
Pu-239	6.6772E-04	482.620	965.241	0.00E+00	3.22E-01	6.45E-01		
Pu-240	8.6839E-05	482.620	965.241	0.00E+00	4.19E-02	8.38E-02		
Pu-241	7.1514E-04	482.620	965.241	0.00E+00	3.45E-01	6.90E-01		
Pu-242	1.9717E-09	482.620	965.241	0.00E+00	9.52E-07	1.90E-06		
Ra-226	1.7654E-12	482.620	965.241	0.00E+00	8.52E-10	1.70E-09		
Ra-228	8.2928E-12	482.620	965.241	0.00E+00	4.00E-09	8.00E-09		
Ru-106	1.8419E-10	482.620	965.241	0.00E+00	8.89E-08	1.78E-07		
Se-79	1.3223E-05	482.620	965.241	0.00E+00	6.38E-03	1.28E-02		
Sn-126	1.1493E-05	482.620	965.241	0.00E+00	5.55E-03	1.11E-02		
Sr-90	1.3649E+00	482.620	965.241	0.00E+00	6.59E+02	1.32E+03		
Tc-99	4.6656E-04	482.620	965.241	0.00E+00	2.25E-01	4.50E-01		
Th-229	1.4547E-11	482.620	965.241	0.00E+00	7.02E-09	1.40E-08		
Th-230	1.6617E-10	482.620	965.241	0.00E+00	8.02E-08	1.60E-07		
Th-232	8.3361E-12	482.620	965.241	0.00E+00	4.02E-09	8.05E-09		
Ti-208	2.1664E-08	482.620	965.241	0.00E+00	1.05E-05	2.09E-05		
U-232	5.8669E-08	482.620	965.241	0.00E+00	2.83E-05	5.66E-05		
U-233	3.1847E-09	482.620	965.241	0.00E+00	1.54E-06	3.07E-06		
U-234	3.8769E-07	482.620	965.241	0.00E+00	1.87E-04	3.74E-04		
U-235	-2.7761E-06	482.620	0.000	9.16E-03	7.82E-03	9.16E-03		
U-236	1.6190E-05	482.620	965.241	0.00E+00	7.81E-03	1.56E-02		
U-238	-2.8547E-09	482.620	0.000	1.05E-04	1.03E-04	1.05E-04		
Y-90	1.3652E+00	482.620	965.241	0.00E+00	6.59E+02	1.32E+03		
Other Radionuclides					7.97E+02	1.59E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.43E+00	1.69E+01
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	This Template was used for the following reasons: This fuel matches on all parameters except cladding (SST is conservative).
BOL HM Constituents:	NICHROME	SST	
BOL Enrichment %:	UO2	U	
	93.15	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		482.620	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
		965.241	

Checks		
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup
Bounding:	2.27	
	4.55	
		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: HWCTR 3EMT-2
 SNF ID #: 118
 Fuel Units & Descr: 7 - TUBE
 Heavy Metal Mass: BOL= : EOL=8.11kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1964
 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"x10"
 0.16

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	4.6920E-09	7,772.046	7,772.046	0.00E+00	3.65E-05	3.65E-05	0.0150	5.422E+14
Am-241	2.2880E-02	7,772.046	7,772.046	0.00E+00	1.78E+02	1.78E+02	0.0250	1.123E+14
Am-242m	3.5400E-06	7,772.046	7,772.046	0.00E+00	2.75E-02	2.75E-02	0.0375	9.881E+13
Am-243	2.0580E-06	7,772.046	7,772.046	0.00E+00	1.60E-02	1.60E-02	0.0575	1.070E+14
C-14	1.1264E-03	7,772.046	7,772.046	0.00E+00	8.75E+00	8.75E+00	0.0850	6.309E+13
Cl-36	8.3760E-11	7,772.046	7,772.046	0.00E+00	6.51E-07	6.51E-07	0.1250	4.163E+13
Cm-243	5.0340E-07	7,772.046	7,772.046	0.00E+00	3.91E-03	3.91E-03	0.2250	5.435E+13
Cm-244	1.0450E-05	7,772.046	7,772.046	0.00E+00	8.12E-02	8.12E-02	0.3750	2.364E+13
Co-60	6.4420E-02	7,772.046	7,772.046	0.00E+00	5.01E+02	5.01E+02	0.5750	4.137E+14
Cs-134	7.9240E-06	7,772.046	7,772.046	0.00E+00	6.16E-02	6.16E-02	0.8500	4.775E+12
Cs-135	7.9140E-06	7,772.046	7,772.046	0.00E+00	6.15E-02	6.15E-02	1.2500	3.934E+13
Cs-137	1.4316E+00	7,772.046	7,772.046	0.00E+00	1.11E+04	1.11E+04	1.7500	1.294E+11
Eu-154	6.7900E-03	7,772.046	7,772.046	0.00E+00	5.28E+01	5.28E+01	2.2500	2.073E+08
Eu-155	6.2800E-04	7,772.046	7,772.046	0.00E+00	4.88E+00	4.88E+00	2.7500	1.326E+07
Fe-55	5.7480E-05	7,772.046	7,772.046	0.00E+00	4.47E-01	4.47E-01	3.5000	4.000E+04
H-3	2.3800E-02	7,772.046	7,772.046	0.00E+00	1.85E+02	1.85E+02	5.0000	1.678E+04
I-129	7.5020E-07	7,772.046	7,772.046	0.00E+00	5.83E-03	5.83E-03	7.0000	1.888E+03
Kr-85	3.8220E-02	7,772.046	7,772.046	0.00E+00	2.97E-02	2.97E-02	11.0000	2.143E+02
Np-237	5.5780E-06	7,772.046	7,772.046	0.00E+00	4.34E-02	4.34E-02		
Pa-231	7.8820E-09	7,772.046	7,772.046	0.00E+00	6.13E-05	6.13E-05		
Pb-210	4.3840E-09	7,772.046	7,772.046	0.00E+00	3.41E-05	3.41E-05		
Pm-147	9.9500E-04	7,772.046	7,772.046	0.00E+00	7.73E+00	7.73E+00		
Pu-238	6.4240E-03	7,772.046	7,772.046	0.00E+00	4.99E+01	4.99E+01		
Pu-239	1.8744E-02	7,772.046	7,772.046	0.00E+00	1.46E+02	1.46E+02		
Pu-240	8.3540E-03	7,772.046	7,772.046	0.00E+00	6.49E+01	6.49E+01		
Pu-241	1.4806E-01	7,772.046	7,772.046	0.00E+00	1.14E+03	1.14E+03		
Pu-242	2.0400E-06	7,772.046	7,772.046	0.00E+00	1.59E-02	1.59E-02		
Ra-226	1.1804E-08	7,772.046	7,772.046	0.00E+00	9.17E-05	9.17E-05		
Ra-228	1.1864E-09	7,772.046	7,772.046	0.00E+00	9.22E-06	9.22E-06		
Ru-106	3.2580E-10	7,772.046	7,772.046	0.00E+00	2.53E-06	2.53E-06		
Se-79	1.2524E-05	7,772.046	7,772.046	0.00E+00	9.73E-02	9.73E-02		
Sn-126	1.2052E-05	7,772.046	7,772.046	0.00E+00	9.37E-02	9.37E-02		
Sr-90	1.2638E+00	7,772.046	7,772.046	0.00E+00	9.82E+03	9.82E+03		
Tc-99	4.4140E-04	7,772.046	7,772.046	0.00E+00	3.43E+00	3.43E+00		
Th-229	4.3480E-09	7,772.046	7,772.046	0.00E+00	3.38E-05	3.38E-05		
Th-230	1.0760E-06	7,772.046	7,772.046	0.00E+00	8.36E-03	8.36E-03		
Th-232	1.1926E-09	7,772.046	7,772.046	0.00E+00	9.27E-06	9.27E-06		
Ti-208	4.6200E-08	7,772.046	7,772.046	0.00E+00	3.59E-04	3.59E-04		
U-232	1.2406E-07	7,772.046	7,772.046	0.00E+00	9.64E-04	9.64E-04		
U-233	9.1620E-07	7,772.046	7,772.046	0.00E+00	7.12E-03	7.12E-03		
U-234	2.3440E-03	7,772.046	7,772.046	0.00E+00	1.82E+01	1.82E+01		
U-235	-2.3296E-06	7,772.046	0.000	1.75E-03	0.00E+00	1.75E-03		
U-236	2.6620E-05	7,772.046	7,772.046	0.00E+00	2.07E-01	2.07E-01		
U-238	-1.3291E-07	7,772.046	0.000	5.13E-03	4.09E-03	5.13E-03		
Y-90	1.2642E+00	7,772.046	7,772.046	0.00E+00	9.83E+03	9.83E+03		
Other Radionuclides					1.06E+04	1.06E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.43E+02	1.43E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	HEAVY WATER	HEAVY WATER	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U-Mo	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		7,772.046	Nominal burnup set equal to bounding burnup.
Bounding:		7,772.046	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:	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: HWCTR DRIVER
 SNF ID #: 117
 Fuel Units & Descr: 76 - TUBE
 Heavy Metal Mass: BOL= : EOL=36.13kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1964
 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"
 3.45

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)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.6920E-09	34,632.914	34,632.914	0.00E+00	1.62E-04	1.62E-04	Avg. MeV	
Am-241	2.2880E-02	34,632.914	34,632.914	0.00E+00	7.92E+02	7.92E+02	0.0150	2.416E+15
Am-242m	3.5400E-06	34,632.914	34,632.914	0.00E+00	1.23E-01	1.23E-01	0.0250	5.005E+14
Am-243	2.0580E-06	34,632.914	34,632.914	0.00E+00	7.13E-02	7.13E-02	0.0375	4.403E+14
C-14	1.1264E-03	34,632.914	34,632.914	0.00E+00	3.90E+01	3.90E+01	0.0575	4.767E+14
Cl-36	8.3760E-11	34,632.914	34,632.914	0.00E+00	2.90E-06	2.90E-06	0.0850	2.811E+14
Cm-243	5.0340E-07	34,632.914	34,632.914	0.00E+00	1.74E-02	1.74E-02	0.1250	1.855E+14
Cm-244	1.0450E-05	34,632.914	34,632.914	0.00E+00	3.62E-01	3.62E-01	0.2250	2.422E+14
Co-60	6.4420E-02	34,632.914	34,632.914	0.00E+00	2.23E+03	2.23E+03	0.3750	1.053E+14
Cs-134	7.9240E-06	34,632.914	34,632.914	0.00E+00	2.74E-01	2.74E-01	0.5750	1.843E+15
Cs-135	7.9140E-06	34,632.914	34,632.914	0.00E+00	2.74E-01	2.74E-01	0.8500	2.128E+13
Cs-137	1.4316E+00	34,632.914	34,632.914	0.00E+00	4.96E+04	4.96E+04	1.2500	1.753E+14
Eu-154	6.7900E-03	34,632.914	34,632.914	0.00E+00	2.35E+02	2.35E+02	1.7500	5.767E+11
Eu-155	6.2800E-04	34,632.914	34,632.914	0.00E+00	2.17E+01	2.17E+01	2.2500	9.237E+08
Fe-55	5.7480E-05	34,632.914	34,632.914	0.00E+00	1.99E+00	1.99E+00	2.7500	5.909E+07
H-3	2.3800E-02	34,632.914	34,632.914	0.00E+00	8.24E+02	8.24E+02	3.5000	1.782E+05
I-129	7.5020E-07	34,632.914	34,632.914	0.00E+00	2.60E-02	2.60E-02	5.0000	7.479E+04
Kr-85	3.8220E-02	34,632.914	34,632.914	0.00E+00	1.32E+03	1.32E+03	7.0000	8.413E+03
Np-237	5.5780E-06	34,632.914	34,632.914	0.00E+00	1.93E-01	1.93E-01	11.0000	9.548E+02
Pa-231	7.8820E-09	34,632.914	34,632.914	0.00E+00	2.73E-04	2.73E-04		
Pb-210	4.3840E-09	34,632.914	34,632.914	0.00E+00	1.52E-04	1.52E-04		
Pm-147	9.9500E-04	34,632.914	34,632.914	0.00E+00	3.45E+01	3.45E+01		
Pu-238	6.4240E-03	34,632.914	34,632.914	0.00E+00	2.22E+02	2.22E+02		
Pu-239	1.8744E-02	34,632.914	34,632.914	0.00E+00	6.49E+02	6.49E+02		
Pu-240	8.3540E-03	34,632.914	34,632.914	0.00E+00	2.89E+02	2.89E+02		
Pu-241	1.4606E-01	34,632.914	34,632.914	0.00E+00	5.06E+03	5.06E+03		
Pu-242	2.0400E-06	34,632.914	34,632.914	0.00E+00	7.07E-02	7.07E-02		
Ra-226	1.1804E-08	34,632.914	34,632.914	0.00E+00	4.09E-04	4.09E-04		
Ra-228	1.1864E-09	34,632.914	34,632.914	0.00E+00	4.11E-05	4.11E-05		
Ru-106	3.2580E-10	34,632.914	34,632.914	0.00E+00	1.13E-05	1.13E-05		
Se-79	1.2524E-05	34,632.914	34,632.914	0.00E+00	4.34E-01	4.34E-01		
Sn-126	1.2052E-05	34,632.914	34,632.914	0.00E+00	4.17E-01	4.17E-01		
Sr-90	1.2638E+00	34,632.914	34,632.914	0.00E+00	4.38E+04	4.38E+04		
Tc-99	4.4140E-04	34,632.914	34,632.914	0.00E+00	1.53E+01	1.53E+01		
Th-229	4.3480E-09	34,632.914	34,632.914	0.00E+00	1.51E-04	1.51E-04		
Th-230	1.0760E-06	34,632.914	34,632.914	0.00E+00	3.73E-02	3.73E-02		
Th-232	1.1926E-09	34,632.914	34,632.914	0.00E+00	4.13E-05	4.13E-05		
Ti-208	4.6200E-08	34,632.914	34,632.914	0.00E+00	1.60E-03	1.60E-03		
U-232	1.2406E-07	34,632.914	34,632.914	0.00E+00	4.30E-03	4.30E-03		
U-233	9.1620E-07	34,632.914	34,632.914	0.00E+00	3.17E-02	3.17E-02		
U-234	2.3440E-03	34,632.914	34,632.914	0.00E+00	8.12E+01	8.12E+01		
U-235	-2.3296E-06	34,632.914	0.000	7.81E-03	0.00E+00	7.81E-03		
U-236	2.6620E-05	34,632.914	34,632.914	0.00E+00	9.22E-01	9.22E-01		
U-238	-1.3291E-07	34,632.914	0.000	2.28E-02	1.82E-02	2.28E-02		
Y-90	1.2642E+00	34,632.914	34,632.914	0.00E+00	4.38E+04	4.38E+04		
Other Radionuclides					4.72E+04	4.72E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.36E+02	6.36E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	HEAVY WATER	HEAVY WATER	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U-Zr	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
		34,632.914	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		34,632.914	

Checks		
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup
	32.83	
Bounding:	32.83	

Estimated EOL HM/Given EOL HM: 2.59

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: HWCTR ETWO
 SNF ID #: 867
 Fuel Units & Descr: 6 - TUBE
 Heavy Metal Mass: BOL = ; EOL=45.46kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1964
 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"
 0.27

II. Estimates

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)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.6920E-09	43,571.999	43,571.999	0.00E+00	2.04E-04	2.04E-04	Avg. MeV	
Am-241	2.2880E-02	43,571.999	43,571.999	0.00E+00	9.97E+02	9.97E+02	0.0150	3.040E+15
Am-242m	3.5400E-06	43,571.999	43,571.999	0.00E+00	1.54E-01	1.54E-01	0.0250	6.297E+14
Am-243	2.0580E-06	43,571.999	43,571.999	0.00E+00	8.97E-02	8.97E-02	0.0375	5.539E+14
C-14	1.1264E-03	43,571.999	43,571.999	0.00E+00	4.91E+01	4.91E+01	0.0575	5.998E+14
Cl-36	8.3760E-11	43,571.999	43,571.999	0.00E+00	3.65E-06	3.65E-06	0.0850	3.537E+14
Cm-243	5.0340E-07	43,571.999	43,571.999	0.00E+00	2.19E-02	2.19E-02	0.1250	2.334E+14
Cm-244	1.0450E-05	43,571.999	43,571.999	0.00E+00	4.55E-01	4.55E-01	0.2250	3.047E+14
Co-60	6.4420E-02	43,571.999	43,571.999	0.00E+00	2.81E+03	2.81E+03	0.3750	1.325E+14
Cs-134	7.9240E-06	43,571.999	43,571.999	0.00E+00	3.45E-01	3.45E-01	0.5750	2.319E+15
Cs-135	7.9140E-06	43,571.999	43,571.999	0.00E+00	3.45E-01	3.45E-01	0.8500	2.677E+13
Cs-137	1.4316E+00	43,571.999	43,571.999	0.00E+00	6.24E+04	6.24E+04	1.2500	2.206E+14
Eu-154	6.7900E-03	43,571.999	43,571.999	0.00E+00	2.96E+02	2.96E+02	1.7500	7.256E+11
Eu-155	6.2800E-04	43,571.999	43,571.999	0.00E+00	2.74E+01	2.74E+01	2.2500	1.162E+09
Fe-55	5.7480E-05	43,571.999	43,571.999	0.00E+00	2.50E+00	2.50E+00	2.7500	7.434E+07
H-3	2.3800E-02	43,571.999	43,571.999	0.00E+00	1.04E+03	1.04E+03	3.5000	2.242E+05
I-129	7.5020E-07	43,571.999	43,571.999	0.00E+00	3.27E-02	3.27E-02	5.0000	9.410E+04
Kr-85	3.8220E-02	43,571.999	43,571.999	0.00E+00	1.67E+03	1.67E+03	7.0000	1.058E+04
Np-237	5.5780E-06	43,571.999	43,571.999	0.00E+00	2.43E-01	2.43E-01	11.0000	1.201E+03
Pa-231	7.8820E-09	43,571.999	43,571.999	0.00E+00	3.43E-04	3.43E-04		
Pb-210	4.3840E-09	43,571.999	43,571.999	0.00E+00	1.91E-04	1.91E-04		
Pm-147	9.9500E-04	43,571.999	43,571.999	0.00E+00	4.34E+01	4.34E+01		
Pu-238	6.4240E-03	43,571.999	43,571.999	0.00E+00	2.80E+02	2.80E+02		
Pu-239	1.8744E-02	43,571.999	43,571.999	0.00E+00	8.17E+02	8.17E+02		
Pu-240	8.3540E-03	43,571.999	43,571.999	0.00E+00	3.64E+02	3.64E+02		
Pu-241	1.4606E-01	43,571.999	43,571.999	0.00E+00	6.36E+03	6.36E+03		
Pu-242	2.0400E-06	43,571.999	43,571.999	0.00E+00	8.89E-02	8.89E-02		
Ra-226	1.1804E-08	43,571.999	43,571.999	0.00E+00	5.14E-04	5.14E-04		
Ra-228	1.1864E-09	43,571.999	43,571.999	0.00E+00	5.17E-05	5.17E-05		
Ru-106	3.2580E-10	43,571.999	43,571.999	0.00E+00	1.42E-05	1.42E-05		
Se-79	1.2524E-05	43,571.999	43,571.999	0.00E+00	5.46E-01	5.46E-01		
Sn-126	1.2052E-05	43,571.999	43,571.999	0.00E+00	5.25E-01	5.25E-01		
Sr-90	1.2638E+00	43,571.999	43,571.999	0.00E+00	5.51E+04	5.51E+04		
Tc-99	4.4140E-04	43,571.999	43,571.999	0.00E+00	1.92E+01	1.92E+01		
Th-229	4.3480E-09	43,571.999	43,571.999	0.00E+00	1.89E-04	1.89E-04		
Th-230	1.0760E-06	43,571.999	43,571.999	0.00E+00	4.69E-02	4.69E-02		
Th-232	1.1926E-09	43,571.999	43,571.999	0.00E+00	5.20E-05	5.20E-05		
Th-208	4.6200E-08	43,571.999	43,571.999	0.00E+00	2.01E-03	2.01E-03		
U-232	1.2406E-07	43,571.999	43,571.999	0.00E+00	5.41E-03	5.41E-03		
U-233	9.1620E-07	43,571.999	43,571.999	0.00E+00	3.99E-02	3.99E-02		
U-234	2.3440E-03	43,571.999	43,571.999	0.00E+00	1.02E+02	1.02E+02		
U-235	2.3296E-06	43,571.999	0.00	9.83E-03	0.00E+00	9.83E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	2.6620E-05	43,571.999	43,571.999	0.00E+00	1.16E+00	1.16E+00	8.01E+02	8.01E+02
U-238	1.3291E-07	43,571.999	0.00	2.87E-02	2.29E-02	2.87E-02	Total	Total
Y-90	1.2642E+00	43,571.999	43,571.999	0.00E+00	5.51E+04	5.51E+04		
Other Radionuclides					5.94E+04	5.94E+04		

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 enrichment (unknown).
BOL HM Constituents:	ZIRC-2	ZIRC	
BOL Enrichment %:	U METAL	U	
		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		43,571.999	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
		43,571.999	

Checks			
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Bounding:	32.83		
	32.83		

¹Reactor shutdown, cora 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: HWCTR IMT
 SNF ID #: 113
 Fuel Units & Descr: 82 - TUBE
 Heavy Metal Mass: BOL= ; EOL=92.77kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1964
 Estimates as of: 2010
 Template: HFBR (Heavy Water, SST, 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"x10"
 1.15

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	5.6840E-09	88,573.243	88,573.243	0.00E+00	5.03E-04	5.03E-04	Avg. MeV	
Am-241	2.1380E-01	88,573.243	88,573.243	0.00E+00	1.89E+04	1.89E+04	0.0150	6.362E+15
Am-242m	1.0302E-04	88,573.243	88,573.243	0.00E+00	9.12E+00	9.12E+00	0.0250	1.244E+15
Am-243	5.2400E-05	88,573.243	88,573.243	0.00E+00	4.64E+00	4.64E+00	0.0375	1.082E+15
C-14	2.2160E-02	88,573.243	88,573.243	0.00E+00	1.96E+03	1.96E+03	0.0575	1.351E+15
Cl-36	4.1880E-04	88,573.243	88,573.243	0.00E+00	3.71E+01	3.71E+01	0.0850	6.359E+14
Cm-243	1.6766E-05	88,573.243	88,573.243	0.00E+00	1.49E+00	1.49E+00	0.1250	4.128E+14
Cm-244	7.3320E-04	88,573.243	88,573.243	0.00E+00	6.49E+01	6.49E+01	0.2250	5.168E+14
Co-60	5.1480E+00	88,573.243	88,573.243	0.00E+00	4.56E+05	4.56E+05	0.3750	2.229E+14
Cs-134	1.7300E-05	88,573.243	88,573.243	0.00E+00	1.53E+00	1.53E+00	0.5750	4.726E+15
Cs-135	3.7460E-06	88,573.243	88,573.243	0.00E+00	3.32E-01	3.32E-01	0.8500	5.263E+13
Cs-137	1.4426E+00	88,573.243	88,573.243	0.00E+00	1.28E+05	1.28E+05	1.2500	3.377E+16
Eu-154	9.2140E-03	88,573.243	88,573.243	0.00E+00	8.16E+02	8.16E+02	1.7500	1.399E+12
Eu-155	8.1360E-04	88,573.243	88,573.243	0.00E+00	7.21E+01	7.21E+01	2.2500	1.789E+11
Fe-55	5.3720E-02	88,573.243	88,573.243	0.00E+00	4.76E+03	4.76E+03	2.7500	1.032E+09
H-3	4.4560E-02	88,573.243	88,573.243	0.00E+00	3.95E+03	3.95E+03	3.5000	2.506E+06
I-129	9.1660E-07	88,573.243	88,573.243	0.00E+00	8.12E-02	8.12E-02	5.0000	1.048E+06
Kr-85	3.2380E-02	88,573.243	88,573.243	0.00E+00	2.87E+03	2.87E+03	7.0000	1.178E+05
Np-237	1.9674E-05	88,573.243	88,573.243	0.00E+00	1.74E+00	1.74E+00	11.0000	1.335E+04
Pa-231	9.3700E-09	88,573.243	88,573.243	0.00E+00	8.30E-04	8.30E-04		
Pb-210	4.0520E-09	88,573.243	88,573.243	0.00E+00	3.59E-04	3.59E-04		
Pm-147	7.8900E-04	88,573.243	88,573.243	0.00E+00	6.99E+01	6.99E+01		
Pu-238	3.6340E-02	88,573.243	88,573.243	0.00E+00	3.22E+03	3.22E+03		
Pu-239	6.5100E-02	88,573.243	88,573.243	0.00E+00	5.77E+03	5.77E+03		
Pu-240	2.6700E-02	88,573.243	88,573.243	0.00E+00	2.36E+03	2.36E+03		
Pu-241	1.3616E+00	88,573.243	88,573.243	0.00E+00	1.21E+05	1.21E+05		
Pu-242	1.6742E-05	88,573.243	88,573.243	0.00E+00	1.48E+00	1.48E+00		
Ra-226	1.0912E-08	88,573.243	88,573.243	0.00E+00	9.67E-04	9.67E-04		
Ra-228	2.0780E-10	88,573.243	88,573.243	0.00E+00	1.84E-05	1.84E-05		
Ru-106	7.4020E-10	88,573.243	88,573.243	0.00E+00	6.56E-05	6.56E-05		
Se-79	2.8500E-05	88,573.243	88,573.243	0.00E+00	2.52E+00	2.52E+00		
Sn-126	1.7794E-05	88,573.243	88,573.243	0.00E+00	1.58E+00	1.58E+00		
Sr-90	1.0372E+00	88,573.243	88,573.243	0.00E+00	9.19E+04	9.19E+04		
Tc-99	4.3360E-04	88,573.243	88,573.243	0.00E+00	3.84E+01	3.84E+01		
Th-229	1.9490E-09	88,573.243	88,573.243	0.00E+00	1.73E-04	1.73E-04		
Th-230	9.9520E-07	88,573.243	88,573.243	0.00E+00	8.81E-02	8.81E-02		
Th-232	2.0900E-10	88,573.243	88,573.243	0.00E+00	1.85E-05	1.85E-05		
Th-208	1.5278E-07	88,573.243	88,573.243	0.00E+00	1.35E-02	1.35E-02		
U-232	4.1360E-07	88,573.243	88,573.243	0.00E+00	3.66E-02	3.66E-02		
U-233	4.1200E-07	88,573.243	88,573.243	0.00E+00	3.65E-02	3.65E-02		
U-234	2.1700E-03	88,573.243	88,573.243	0.00E+00	1.92E+02	1.92E+02		
U-235	-1.7036E-06	88,573.243	0.000	2.01E-02	0.00E+00	2.01E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	2.6080E-05	88,573.243	88,573.243	0.00E+00	2.31E+00	2.31E+00	9.57E+03	9.57E+03
U-238	-5.1291E-07	88,573.243	0.000	5.87E-02	1.32E-02	5.87E-02	Total	Total
Y-90	1.0374E+00	88,573.243	88,573.243	0.00E+00	9.19E+04	9.19E+04		
Other Radionuclides					7.62E+05	7.62E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.57E+03	9.57E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	HEAVY WATER	HEAVY WATER	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U METAL	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		88,573.243	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		88,573.243	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	32.70		
Bounding:	32.70		

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: HWCTR IRO
 SNF ID #: 976
 Fuel Units & Descr: 2 - TUBE
 Heavy Metal Mass: BOL = , EOL=5.41kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1964
 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"x10"
 0.02

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)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.6920E-09	5,183.089	5,183.089	0.00E+00	2.43E-05	2.43E-05	Avg. MeV	
Am-241	2.2880E-02	5,183.089	5,183.089	0.00E+00	1.19E+02	1.19E+02	0.0150	3.616E+14
Am-242m	3.5400E-06	5,183.089	5,183.089	0.00E+00	1.83E-02	1.83E-02	0.0250	7.490E+13
Am-243	2.0580E-06	5,183.089	5,183.089	0.00E+00	1.07E-02	1.07E-02	0.0375	6.589E+13
C-14	1.1264E-03	5,183.089	5,183.089	0.00E+00	5.84E+00	5.84E+00	0.0575	7.135E+13
Cl-36	8.3760E-11	5,183.089	5,183.089	0.00E+00	4.34E-07	4.34E-07	0.0850	4.207E+13
Cm-243	5.0340E-07	5,183.089	5,183.089	0.00E+00	2.61E-03	2.61E-03	0.1250	2.776E+13
Cm-244	1.0450E-05	5,183.089	5,183.089	0.00E+00	5.42E-02	5.42E-02	0.2250	3.624E+13
Co-60	6.4420E-02	5,183.089	5,183.089	0.00E+00	3.34E+02	3.34E+02	0.3750	1.576E+13
Cs-134	7.9240E-06	5,183.089	5,183.089	0.00E+00	4.11E-02	4.11E-02	0.5750	2.759E+14
Cs-135	7.9140E-06	5,183.089	5,183.089	0.00E+00	4.10E-02	4.10E-02	0.8500	3.184E+12
Cs-137	1.4316E+00	5,183.089	5,183.089	0.00E+00	7.42E+03	7.42E+03	1.2500	2.624E+13
Eu-154	6.7900E-03	5,183.089	5,183.089	0.00E+00	3.52E+01	3.52E+01	1.7500	8.631E+10
Eu-155	6.2800E-04	5,183.089	5,183.089	0.00E+00	3.25E+00	3.25E+00	2.2500	1.382E+08
Fe-55	5.7480E-05	5,183.089	5,183.089	0.00E+00	2.98E-01	2.98E-01	2.7500	8.843E+06
H-3	2.3800E-02	5,183.089	5,183.089	0.00E+00	1.23E+02	1.23E+02	3.5000	2.667E+04
I-129	7.5020E-07	5,183.089	5,183.089	0.00E+00	3.89E-03	3.89E-03	5.0000	1.119E+04
Kr-85	3.8220E-02	5,183.089	5,183.089	0.00E+00	1.98E+02	1.98E+02	7.0000	1.259E+03
Np-237	5.5780E-06	5,183.089	5,183.089	0.00E+00	2.89E-02	2.89E-02	11.0000	1.429E+02
Pa-231	7.8820E-09	5,183.089	5,183.089	0.00E+00	4.09E-05	4.09E-05		
Pb-210	4.3840E-09	5,183.089	5,183.089	0.00E+00	2.27E-05	2.27E-05		
Pm-147	9.9500E-04	5,183.089	5,183.089	0.00E+00	5.16E+00	5.16E+00		
Pu-238	6.4240E-03	5,183.089	5,183.089	0.00E+00	3.33E+01	3.33E+01		
Pu-239	1.8744E-02	5,183.089	5,183.089	0.00E+00	9.72E+01	9.72E+01		
Pu-240	8.3540E-03	5,183.089	5,183.089	0.00E+00	4.33E+01	4.33E+01		
Pu-241	1.4606E-01	5,183.089	5,183.089	0.00E+00	7.57E+02	7.57E+02		
Pu-242	2.0400E-06	5,183.089	5,183.089	0.00E+00	1.06E-02	1.06E-02		
Ra-226	1.1804E-08	5,183.089	5,183.089	0.00E+00	6.12E-05	6.12E-05		
Ra-228	1.1864E-09	5,183.089	5,183.089	0.00E+00	6.15E-06	6.15E-06		
Ru-106	3.2580E-10	5,183.089	5,183.089	0.00E+00	1.69E-06	1.69E-06		
Se-79	1.2524E-05	5,183.089	5,183.089	0.00E+00	6.49E-02	6.49E-02		
Sn-126	1.2052E-05	5,183.089	5,183.089	0.00E+00	6.25E-02	6.25E-02		
Sr-90	1.2638E+00	5,183.089	5,183.089	0.00E+00	6.55E+03	6.55E+03		
Tc-99	4.4140E-04	5,183.089	5,183.089	0.00E+00	2.29E+00	2.29E+00		
Th-229	4.3480E-09	5,183.089	5,183.089	0.00E+00	2.25E-05	2.25E-05		
Th-230	1.0760E-06	5,183.089	5,183.089	0.00E+00	5.58E-03	5.58E-03		
Th-232	1.1926E-09	5,183.089	5,183.089	0.00E+00	6.18E-06	6.18E-06		
Ti-208	4.6200E-08	5,183.089	5,183.089	0.00E+00	2.39E-04	2.39E-04		
U-232	1.2406E-07	5,183.089	5,183.089	0.00E+00	6.43E-04	6.43E-04		
U-233	9.1620E-07	5,183.089	5,183.089	0.00E+00	4.75E-03	4.75E-03		
U-234	2.3440E-03	5,183.089	5,183.089	0.00E+00	1.21E+01	1.21E+01		
U-235	-2.3296E-06	5,183.089	0.000	1.17E-03	0.00E+00	1.17E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	2.6620E-05	5,183.089	5,183.089	0.00E+00	1.38E-01	1.38E-01	9.52E+01	9.52E+01
U-238	-1.3291E-07	5,183.089	0.000	3.42E-03	2.73E-03	3.42E-03	Total	Total
Y-90	1.2642E+00	5,183.089	5,183.089	0.00E+00	6.55E+03	6.55E+03		
Other Radionuclides					7.07E+03	7.07E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
HEAVY WATER	HEAVY WATER	HEAVY WATER	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
5,183.089	5,183.089	5,183.089	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		5,183.089	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup	
32.83	32.83	2.59	
Bounding:	32.83		

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: HWCTR IS
 SNF ID #: 977
 Fuel Units & Descr: 3 - TUBE
 Heavy Metal Mass: BOL= ; EOL=15.78kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1964
 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"
 0.14

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	4.6920E-09	15,122.233	15,122.233	0.00E+00	7.10E-05	7.10E-05	0.0150	1.055E+15
Am-241	2.2880E-02	15,122.233	15,122.233	0.00E+00	3.46E+02	3.46E+02	0.0250	2.185E+14
Am-242m	3.5400E-06	15,122.233	15,122.233	0.00E+00	5.35E-02	5.35E-02	0.0375	1.923E+14
Am-243	2.0580E-06	15,122.233	15,122.233	0.00E+00	3.11E-02	3.11E-02	0.0575	2.082E+14
C-14	1.1264E-03	15,122.233	15,122.233	0.00E+00	1.70E+01	1.70E+01	0.0850	1.228E+14
Cl-36	8.3760E-11	15,122.233	15,122.233	0.00E+00	1.27E-06	1.27E-06	0.1250	8.099E+13
Cm-243	5.0340E-07	15,122.233	15,122.233	0.00E+00	7.61E-03	7.61E-03	0.2250	1.057E+14
Cm-244	1.0450E-05	15,122.233	15,122.233	0.00E+00	1.58E-01	1.58E-01	0.3750	4.599E+13
Co-60	6.4420E-02	15,122.233	15,122.233	0.00E+00	9.74E+02	9.74E+02	0.5750	8.049E+14
Cs-134	7.9240E-06	15,122.233	15,122.233	0.00E+00	1.20E-01	1.20E-01	0.8500	9.290E+13
Cs-135	7.9140E-06	15,122.233	15,122.233	0.00E+00	1.20E-01	1.20E-01	1.2500	7.655E+12
Cs-137	1.4316E+00	15,122.233	15,122.233	0.00E+00	2.16E+04	2.16E+04	1.7500	2.518E+11
Eu-154	6.7900E-03	15,122.233	15,122.233	0.00E+00	1.03E+02	1.03E+02	2.2500	4.033E+08
Eu-155	6.2800E-04	15,122.233	15,122.233	0.00E+00	9.50E+00	9.50E+00	2.7500	2.580E+07
Fe-55	5.7480E-05	15,122.233	15,122.233	0.00E+00	8.69E-01	8.69E-01	3.5000	7.782E+04
H-3	2.3800E-02	15,122.233	15,122.233	0.00E+00	3.60E+02	3.60E+02	5.0000	3.266E+04
I-129	7.5020E-07	15,122.233	15,122.233	0.00E+00	1.13E-02	1.13E-02	7.0000	3.674E+03
Kr-85	3.8220E-02	15,122.233	15,122.233	0.00E+00	5.78E+02	5.78E+02	11.0000	4.169E+02
Np-237	5.5780E-06	15,122.233	15,122.233	0.00E+00	8.44E-02	8.44E-02		
Pa-231	7.8820E-09	15,122.233	15,122.233	0.00E+00	1.19E-04	1.19E-04		
Pb-210	4.3840E-09	15,122.233	15,122.233	0.00E+00	6.63E-05	6.63E-05		
Pm-147	9.9500E-04	15,122.233	15,122.233	0.00E+00	1.50E+01	1.50E+01		
Pu-238	6.4240E-03	15,122.233	15,122.233	0.00E+00	9.71E+01	9.71E+01		
Pu-239	1.8744E-02	15,122.233	15,122.233	0.00E+00	2.83E+02	2.83E+02		
Pu-240	8.3540E-03	15,122.233	15,122.233	0.00E+00	1.26E+02	1.26E+02		
Pu-241	1.4606E-01	15,122.233	15,122.233	0.00E+00	2.21E+03	2.21E+03		
Pu-242	2.0400E-06	15,122.233	15,122.233	0.00E+00	3.08E-02	3.08E-02		
Ra-226	1.1804E-08	15,122.233	15,122.233	0.00E+00	1.79E-04	1.79E-04		
Ra-228	1.1864E-09	15,122.233	15,122.233	0.00E+00	1.79E-05	1.79E-05		
Ru-106	3.2580E-10	15,122.233	15,122.233	0.00E+00	4.93E-06	4.93E-06		
Se-79	1.2524E-05	15,122.233	15,122.233	0.00E+00	1.89E-01	1.89E-01		
Sn-126	1.2052E-05	15,122.233	15,122.233	0.00E+00	1.82E-01	1.82E-01		
Sr-90	1.2638E+00	15,122.233	15,122.233	0.00E+00	1.91E+04	1.91E+04		
Tc-99	4.4140E-04	15,122.233	15,122.233	0.00E+00	6.67E+00	6.67E+00		
Th-229	4.3480E-09	15,122.233	15,122.233	0.00E+00	6.58E-05	6.58E-05		
Th-230	1.0760E-06	15,122.233	15,122.233	0.00E+00	1.63E-02	1.63E-02		
Th-232	1.1926E-09	15,122.233	15,122.233	0.00E+00	1.80E-05	1.80E-05		
Ti-208	4.6200E-08	15,122.233	15,122.233	0.00E+00	6.99E-04	6.99E-04		
U-232	1.2406E-07	15,122.233	15,122.233	0.00E+00	1.88E-03	1.88E-03		
U-233	9.1620E-07	15,122.233	15,122.233	0.00E+00	1.39E-02	1.39E-02		
U-234	2.3440E-03	15,122.233	15,122.233	0.00E+00	3.54E+01	3.54E+01		
U-235	-2.3296E-06	15,122.233	0.000	3.41E-03	0.00E+00	3.41E-03		
U-236	2.6620E-05	15,122.233	15,122.233	0.00E+00	4.03E-01	4.03E-01		
U-238	-1.3291E-07	15,122.233	0.000	9.97E-03	7.96E-03	9.97E-03		
Y-90	1.2642E+00	15,122.233	15,122.233	0.00E+00	1.91E+04	1.91E+04		
Other Radionuclides					2.06E+04	2.06E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.78E+02	2.78E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	HEAVY WATER	HEAVY WATER	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U-Zr	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		15,122.233	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		15,122.233	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	32.83		2.59
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: HWCTR OT
 SNF ID #: 283
 Fuel Units & Descr: 8 - TUBE
 Heavy Metal Mass: BOL = EOL=139.53kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1963
 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"x15"
 0.36

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	8.7758E-10	209.629	209.629	0.00E+00	1.84E-07	1.84E-07	0.0150	1.128E+13
Am-241	1.4352E-01	209.629	209.629	0.00E+00	3.01E+01	3.01E+01	0.0250	2.275E+12
Am-242m	2.8698E-04	209.629	209.629	0.00E+00	6.02E-02	6.02E-02	0.0375	2.169E+12
Am-243	6.2565E-04	209.629	209.629	0.00E+00	1.31E-01	1.31E-01	0.0575	2.506E+12
C-14	4.7901E-05	209.629	209.629	0.00E+00	1.00E-02	1.00E-02	0.0850	1.262E+12
Ci-36	8.0297E-07	209.629	209.629	0.00E+00	1.68E-04	1.68E-04	0.1250	8.758E+11
Cm-243	2.5081E-04	209.629	209.629	0.00E+00	5.26E-02	5.26E-02	0.2250	1.082E+12
Cm-244	4.9015E-02	209.629	209.629	0.00E+00	1.03E+01	1.03E+01	0.3750	4.653E+11
Co-60	2.5581E-03	209.629	209.629	0.00E+00	5.36E-01	5.36E-01	0.5750	1.082E+13
Cs-134	4.0536E-05	209.629	209.629	0.00E+00	8.50E-03	8.50E-03	0.8500	1.497E+11
Cs-135	1.4433E-05	209.629	209.629	0.00E+00	3.03E-03	3.03E-03	1.2500	1.471E+11
Cs-137	1.3979E+00	209.629	209.629	0.00E+00	2.93E+02	2.93E+02	1.7500	4.405E+09
Eu-154	2.0203E-02	209.629	209.629	0.00E+00	4.24E+00	4.24E+00	2.2500	7.098E+05
Eu-155	1.7684E-03	209.629	209.629	0.00E+00	3.71E-01	3.71E-01	2.7500	1.459E+06
Fe-55	4.3136E-05	209.629	209.629	0.00E+00	9.04E-03	9.04E-03	3.5000	1.499E+05
H-3	2.0769E-02	209.629	209.629	0.00E+00	4.35E+00	4.35E+00	5.0000	6.407E+04
I-129	9.8288E-07	209.629	209.629	0.00E+00	2.06E-04	2.06E-04	7.0000	7.385E+03
Kr-85	2.8214E-02	209.629	209.629	0.00E+00	5.91E+00	5.91E+00	11.0000	8.482E+02
Np-237	1.1218E-05	209.629	209.629	0.00E+00	2.35E-03	2.35E-03		
Pa-231	1.3036E-09	209.629	209.629	0.00E+00	2.73E-07	2.73E-07		
Pb-210	8.5078E-11	209.629	209.629	0.00E+00	1.78E-08	1.78E-08		
Pm-147	3.6531E-04	209.629	209.629	0.00E+00	7.66E-02	7.66E-02		
Pu-238	7.4564E-02	209.629	209.629	0.00E+00	1.56E+01	1.56E+01		
Pu-239	1.1623E-02	209.629	209.629	0.00E+00	2.44E+00	2.44E+00		
Pu-240	1.5132E-02	209.629	209.629	0.00E+00	3.17E+00	3.17E+00		
Pu-241	9.0036E-01	209.629	209.629	0.00E+00	1.89E+02	1.89E+02		
Pu-242	6.4260E-05	209.629	209.629	0.00E+00	1.35E-02	1.35E-02		
Ra-226	2.2804E-10	209.629	209.629	0.00E+00	4.78E-08	4.78E-08		
Ra-228	5.2713E-12	209.629	209.629	0.00E+00	1.11E-09	1.11E-09		
Ru-106	6.1160E-10	209.629	209.629	0.00E+00	1.28E-07	1.28E-07		
Se-79	1.2377E-05	209.629	209.629	0.00E+00	2.59E-03	2.59E-03		
Sn-126	2.5210E-05	209.629	209.629	0.00E+00	5.28E-03	5.28E-03		
Sr-90	9.1667E-01	209.629	209.629	0.00E+00	1.92E+02	1.92E+02		
Tc-99	3.9357E-04	209.629	209.629	0.00E+00	8.25E-02	8.25E-02		
Th-229	1.2057E-10	209.629	209.629	0.00E+00	2.53E-08	2.53E-08		
Th-230	2.1043E-08	209.629	209.629	0.00E+00	4.41E-06	4.41E-06		
Th-232	5.2972E-12	209.629	209.629	0.00E+00	1.11E-09	1.11E-09		
Ti-208	1.7474E-07	209.629	209.629	0.00E+00	3.66E-05	3.66E-05		
U-232	4.7368E-07	209.629	209.629	0.00E+00	9.93E-05	9.93E-05		
U-233	2.5097E-08	209.629	209.629	0.00E+00	5.26E-06	5.26E-06		
U-234	5.0000E-05	209.629	209.629	0.00E+00	1.05E-02	1.05E-02		
U-235	-1.4489E-06	209.629	0.000	9.66E-03	9.36E-03	9.66E-03		
U-236	7.5824E-06	209.629	209.629	0.00E+00	1.59E-03	1.59E-03	4.82E+00	4.82E+00
U-238	-2.6129E-07	209.629	0.000	4.54E-02	4.54E-02	4.54E-02	Total	Total
Y-90	9.1699E-01	209.629	209.629	0.00E+00	1.92E+02	1.92E+02		
Other Radionuclides					2.81E+02	2.81E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.82E+00	4.82E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: LIGHT WATER	Used: LIGHT WATER	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated: 209.629	Nominal burnup set equal to bounding burnup. Bounding burnup taken from SFD and converted to MWd using BOL=139.752kg
Bounding:		209.629	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier: 0.04	Estimated Burnup/Given Burnup	1.00
Bounding:	0.04		

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: HWCTR RMT & SMT
 SNF ID #: 790
 Fuel Units & Descr: 10 - TUBE
 Heavy Metal Mass: BOL = : EOL=63.75kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1964
 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							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	4.6920E-09	61,103.939	61,103.939	0.00E+00	2.87E-04	2.87E-04	0.0150	4.263E+15
Am-241	2.2880E-02	61,103.939	61,103.939	0.00E+00	1.40E+03	1.40E+03	0.0250	8.830E+14
Am-242m	3.5400E-06	61,103.939	61,103.939	0.00E+00	2.16E-01	2.16E-01	0.0375	7.768E+14
Am-243	2.0580E-06	61,103.939	61,103.939	0.00E+00	1.26E-01	1.26E-01	0.0575	8.411E+14
C-14	1.1264E-03	61,103.939	61,103.939	0.00E+00	6.88E+01	6.88E+01	0.0850	4.960E+14
Cl-36	8.3760E-11	61,103.939	61,103.939	0.00E+00	5.12E-06	5.12E-06	0.1250	3.273E+14
Cm-243	5.0340E-07	61,103.939	61,103.939	0.00E+00	3.08E-02	3.08E-02	0.2250	4.273E+14
Cm-244	1.0450E-05	61,103.939	61,103.939	0.00E+00	6.39E-01	6.39E-01	0.3750	1.858E+14
Co-60	6.4420E-02	61,103.939	61,103.939	0.00E+00	3.94E+03	3.94E+03	0.5750	3.252E+15
Cs-134	7.9240E-06	61,103.939	61,103.939	0.00E+00	4.84E-01	4.84E-01	0.8500	3.754E+13
Cs-135	7.9140E-06	61,103.939	61,103.939	0.00E+00	4.84E-01	4.84E-01	1.2500	3.093E+14
Cs-137	1.4316E+00	61,103.939	61,103.939	0.00E+00	8.75E+04	8.75E+04	1.7500	1.018E+12
Eu-154	6.7900E-03	61,103.939	61,103.939	0.00E+00	4.15E+02	4.15E+02	2.2500	1.630E+09
Eu-155	6.2800E-04	61,103.939	61,103.939	0.00E+00	3.84E+01	3.84E+01	2.7500	1.043E+08
Fe-55	5.7480E-05	61,103.939	61,103.939	0.00E+00	3.51E+00	3.51E+00	3.5000	3.144E+05
H-3	2.3800E-02	61,103.939	61,103.939	0.00E+00	1.45E+03	1.45E+03	5.0000	1.320E+05
I-129	7.5020E-07	61,103.939	61,103.939	0.00E+00	4.58E-02	4.58E-02	7.0000	1.484E+04
Kr-85	3.8220E-02	61,103.939	61,103.939	0.00E+00	2.34E+03	2.34E+03	11.0000	1.685E+03
Np-237	5.5780E-06	61,103.939	61,103.939	0.00E+00	3.41E-01	3.41E-01		
Pa-231	7.8820E-09	61,103.939	61,103.939	0.00E+00	4.82E-04	4.82E-04		
Pb-210	4.3840E-09	61,103.939	61,103.939	0.00E+00	2.68E-04	2.68E-04		
Pm-147	9.9500E-04	61,103.939	61,103.939	0.00E+00	6.08E+01	6.08E+01		
Pu-238	6.4240E-03	61,103.939	61,103.939	0.00E+00	3.93E+02	3.93E+02		
Pu-239	1.8744E-02	61,103.939	61,103.939	0.00E+00	1.15E+03	1.15E+03		
Pu-240	8.3540E-03	61,103.939	61,103.939	0.00E+00	5.10E+02	5.10E+02		
Pu-241	1.4606E-01	61,103.939	61,103.939	0.00E+00	8.92E+03	8.92E+03		
Pu-242	2.0400E-06	61,103.939	61,103.939	0.00E+00	1.25E-01	1.25E-01		
Ra-226	1.1804E-08	61,103.939	61,103.939	0.00E+00	7.21E-04	7.21E-04		
Ra-228	1.1864E-09	61,103.939	61,103.939	0.00E+00	7.25E-05	7.25E-05		
Ru-106	3.2580E-10	61,103.939	61,103.939	0.00E+00	1.99E-05	1.99E-05		
Se-79	1.2524E-05	61,103.939	61,103.939	0.00E+00	7.65E-01	7.65E-01		
Sn-126	1.2052E-05	61,103.939	61,103.939	0.00E+00	7.36E-01	7.36E-01		
Sr-90	1.2638E+00	61,103.939	61,103.939	0.00E+00	7.72E+04	7.72E+04		
Tc-99	4.4140E-04	61,103.939	61,103.939	0.00E+00	2.70E+01	2.70E+01		
Th-229	4.3480E-09	61,103.939	61,103.939	0.00E+00	2.66E-04	2.66E-04		
Th-230	1.0760E-06	61,103.939	61,103.939	0.00E+00	6.57E-02	6.57E-02		
Th-232	1.1926E-09	61,103.939	61,103.939	0.00E+00	7.29E-05	7.29E-05		
Tl-208	4.6200E-08	61,103.939	61,103.939	0.00E+00	2.82E-03	2.82E-03		
U-232	1.2400E-07	61,103.939	61,103.939	0.00E+00	7.58E-03	7.58E-03		
U-233	9.1620E-07	61,103.939	61,103.939	0.00E+00	5.60E-02	5.60E-02		
U-234	2.3440E-03	61,103.939	61,103.939	0.00E+00	1.43E+02	1.43E+02		
U-235	-2.3296E-06	61,103.939	0.000	1.38E-02	0.00E+00	1.38E-02		
U-236	2.6620E-05	61,103.939	61,103.939	0.00E+00	1.63E+00	1.63E+00		
U-238	-1.3291E-07	61,103.939	0.000	4.03E-02	3.22E-02	4.03E-02		
Y-90	1.2642E+00	61,103.939	61,103.939	0.00E+00	7.72E+04	7.72E+04		
Other Radionuclides					8.34E+04	8.34E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD HEAVY WATER	Used HEAVY WATER	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	ZIRC-2	ZIRC	
BOL HM Constituents:	U METAL	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		61,103.939	

Checks		
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup
Bounding:	32.83	2.59

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: HWCTR SOT
 SNF ID #: 120
 Fuel Units & Descr: 96 - TUBE
 Heavy Metal Mass: BOL= ; EOL=249.72kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1964
 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"x10"
 1.09

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.6920E-09	239,374.531	239,374.531	0.00E+00	1.12E-03	1.12E-03	Avg. MeV	
Am-241	2.2880E-02	239,374.531	239,374.531	0.00E+00	5.48E+03	5.48E+03	0.0150	1.670E+16
Am-242m	3.5400E-06	239,374.531	239,374.531	0.00E+00	8.47E-01	8.47E-01	0.0250	3.459E+15
Am-243	2.0580E-06	239,374.531	239,374.531	0.00E+00	4.93E-01	4.93E-01	0.0375	3.043E+15
C-14	1.1264E-03	239,374.531	239,374.531	0.00E+00	2.70E+02	2.70E+02	0.0575	3.295E+15
Cl-36	8.3760E-11	239,374.531	239,374.531	0.00E+00	2.01E-05	2.01E-05	0.0850	1.943E+15
Cm-243	5.0340E-07	239,374.531	239,374.531	0.00E+00	1.21E-01	1.21E-01	0.1250	1.282E+15
Cm-244	1.0450E-05	239,374.531	239,374.531	0.00E+00	2.50E+00	2.50E+00	0.2250	1.674E+15
Co-60	6.4420E-02	239,374.531	239,374.531	0.00E+00	1.54E+04	1.54E+04	0.3750	7.280E+14
Cs-134	7.9240E-06	239,374.531	239,374.531	0.00E+00	1.90E+00	1.90E+00	0.5750	1.274E+14
Cs-135	7.9140E-06	239,374.531	239,374.531	0.00E+00	1.89E+00	1.89E+00	0.8500	1.471E+14
Cs-137	1.4316E+00	239,374.531	239,374.531	0.00E+00	3.43E+05	3.43E+05	1.2500	1.212E+15
Eu-154	6.7900E-03	239,374.531	239,374.531	0.00E+00	1.63E+03	1.63E+03	1.7500	3.986E+12
Eu-155	6.2800E-04	239,374.531	239,374.531	0.00E+00	1.50E+02	1.50E+02	2.2500	6.384E+09
Fe-55	5.7480E-05	239,374.531	239,374.531	0.00E+00	1.38E+01	1.38E+01	2.7500	4.084E+08
H-3	2.3800E-02	239,374.531	239,374.531	0.00E+00	5.70E+03	5.70E+03	3.5000	1.232E+06
I-129	7.5020E-07	239,374.531	239,374.531	0.00E+00	1.80E-01	1.80E-01	5.0000	5.170E+05
Kr-85	3.8220E-02	239,374.531	239,374.531	0.00E+00	9.15E+03	9.15E+03	7.0000	5.815E+04
Np-237	5.5780E-06	239,374.531	239,374.531	0.00E+00	1.34E+00	1.34E+00	11.0000	6.599E+03
Pa-231	7.8820E-09	239,374.531	239,374.531	0.00E+00	1.89E-03	1.89E-03		
Pb-210	4.3840E-09	239,374.531	239,374.531	0.00E+00	1.05E-03	1.05E-03		
Pm-147	9.9500E-04	239,374.531	239,374.531	0.00E+00	2.38E+02	2.38E+02		
Pu-238	6.4240E-03	239,374.531	239,374.531	0.00E+00	1.54E+03	1.54E+03		
Pu-239	1.8744E-02	239,374.531	239,374.531	0.00E+00	4.49E+03	4.49E+03		
Pu-240	8.3540E-03	239,374.531	239,374.531	0.00E+00	2.00E+03	2.00E+03		
Pu-241	1.4606E-01	239,374.531	239,374.531	0.00E+00	3.50E+04	3.50E+04		
Pu-242	2.0400E-06	239,374.531	239,374.531	0.00E+00	4.88E-01	4.88E-01		
Ra-226	1.1804E-08	239,374.531	239,374.531	0.00E+00	2.83E-03	2.83E-03		
Ra-228	1.1864E-09	239,374.531	239,374.531	0.00E+00	2.84E-04	2.84E-04		
Ru-106	3.2580E-10	239,374.531	239,374.531	0.00E+00	7.80E-05	7.80E-05		
Se-79	1.2524E-05	239,374.531	239,374.531	0.00E+00	3.00E+00	3.00E+00		
Sn-126	1.2052E-05	239,374.531	239,374.531	0.00E+00	2.88E+00	2.88E+00		
Sr-90	1.2638E+00	239,374.531	239,374.531	0.00E+00	3.03E+05	3.03E+05		
Tc-99	4.4140E-04	239,374.531	239,374.531	0.00E+00	1.06E+02	1.06E+02		
Th-229	4.3480E-09	239,374.531	239,374.531	0.00E+00	1.04E-03	1.04E-03		
Th-230	1.0760E-06	239,374.531	239,374.531	0.00E+00	2.58E-01	2.58E-01		
Th-232	1.1926E-09	239,374.531	239,374.531	0.00E+00	2.85E-04	2.85E-04		
Ti-208	4.6200E-08	239,374.531	239,374.531	0.00E+00	1.11E-02	1.11E-02		
U-232	1.2406E-07	239,374.531	239,374.531	0.00E+00	2.97E-02	2.97E-02		
U-233	9.1620E-07	239,374.531	239,374.531	0.00E+00	2.19E-01	2.19E-01		
U-234	2.3440E-03	239,374.531	239,374.531	0.00E+00	5.61E+02	5.61E+02		
U-235	-2.3296E-06	239,374.531	0.000	5.40E-02	0.00E+00	5.40E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	2.6620E-05	239,374.531	239,374.531	0.00E+00	6.37E+00	6.37E+00	4.40E+03	4.40E+03
U-238	-1.3291E-07	239,374.531	0.000	1.58E-01	1.26E-01	1.58E-01	Total	Total
Y-90	1.2642E+00	239,374.531	239,374.531	0.00E+00	3.03E+05	3.03E+05		
Other Radionuclides					3.27E+05	3.27E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.40E+03	4.40E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	HEAVY WATER	HEAVY WATER	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		239,374.531	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		239,374.531	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
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: HWCTR SPR
 SNF ID #: 783
 Fuel Units & Descr: 56 - TUBE
 Heavy Metal Mass: BOL= : EOL=437.68kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1964
 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"
 2.55

II. Estimates

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	4.6920E-09	419,538.842	419,538.842	0.00E+00	1.97E-03	1.97E-03	0.0150	2.927E+16
Am-241	2.2880E-02	419,538.842	419,538.842	0.00E+00	9.60E+03	9.60E+03	0.0250	6.063E+15
Am-242m	3.5400E-06	419,538.842	419,538.842	0.00E+00	1.49E+00	1.49E+00	0.0375	5.334E+15
Am-243	2.0580E-06	419,538.842	419,538.842	0.00E+00	8.63E-01	8.63E-01	0.0575	5.775E+15
C-14	1.1264E-03	419,538.842	419,538.842	0.00E+00	4.73E+02	4.73E+02	0.0850	3.405E+15
Cl-36	8.3760E-11	419,538.842	419,538.842	0.00E+00	3.51E-05	3.51E-05	0.1250	2.247E+15
Cm-243	5.0340E-07	419,538.842	419,538.842	0.00E+00	2.11E-01	2.11E-01	0.2250	2.934E+15
Cm-244	1.0450E-05	419,538.842	419,538.842	0.00E+00	4.38E+00	4.38E+00	0.3750	1.276E+15
Co-60	6.4420E-02	419,538.842	419,538.842	0.00E+00	2.70E+04	2.70E+04	0.5750	2.233E+16
Cs-134	7.9240E-06	419,538.842	419,538.842	0.00E+00	3.32E+00	3.32E+00	0.8500	2.577E+14
Cs-135	7.9140E-06	419,538.842	419,538.842	0.00E+00	3.32E+00	3.32E+00	1.2500	2.124E+15
Cs-137	1.4316E+00	419,538.842	419,538.842	0.00E+00	6.01E+05	6.01E+05	1.7500	6.986E+12
Eu-154	6.7900E-03	419,538.842	419,538.842	0.00E+00	2.85E+03	2.85E+03	2.2500	1.119E+10
Eu-155	6.2800E-04	419,538.842	419,538.842	0.00E+00	2.63E+02	2.63E+02	2.7500	7.158E+08
Fe-55	5.7480E-05	419,538.842	419,538.842	0.00E+00	2.41E+01	2.41E+01	3.5000	2.159E+06
H-3	2.3800E-02	419,538.842	419,538.842	0.00E+00	9.99E+03	9.99E+03	5.0000	9.060E+05
I-129	7.5020E-07	419,538.842	419,538.842	0.00E+00	3.15E-01	3.15E-01	7.0000	1.019E+05
Kr-85	3.8220E-02	419,538.842	419,538.842	0.00E+00	1.60E+04	1.60E+04	11.0000	1.157E+04
Np-237	5.5780E-06	419,538.842	419,538.842	0.00E+00	2.34E+00	2.34E+00		
Pa-231	7.8820E-09	419,538.842	419,538.842	0.00E+00	3.31E-03	3.31E-03		
Pb-210	4.3840E-09	419,538.842	419,538.842	0.00E+00	1.84E-03	1.84E-03		
Pm-147	9.9500E-04	419,538.842	419,538.842	0.00E+00	4.17E+02	4.17E+02		
Pu-238	6.4240E-03	419,538.842	419,538.842	0.00E+00	2.70E+03	2.70E+03		
Pu-239	1.8744E-02	419,538.842	419,538.842	0.00E+00	7.86E+03	7.86E+03		
Pu-240	8.3540E-03	419,538.842	419,538.842	0.00E+00	3.50E+03	3.50E+03		
Pu-241	1.4606E-01	419,538.842	419,538.842	0.00E+00	6.13E+04	6.13E+04		
Pu-242	2.0400E-06	419,538.842	419,538.842	0.00E+00	8.56E-01	8.56E-01		
Ra-226	1.1804E-08	419,538.842	419,538.842	0.00E+00	4.95E-03	4.95E-03		
Ra-228	1.1864E-09	419,538.842	419,538.842	0.00E+00	4.98E-04	4.98E-04		
Ru-106	3.2580E-10	419,538.842	419,538.842	0.00E+00	1.37E-04	1.37E-04		
Se-79	1.2524E-05	419,538.842	419,538.842	0.00E+00	5.25E+00	5.25E+00		
Sn-126	1.2052E-05	419,538.842	419,538.842	0.00E+00	5.06E+00	5.06E+00		
Sr-90	1.2638E+00	419,538.842	419,538.842	0.00E+00	5.30E+05	5.30E+05		
Tc-99	4.4140E-04	419,538.842	419,538.842	0.00E+00	1.85E+02	1.85E+02		
Th-229	4.3480E-09	419,538.842	419,538.842	0.00E+00	1.82E-03	1.82E-03		
Th-230	1.0760E-06	419,538.842	419,538.842	0.00E+00	4.51E-01	4.51E-01		
Th-232	1.1926E-09	419,538.842	419,538.842	0.00E+00	5.00E-04	5.00E-04		
Th-208	4.6200E-08	419,538.842	419,538.842	0.00E+00	1.94E-02	1.94E-02		
U-232	1.2406E-07	419,538.842	419,538.842	0.00E+00	5.20E-02	5.20E-02		
U-233	9.1620E-07	419,538.842	419,538.842	0.00E+00	3.84E-01	3.84E-01		
U-234	2.3440E-03	419,538.842	419,538.842	0.00E+00	9.83E+02	9.83E+02		
U-235	-2.3296E-06	419,538.842	0.000	9.46E-02	0.00E+00	9.46E-02		
U-236	2.6620E-05	419,538.842	419,538.842	0.00E+00	1.12E+01	1.12E+01		
U-238	-1.3291E-07	419,538.842	0.000	2.77E-01	2.21E-01	2.77E-01		
Y-90	1.2642E+00	419,538.842	419,538.842	0.00E+00	5.30E+05	5.30E+05		
Other Radionuclides					5.72E+05	5.72E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.71E+03	7.71E+03
Total	Total

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 enrichment (unknown).
BOL HM Constituents:	ZIRC	ZIRC	
BOL Enrichment %:	U-Zr 2%	U	
		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		419,538.842	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
		419,538.842	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Bounding:	32.83	32.83	2.59

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: HWCTR SPRO
 SNF ID #: 772
 Fuel Units & Descr: 48 - TUBE
 Heavy Metal Mass: BOL = : EOL=180.92kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1964
 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"x10"
 0.55

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	4.6920E-09	173,422.997	173,422.997	0.00E+00	8.14E-04	8.14E-04	0.0150	1.210E+16
Am-241	2.2880E-02	173,422.997	173,422.997	0.00E+00	3.97E+03	3.97E+03	0.0250	2.506E+15
Am-242m	3.5400E-06	173,422.997	173,422.997	0.00E+00	6.14E-01	6.14E-01	0.0375	2.205E+15
Am-243	2.0580E-06	173,422.997	173,422.997	0.00E+00	3.57E-01	3.57E-01	0.0575	2.387E+15
C-14	1.1264E-03	173,422.997	173,422.997	0.00E+00	1.95E+02	1.95E+02	0.0850	1.408E+15
Cl-36	8.3760E-11	173,422.997	173,422.997	0.00E+00	1.45E-05	1.45E-05	0.1250	9.288E+14
Cm-243	5.0340E-07	173,422.997	173,422.997	0.00E+00	8.73E-02	8.73E-02	0.2250	1.213E+15
Cm-244	1.0450E-05	173,422.997	173,422.997	0.00E+00	1.81E+00	1.81E+00	0.3750	5.274E+14
Co-60	6.4420E-02	173,422.997	173,422.997	0.00E+00	1.12E+04	1.12E+04	0.5750	9.231E+15
Cs-134	7.9240E-06	173,422.997	173,422.997	0.00E+00	1.37E+00	1.37E+00	0.8500	1.065E+14
Cs-135	7.9140E-06	173,422.997	173,422.997	0.00E+00	1.37E+00	1.37E+00	1.2500	8.779E+14
Cs-137	1.4316E+00	173,422.997	173,422.997	0.00E+00	2.48E+05	2.48E+05	1.7500	2.888E+12
Eu-154	6.7900E-03	173,422.997	173,422.997	0.00E+00	1.18E+03	1.18E+03	2.2500	4.625E+09
Eu-155	6.2800E-04	173,422.997	173,422.997	0.00E+00	1.09E+02	1.09E+02	2.7500	2.959E+08
Fe-55	5.7480E-05	173,422.997	173,422.997	0.00E+00	9.97E+00	9.97E+00	3.5000	8.925E+05
H-3	2.3800E-02	173,422.997	173,422.997	0.00E+00	4.13E+03	4.13E+03	5.0000	3.745E+05
I-129	7.5020E-07	173,422.997	173,422.997	0.00E+00	1.30E-01	1.30E-01	7.0000	4.213E+04
Kr-85	3.8220E-02	173,422.997	173,422.997	0.00E+00	6.63E+03	6.63E+03	11.0000	4.781E+03
Np-237	5.5780E-06	173,422.997	173,422.997	0.00E+00	9.67E-01	9.67E-01		
Pa-231	7.8820E-09	173,422.997	173,422.997	0.00E+00	1.37E-03	1.37E-03		
Pb-210	4.3840E-09	173,422.997	173,422.997	0.00E+00	7.60E-04	7.60E-04		
Pm-147	9.9500E-04	173,422.997	173,422.997	0.00E+00	1.73E+02	1.73E+02		
Pu-238	6.4240E-03	173,422.997	173,422.997	0.00E+00	1.11E+03	1.11E+03		
Pu-239	1.8744E-02	173,422.997	173,422.997	0.00E+00	3.25E+03	3.25E+03		
Pu-240	8.3540E-03	173,422.997	173,422.997	0.00E+00	1.45E+03	1.45E+03		
Pu-241	1.4606E-01	173,422.997	173,422.997	0.00E+00	2.53E+04	2.53E+04		
Pu-242	2.0400E-06	173,422.997	173,422.997	0.00E+00	3.54E-01	3.54E-01		
Ra-226	1.1804E-08	173,422.997	173,422.997	0.00E+00	2.05E-03	2.05E-03		
Ra-228	1.1864E-09	173,422.997	173,422.997	0.00E+00	2.06E-04	2.06E-04		
Ru-106	3.2580E-10	173,422.997	173,422.997	0.00E+00	5.65E-05	5.65E-05		
Se-79	1.2524E-05	173,422.997	173,422.997	0.00E+00	2.17E+00	2.17E+00		
Sn-126	1.2052E-05	173,422.997	173,422.997	0.00E+00	2.09E+00	2.09E+00		
Sr-90	1.2638E+00	173,422.997	173,422.997	0.00E+00	2.19E+05	2.19E+05		
Tc-99	4.4140E-04	173,422.997	173,422.997	0.00E+00	7.65E+01	7.65E+01		
Th-229	4.3480E-09	173,422.997	173,422.997	0.00E+00	7.54E-04	7.54E-04		
Th-230	1.0760E-06	173,422.997	173,422.997	0.00E+00	1.87E-01	1.87E-01		
Th-232	1.1926E-09	173,422.997	173,422.997	0.00E+00	2.07E-04	2.07E-04		
Tl-208	4.6200E-08	173,422.997	173,422.997	0.00E+00	8.01E-03	8.01E-03		
U-232	1.2406E-07	173,422.997	173,422.997	0.00E+00	2.15E-02	2.15E-02		
U-233	9.1620E-07	173,422.997	173,422.997	0.00E+00	1.59E-01	1.59E-01		
U-234	2.3440E-03	173,422.997	173,422.997	0.00E+00	4.07E+02	4.07E+02		
U-235	-2.3296E-06	173,422.997	0.000	3.91E-02	0.00E+00	3.91E-02		
U-236	2.6620E-05	173,422.997	173,422.997	0.00E+00	4.62E+00	4.62E+00		
U-238	-1.3291E-07	173,422.997	0.000	1.14E-01	9.13E-02	1.14E-01		
Y-90	1.2642E+00	173,422.997	173,422.997	0.00E+00	2.19E+05	2.19E+05		
Other Radionuclides					2.37E+05	2.37E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.19E+03	3.19E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: HEAVY WATER	Used: HEAVY WATER	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD: 173,422.997	Estimated: 173,422.997	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		173,422.997	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier: 32.83	Estimated Burnup/ Given Burnup	2.59
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: HWCTR SPRO
 SNF ID #: 978
 Fuel Units & Descr: 5 - TUBE
 Heavy Metal Mass: BOL= ; EOL=89.36kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1964
 Estimates as of: 2010
 Template: HFBR (Heavy Water, SST, 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"x10"
 0.06

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	5.6840E-09	85,315.001	85,315.001	0.00E+00	4.85E-04	4.85E-04	Avg. MeV	
Am-241	2.1380E-01	85,315.001	85,315.001	0.00E+00	1.82E+04	1.82E+04	0.0150	6.128E+15
Am-242m	1.0302E-04	85,315.001	85,315.001	0.00E+00	8.79E+00	8.79E+00	0.0250	1.199E+15
Am-243	5.2400E-05	85,315.001	85,315.001	0.00E+00	4.47E+00	4.47E+00	0.0375	1.042E+15
C-14	2.2160E-02	85,315.001	85,315.001	0.00E+00	1.89E+03	1.89E+03	0.0575	1.301E+15
Cl-36	4.1880E-04	85,315.001	85,315.001	0.00E+00	3.57E+01	3.57E+01	0.0850	6.126E+14
Cm-243	1.6766E-05	85,315.001	85,315.001	0.00E+00	1.43E+00	1.43E+00	0.1250	3.976E+14
Cm-244	7.3320E-04	85,315.001	85,315.001	0.00E+00	6.26E+01	6.26E+01	0.2250	4.978E+14
Co-60	5.1480E+00	85,315.001	85,315.001	0.00E+00	4.39E+05	4.39E+05	0.3750	2.147E+14
Cs-134	1.7300E-05	85,315.001	85,315.001	0.00E+00	1.48E+00	1.48E+00	0.5750	4.552E+15
Cs-135	3.7460E-06	85,315.001	85,315.001	0.00E+00	3.20E-01	3.20E-01	0.8500	5.070E+13
Cs-137	1.4426E+00	85,315.001	85,315.001	0.00E+00	1.23E+05	1.23E+05	1.2500	3.253E+16
Eu-154	9.2140E-03	85,315.001	85,315.001	0.00E+00	7.86E+02	7.86E+02	1.7500	1.347E+12
Eu-155	8.1360E-04	85,315.001	85,315.001	0.00E+00	6.94E+01	6.94E+01	2.2500	1.724E+11
Fe-55	5.3720E-02	85,315.001	85,315.001	0.00E+00	4.58E+03	4.58E+03	2.7500	9.936E+08
H-3	4.4560E-02	85,315.001	85,315.001	0.00E+00	3.80E+03	3.80E+03	3.5000	2.414E+06
I-129	9.1660E-07	85,315.001	85,315.001	0.00E+00	7.82E-02	7.82E-02	5.0000	1.010E+06
Kr-85	3.2380E-02	85,315.001	85,315.001	0.00E+00	2.76E+03	2.76E+03	7.0000	1.135E+05
Np-237	1.9674E-05	85,315.001	85,315.001	0.00E+00	1.68E+00	1.68E+00	11.0000	1.286E+04
Pa-231	9.3700E-09	85,315.001	85,315.001	0.00E+00	7.99E-04	7.99E-04		
Pb-210	4.0520E-09	85,315.001	85,315.001	0.00E+00	3.46E-04	3.46E-04		
Pm-147	7.8900E-04	85,315.001	85,315.001	0.00E+00	6.73E+01	6.73E+01		
Pu-238	3.6340E-02	85,315.001	85,315.001	0.00E+00	3.10E+03	3.10E+03		
Pu-239	6.5100E-02	85,315.001	85,315.001	0.00E+00	5.55E+03	5.55E+03		
Pu-240	2.6700E-02	85,315.001	85,315.001	0.00E+00	2.28E+03	2.28E+03		
Pu-241	1.3616E+00	85,315.001	85,315.001	0.00E+00	1.16E+05	1.16E+05		
Pu-242	1.6742E-05	85,315.001	85,315.001	0.00E+00	1.43E+00	1.43E+00		
Ra-226	1.0912E-08	85,315.001	85,315.001	0.00E+00	9.31E-04	9.31E-04		
Ra-228	2.0780E-10	85,315.001	85,315.001	0.00E+00	1.77E-05	1.77E-05		
Ru-106	7.4020E-10	85,315.001	85,315.001	0.00E+00	6.32E-05	6.32E-05		
Se-79	2.8500E-05	85,315.001	85,315.001	0.00E+00	2.43E+00	2.43E+00		
Sn-126	1.7794E-05	85,315.001	85,315.001	0.00E+00	1.52E+00	1.52E+00		
Sr-90	1.0372E+00	85,315.001	85,315.001	0.00E+00	8.85E+04	8.85E+04		
Tc-99	4.3360E-04	85,315.001	85,315.001	0.00E+00	3.70E+01	3.70E+01		
Th-229	1.9490E-09	85,315.001	85,315.001	0.00E+00	1.66E-04	1.66E-04		
Th-230	9.9520E-07	85,315.001	85,315.001	0.00E+00	8.49E-02	8.49E-02		
Th-232	2.0900E-10	85,315.001	85,315.001	0.00E+00	1.78E-05	1.78E-05		
Tl-208	1.5278E-07	85,315.001	85,315.001	0.00E+00	1.30E-02	1.30E-02		
U-232	4.1360E-07	85,315.001	85,315.001	0.00E+00	3.53E-02	3.53E-02		
U-233	4.1200E-07	85,315.001	85,315.001	0.00E+00	3.51E-02	3.51E-02		
U-234	2.1700E-03	85,315.001	85,315.001	0.00E+00	1.85E+02	1.85E+02		
U-235	-1.7036E-06	85,315.001	0.000	1.93E-02	0.00E+00	1.93E-02		
U-236	2.6080E-05	85,315.001	85,315.001	0.00E+00	2.23E+00	2.23E+00		
U-238	-5.1291E-07	85,315.001	0.000	5.65E-02	1.27E-02	5.65E-02		
Y-90	1.0374E+00	85,315.001	85,315.001	0.00E+00	8.85E+04	8.85E+04		
Other Radionuclides					7.34E+05	7.34E+05		

Thermal Power
 Nominal Heat Output (Watts): 9.22E+03
 Bounding Heat Output (Watts): 9.22E+03
 Total: Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
HEAVY WATER	HEAVY WATER	HEAVY WATER	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	SST	SST	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
85,315.001		85,315.001	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		85,315.001	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup	
32.70	32.70		2.27
Bounding:	32.70		

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: HWCTR SPRO
 SNF ID #: 115
 Fuel Units & Descr: 3 - TUBE
 Heavy Metal Mass: BOL= : EOL=6.50kg
 ROD Storage Sits: SRS

Fuel decay start date: 1964
 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"x10"
 0.08

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	4.6920E-09	6,229.542	6,229.542	0.00E+00	2.92E-05	2.92E-05	0.0150	4.346E+14
Am-241	2.2880E-02	6,229.542	6,229.542	0.00E+00	1.43E+02	1.43E+02	0.0250	9.002E+13
Am-242m	3.5400E-06	6,229.542	6,229.542	0.00E+00	2.21E-02	2.21E-02	0.0375	7.920E+13
Am-243	2.0580E-06	6,229.542	6,229.542	0.00E+00	1.28E-02	1.28E-02	0.0575	8.575E+13
C-14	1.1264E-03	6,229.542	6,229.542	0.00E+00	7.02E+00	7.02E+00	0.0850	5.057E+13
Ci-36	8.3760E-11	6,229.542	6,229.542	0.00E+00	5.22E-07	5.22E-07	0.1250	3.336E+13
Cm-243	5.0340E-07	6,229.542	6,229.542	0.00E+00	3.14E-03	3.14E-03	0.2250	4.356E+13
Cm-244	1.0450E-05	6,229.542	6,229.542	0.00E+00	6.51E-02	6.51E-02	0.3750	1.895E+13
Co-60	6.4420E-02	6,229.542	6,229.542	0.00E+00	4.01E+02	4.01E+02	0.5750	3.316E+14
Cs-134	7.9240E-06	6,229.542	6,229.542	0.00E+00	4.94E-02	4.94E-02	0.8500	3.827E+12
Cs-135	7.9140E-06	6,229.542	6,229.542	0.00E+00	4.93E-02	4.93E-02	1.2500	3.154E+13
Cs-137	1.4316E+00	6,229.542	6,229.542	0.00E+00	8.92E+03	8.92E+03	1.7500	1.037E+11
Eu-154	6.7900E-03	6,229.542	6,229.542	0.00E+00	4.23E+01	4.23E+01	2.2500	1.661E+08
Eu-155	6.2800E-04	6,229.542	6,229.542	0.00E+00	3.91E+00	3.91E+00	2.7500	1.063E+07
Fe-55	5.7480E-05	6,229.542	6,229.542	0.00E+00	3.58E-01	3.58E-01	3.5000	3.206E+04
H-3	2.3800E-02	6,229.542	6,229.542	0.00E+00	1.48E+02	1.48E+02	5.0000	1.345E+04
I-129	7.5020E-07	6,229.542	6,229.542	0.00E+00	4.67E-03	4.67E-03	7.0000	1.513E+03
Kr-85	3.8220E-02	6,229.542	6,229.542	0.00E+00	2.38E+02	2.38E+02	11.0000	1.717E+02
Np-237	5.5780E-06	6,229.542	6,229.542	0.00E+00	3.47E-02	3.47E-02		
Pa-231	7.8820E-09	6,229.542	6,229.542	0.00E+00	4.91E-05	4.91E-05		
Pb-210	4.3840E-09	6,229.542	6,229.542	0.00E+00	2.73E-05	2.73E-05		
Pm-147	9.9500E-04	6,229.542	6,229.542	0.00E+00	6.20E+00	6.20E+00		
Pu-238	6.4240E-03	6,229.542	6,229.542	0.00E+00	4.00E+01	4.00E+01		
Pu-239	1.8744E-02	6,229.542	6,229.542	0.00E+00	1.17E+02	1.17E+02		
Pu-240	8.3540E-03	6,229.542	6,229.542	0.00E+00	5.20E+01	5.20E+01		
Pu-241	1.4606E-01	6,229.542	6,229.542	0.00E+00	9.10E+02	9.10E+02		
Pu-242	2.0400E-06	6,229.542	6,229.542	0.00E+00	1.27E-02	1.27E-02		
Ra-226	1.1804E-08	6,229.542	6,229.542	0.00E+00	7.35E-05	7.35E-05		
Ra-228	1.1864E-09	6,229.542	6,229.542	0.00E+00	7.39E-06	7.39E-06		
Ru-106	3.2580E-10	6,229.542	6,229.542	0.00E+00	2.03E-06	2.03E-06		
Se-79	1.2524E-05	6,229.542	6,229.542	0.00E+00	7.80E-02	7.80E-02		
Sn-126	1.2052E-05	6,229.542	6,229.542	0.00E+00	7.51E-02	7.51E-02		
Sr-90	1.2638E+00	6,229.542	6,229.542	0.00E+00	7.87E+03	7.87E+03		
Tc-99	4.4140E-04	6,229.542	6,229.542	0.00E+00	2.75E+00	2.75E+00		
Th-229	4.3480E-09	6,229.542	6,229.542	0.00E+00	2.71E-05	2.71E-05		
Th-230	1.0760E-06	6,229.542	6,229.542	0.00E+00	6.70E-03	6.70E-03		
Th-232	1.1926E-09	6,229.542	6,229.542	0.00E+00	7.43E-06	7.43E-06		
Ti-208	4.6200E-08	6,229.542	6,229.542	0.00E+00	2.88E-04	2.88E-04		
U-232	1.2406E-07	6,229.542	6,229.542	0.00E+00	7.73E-04	7.73E-04		
U-233	9.1620E-07	6,229.542	6,229.542	0.00E+00	5.71E-03	5.71E-03		
U-234	2.3440E-03	6,229.542	6,229.542	0.00E+00	1.46E+01	1.46E+01		
U-235	-2.3296E-06	6,229.542	0.000	1.40E-03	0.00E+00	1.40E-03		
U-236	2.6620E-05	6,229.542	6,229.542	0.00E+00	1.66E-01	1.66E-01		
U-238	-1.3291E-07	6,229.542	0.000	4.11E-03	3.28E-03	4.11E-03		
Y-90	1.2642E+00	6,229.542	6,229.542	0.00E+00	7.88E+03	7.88E+03		
Other Radionuclides					8.50E+03	8.50E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.14E+02	1.14E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	HEAVY WATER	HEAVY WATER	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	ZIRC-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		6,229.542	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		6,229.542	

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	32.83	
Bounding:	32.83	
		Estimated EOL HM/ Given EOL HM
		2.59

¹ Reactor shutdown, core removal, storage, shipping or other data 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: HWCTR TFEN 1Fuel decay start date: 1964
 SNF ID #: 880 Estimate as of: 2010
 Fuel Units & Descr: 11 - TUBE Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
 Heavy Metal Mass: BOL= ; EOL=162.08kg 2Template Burnup(MWd): 5
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x15"
 0.50

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	4.6920E-09	155,363.948	155,363.948	0.00E+00	7.29E-04	7.29E-04	0.0150	1.084E+16
Am-241	2.2880E-02	155,363.948	155,363.948	0.00E+00	3.55E+03	3.55E+03	0.0250	2.245E+15
Am-242m	3.5400E-06	155,363.948	155,363.948	0.00E+00	5.50E-01	5.50E-01	0.0375	1.975E+15
Am-243	2.0580E-06	155,363.948	155,363.948	0.00E+00	3.20E-01	3.20E-01	0.0575	2.139E+15
C-14	1.1264E-03	155,363.948	155,363.948	0.00E+00	1.75E+02	1.75E+02	0.0850	1.261E+15
Ci-36	8.3760E-11	155,363.948	155,363.948	0.00E+00	1.30E-05	1.30E-05	0.1250	8.321E+14
Cm-243	5.0340E-07	155,363.948	155,363.948	0.00E+00	7.82E-02	7.82E-02	0.2250	1.086E+15
Cm-244	1.0450E-05	155,363.948	155,363.948	0.00E+00	1.62E+00	1.62E+00	0.3750	4.725E+14
Co-60	6.4420E-02	155,363.948	155,363.948	0.00E+00	1.00E+04	1.00E+04	0.5750	8.270E+15
Cs-134	7.9240E-06	155,363.948	155,363.948	0.00E+00	1.23E+00	1.23E+00	0.8500	9.545E+13
Cs-135	7.9140E-06	155,363.948	155,363.948	0.00E+00	1.23E+00	1.23E+00	1.2500	7.865E+14
Cs-137	1.4316E+00	155,363.948	155,363.948	0.00E+00	2.22E+05	2.22E+05	1.7500	2.587E+12
Eu-154	6.7900E-03	155,363.948	155,363.948	0.00E+00	1.05E+03	1.05E+03	2.2500	4.144E+09
Eu-155	6.2800E-04	155,363.948	155,363.948	0.00E+00	9.76E+01	9.76E+01	2.7500	2.651E+08
Fe-55	5.7480E-05	155,363.948	155,363.948	0.00E+00	8.93E+00	8.93E+00	3.5000	7.995E+05
H-3	2.3800E-02	155,363.948	155,363.948	0.00E+00	3.70E+03	3.70E+03	5.0000	3.355E+05
I-129	7.5020E-07	155,363.948	155,363.948	0.00E+00	1.17E-01	1.17E-01	7.0000	3.774E+04
Kr-85	3.8220E-02	155,363.948	155,363.948	0.00E+00	5.94E+03	5.94E+03	11.0000	4.283E+03
Np-237	5.5780E-06	155,363.948	155,363.948	0.00E+00	8.67E-01	8.67E-01		
Pa-231	7.8820E-09	155,363.948	155,363.948	0.00E+00	1.22E-03	1.22E-03		
Pb-210	4.3840E-09	155,363.948	155,363.948	0.00E+00	6.81E-04	6.81E-04		
Pm-147	9.9500E-04	155,363.948	155,363.948	0.00E+00	1.55E+02	1.55E+02		
Pu-238	6.4240E-03	155,363.948	155,363.948	0.00E+00	9.98E+02	9.98E+02		
Pu-239	1.8744E-02	155,363.948	155,363.948	0.00E+00	2.91E+03	2.91E+03		
Pu-240	8.3540E-03	155,363.948	155,363.948	0.00E+00	1.30E+03	1.30E+03		
Pu-241	1.4606E-01	155,363.948	155,363.948	0.00E+00	2.27E+04	2.27E+04		
Pu-242	2.0400E-06	155,363.948	155,363.948	0.00E+00	3.17E-01	3.17E-01		
Ra-226	1.1804E-08	155,363.948	155,363.948	0.00E+00	1.83E-03	1.83E-03		
Ra-228	1.1864E-09	155,363.948	155,363.948	0.00E+00	1.84E-04	1.84E-04		
Ru-106	3.2580E-10	155,363.948	155,363.948	0.00E+00	5.06E-05	5.06E-05		
Se-79	1.2524E-05	155,363.948	155,363.948	0.00E+00	1.95E+00	1.95E+00		
Sn-126	1.2052E-05	155,363.948	155,363.948	0.00E+00	1.87E+00	1.87E+00		
Sr-90	1.2638E+00	155,363.948	155,363.948	0.00E+00	1.96E+05	1.96E+05		
Tc-99	4.4140E-04	155,363.948	155,363.948	0.00E+00	6.86E+01	6.86E+01		
Th-229	4.3480E-09	155,363.948	155,363.948	0.00E+00	6.76E-04	6.76E-04		
Th-230	1.0760E-06	155,363.948	155,363.948	0.00E+00	1.67E-01	1.67E-01		
Th-232	1.1926E-09	155,363.948	155,363.948	0.00E+00	1.85E-04	1.85E-04		
Th-208	4.6200E-08	155,363.948	155,363.948	0.00E+00	7.18E-03	7.18E-03		
U-232	1.2406E-07	155,363.948	155,363.948	0.00E+00	1.93E-02	1.93E-02		
U-233	9.1620E-07	155,363.948	155,363.948	0.00E+00	1.42E-01	1.42E-01		
U-234	2.3440E-03	155,363.948	155,363.948	0.00E+00	3.64E+02	3.64E+02		
U-235	2.3296E-06	155,363.948	0.000	3.50E-02	0.00E+00	3.50E-02		
U-236	2.6620E-05	155,363.948	155,363.948	0.00E+00	4.14E+00	4.14E+00		
U-238	-1.3291E-07	155,363.948	0.000	1.02E-01	8.18E-02	1.02E-01		
Y-90	1.2642E+00	155,363.948	155,363.948	0.00E+00	1.96E+05	1.96E+05		
Other Radionuclides					2.12E+05	2.12E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.85E+03	2.85E+03
Total	Total

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).
	From SFD	Used	
Reactor Moderator:	HEAVY WATER	HEAVY WATER	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U-Zr 2%	U	
BOL Enrichment %:		0 to 5	

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:		155,363.948	
Bounding:		155,363.948	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	32.83		2.59
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: HWCTR TMT-1-2 & 1-3
 SNF ID #: 112
 Fuel Units & Desc.: 2 - TUBE
 Heavy Metal Mass: BOL= ; EOL=77.91kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1964
 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"x15"
 0.09

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	273.694	547.387	0.00E+00	6.31E-04	1.26E-03	Avg. MeV	
Am-241	8.4448E+00	273.694	547.387	0.00E+00	2.31E+03	4.62E+03	0.0150	6.812E+14
Am-242m	1.6848E-02	273.694	547.387	0.00E+00	4.61E+00	9.22E+00	0.0250	1.335E+14
Am-243	1.6320E-02	273.694	547.387	0.00E+00	4.47E+00	8.93E+00	0.0375	1.166E+14
C-14	1.2090E-01	273.694	547.387	0.00E+00	3.31E+01	6.62E+01	0.0575	1.835E+14
Cl-36	2.2849E-03	273.694	547.387	0.00E+00	6.25E-01	1.25E+00	0.0850	7.161E+13
Cm-243	8.6624E-04	273.694	547.387	0.00E+00	2.37E-01	4.74E-01	0.1250	5.613E+13
Cm-244	1.6848E-01	273.694	547.387	0.00E+00	4.61E+01	9.22E+01	0.2250	6.204E+13
Co-60	2.8086E+01	273.694	547.387	0.00E+00	7.69E+03	1.54E+04	0.3750	2.653E+13
Cs-134	3.4148E-04	273.694	547.387	0.00E+00	9.35E-02	1.87E-01	0.5750	4.315E+14
Cs-135	4.3976E-04	273.694	547.387	0.00E+00	1.20E-01	2.41E-01	0.8500	1.649E+13
Cs-137	2.1049E+01	273.694	547.387	0.00E+00	5.76E+03	1.15E+04	1.2500	1.153E+15
Eu-154	1.2500E+00	273.694	547.387	0.00E+00	3.42E+02	6.84E+02	1.7500	5.099E+11
Eu-155	6.8986E-02	273.694	547.387	0.00E+00	1.89E+01	3.78E+01	2.2500	6.045E+09
Fe-55	2.9308E-01	273.694	547.387	0.00E+00	8.02E+01	1.60E+02	2.7500	1.703E+09
H-3	2.4311E-01	273.694	547.387	0.00E+00	6.65E+01	1.33E+02	3.5000	1.548E+06
I-129	1.0618E-05	273.694	547.387	0.00E+00	2.91E-03	5.81E-03	5.0000	6.566E+05
Kr-85	5.9882E-01	273.694	547.387	0.00E+00	1.64E+02	3.28E+02	7.0000	7.506E+04
Np-237	1.5668E-04	273.694	547.387	0.00E+00	4.29E-02	8.58E-02	11.0000	8.582E+03
Pa-231	2.8656E-06	273.694	547.387	0.00E+00	7.84E-04	1.57E-03		
Pb-210	2.3918E-08	273.694	547.387	0.00E+00	6.55E-06	1.31E-05		
Pm-147	1.6900E-02	273.694	547.387	0.00E+00	4.63E+00	9.25E+00		
Pu-238	2.9808E+00	273.694	547.387	0.00E+00	8.16E+02	1.63E+03		
Pu-239	4.1648E-01	273.694	547.387	0.00E+00	1.14E+02	2.28E+02		
Pu-240	2.9264E-01	273.694	547.387	0.00E+00	8.01E+01	1.60E+02		
Pu-241	4.8704E+01	273.694	547.387	0.00E+00	1.33E+04	2.67E+04		
Pu-242	2.4560E-03	273.694	547.387	0.00E+00	6.72E-01	1.34E+00		
Ra-226	6.4400E-08	273.694	547.387	0.00E+00	1.76E-05	3.53E-05		
Ra-228	5.9952E-07	273.694	547.387	0.00E+00	1.64E-04	3.28E-04		
Ru-106	8.5526E-07	273.694	547.387	0.00E+00	2.34E-04	4.68E-04		
Se-79	1.9181E-04	273.694	547.387	0.00E+00	5.25E-02	1.05E-01		
Sn-126	1.6671E-04	273.694	547.387	0.00E+00	4.56E-02	9.13E-02		
Sr-90	1.9799E+01	273.694	547.387	0.00E+00	5.42E+03	1.08E+04		
Tc-99	6.7678E-03	273.694	547.387	0.00E+00	1.85E+00	3.70E+00		
Th-229	1.7488E-06	273.694	547.387	0.00E+00	4.79E-04	9.57E-04		
Th-230	5.8704E-06	273.694	547.387	0.00E+00	1.61E-03	3.21E-03		
Th-232	-4.2431E-09	273.694	0.000	1.59E-03	1.58E-03	1.59E-03		
Tl-208	8.7573E-05	273.694	547.387	0.00E+00	2.40E-02	4.79E-02		
U-232	2.3706E-04	273.694	547.387	0.00E+00	6.49E-02	1.30E-01		
U-233	3.6128E-04	273.694	547.387	0.00E+00	9.89E-02	1.98E-01		
U-234	1.2788E-02	273.694	547.387	0.00E+00	3.50E+00	7.00E+00		
U-235	5.7486E-04	273.694	547.387	3.36E-02	1.91E-01	3.48E-01		
U-236	2.3485E-04	273.694	547.387	0.00E+00	6.43E-02	1.29E-01		
U-238	1.1581E-04	273.694	547.387	4.19E-03	3.59E-02	6.76E-02		
Y-90	1.9804E+01	273.694	547.387	0.00E+00	5.42E+03	1.08E+04		
Other Radionuclides					1.69E+04	3.38E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.03E+02	6.06E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
HEAVY WATER	HEAVY WATER	(Worst Case)	This Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	ZIRC-2	SST/Inconel	
BOL HM Constituents:	U-Th Metal	U, Th, & Pu	
BOL Enrichment %:		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
273.694	273.694	273.694	Nominal burnup taken from SFD and converted to MWd using BOL=78.198kg Bounding burnup assumed to be twice nominal burnup.
547.387	547.387	547.387	

Checks		
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup
0.10	0.10	
Bounding:	0.21	

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: HWCTR TWNT
 SNF ID #: 791
 Fuel Units & Descr: 15 - TUBE
 Heavy Metal Mass: BOL = : EOL=321.82kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1964
 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"
 0.68

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	4.6920E-09	308,482.102	308,482.102	0.00E+00	1.45E-03	1.45E-03		
Am-241	2.2880E-02	308,482.102	308,482.102	0.00E+00	7.06E+03	7.06E+03	0.0150	2.152E+16
Am-242m	3.5400E-06	308,482.102	308,482.102	0.00E+00	1.09E+00	1.09E+00	0.0250	4.458E+15
Am-243	2.0580E-06	308,482.102	308,482.102	0.00E+00	6.35E-01	6.35E-01	0.0375	3.922E+15
C-14	1.1264E-03	308,482.102	308,482.102	0.00E+00	3.47E+02	3.47E+02	0.0575	4.246E+15
Cl-36	8.3760E-11	308,482.102	308,482.102	0.00E+00	2.58E-05	2.58E-05	0.0850	2.504E+15
Cm-243	5.0340E-07	308,482.102	308,482.102	0.00E+00	1.55E-01	1.55E-01	0.1250	1.652E+15
Cm-244	1.0450E-05	308,482.102	308,482.102	0.00E+00	3.22E+00	3.22E+00	0.2250	2.157E+15
Co-60	6.4420E-02	308,482.102	308,482.102	0.00E+00	1.99E+04	1.99E+04	0.3750	9.382E+14
Cs-134	7.9240E-06	308,482.102	308,482.102	0.00E+00	2.44E+00	2.44E+00	0.5750	1.642E+16
Cs-135	7.9140E-06	308,482.102	308,482.102	0.00E+00	2.44E+00	2.44E+00	0.8500	1.895E+14
Cs-137	1.4318E+00	308,482.102	308,482.102	0.00E+00	4.42E+05	4.42E+05	1.2500	1.562E+15
Eu-154	6.7900E-03	308,482.102	308,482.102	0.00E+00	2.09E+03	2.09E+03	1.7500	5.137E+12
Eu-155	6.2800E-02	308,482.102	308,482.102	0.00E+00	1.94E+02	1.94E+02	2.2500	8.227E+09
Fe-55	5.7480E-05	308,482.102	308,482.102	0.00E+00	1.77E+01	1.77E+01	2.7500	5.263E+08
H-3	2.3800E-02	308,482.102	308,482.102	0.00E+00	7.34E+03	7.34E+03	3.5000	1.587E+06
I-129	7.5020E-07	308,482.102	308,482.102	0.00E+00	2.31E-01	2.31E-01	5.0000	6.662E+05
Kr-85	3.8220E-02	308,482.102	308,482.102	0.00E+00	1.18E+04	1.18E+04	7.0000	7.494E+04
Np-237	5.5780E-06	308,482.102	308,482.102	0.00E+00	1.72E+00	1.72E+00	11.0000	8.505E+03
Pa-231	7.8820E-09	308,482.102	308,482.102	0.00E+00	2.43E-03	2.43E-03		
Pb-210	4.3840E-09	308,482.102	308,482.102	0.00E+00	1.35E-03	1.35E-03		
Pm-147	9.9500E-04	308,482.102	308,482.102	0.00E+00	3.07E+02	3.07E+02		
Pu-238	6.4240E-03	308,482.102	308,482.102	0.00E+00	1.98E+03	1.98E+03		
Pu-239	1.8744E-02	308,482.102	308,482.102	0.00E+00	5.78E+03	5.78E+03		
Pu-240	8.3540E-03	308,482.102	308,482.102	0.00E+00	2.58E+03	2.58E+03		
Pu-241	1.4606E-01	308,482.102	308,482.102	0.00E+00	4.51E+04	4.51E+04		
Pu-242	2.0400E-06	308,482.102	308,482.102	0.00E+00	6.29E-01	6.29E-01		
Ra-226	1.1804E-08	308,482.102	308,482.102	0.00E+00	3.64E-03	3.64E-03		
Ra-228	1.1864E-09	308,482.102	308,482.102	0.00E+00	3.66E-04	3.66E-04		
Ru-106	3.2580E-10	308,482.102	308,482.102	0.00E+00	1.01E-04	1.01E-04		
Se-79	1.2524E-05	308,482.102	308,482.102	0.00E+00	3.66E+00	3.66E+00		
Sn-126	1.2052E-05	308,482.102	308,482.102	0.00E+00	3.72E+00	3.72E+00		
Sr-90	1.2638E+00	308,482.102	308,482.102	0.00E+00	3.90E+05	3.90E+05		
Tc-99	4.4140E-04	308,482.102	308,482.102	0.00E+00	1.36E+02	1.36E+02		
Th-229	4.3480E-09	308,482.102	308,482.102	0.00E+00	1.34E-03	1.34E-03		
Th-230	1.0760E-06	308,482.102	308,482.102	0.00E+00	3.32E-01	3.32E-01		
Th-232	1.1926E-09	308,482.102	308,482.102	0.00E+00	3.68E-04	3.68E-04		
Th-208	4.6200E-08	308,482.102	308,482.102	0.00E+00	1.43E-02	1.43E-02		
U-232	1.2406E-07	308,482.102	308,482.102	0.00E+00	3.83E-02	3.83E-02		
U-233	9.1620E-07	308,482.102	308,482.102	0.00E+00	2.83E-01	2.83E-01		
U-234	2.3440E-03	308,482.102	308,482.102	0.00E+00	7.23E+02	7.23E+02		
U-235	-2.3296E-06	308,482.102	0.000	6.96E-02	0.00E+00	6.96E-02		
U-236	2.6820E-05	308,482.102	308,482.102	0.00E+00	8.21E+00	8.21E+00		
U-238	-1.3291E-07	308,482.102	0.000	2.03E-01	1.62E-01	2.03E-01		
Y-90	1.2642E+00	308,482.102	308,482.102	0.00E+00	3.90E+05	3.90E+05		
Other Radionuclides					4.21E+05	4.21E+05		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							5.67E+03	5.67E+03
							Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: HEAVY WATER	Used: HEAVY WATER	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U METAL	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD: 308,482.102	Estimated: 308,482.102	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		308,482.102	

Checks		
Nominal:	Burnup Multiplier: 32.83	Estimated Burnup/ Given Burnup: 2.59
Bounding:	32.83	

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: IAN-R1 (COLUMBIA)
SNF ID #: 596

Fuel Units & Descr: 16 - MTR TYPE
Heavy Metal Mass: BOL=2.54kg ; EOL=2.43kg
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"
0.67

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	4.5861E-10	104.551	209.102	0.00E+00	4.79E-08	9.59E-08	0.0150	2.494E+13
Am-241	1.7832E-03	104.551	209.102	0.00E+00	1.86E-01	3.73E-01	0.0250	5.202E+12
Am-242m	4.3410E-07	104.551	209.102	0.00E+00	4.54E-05	9.08E-05	0.0375	4.543E+12
Am-243	1.4907E-06	104.551	209.102	0.00E+00	1.56E-04	3.12E-04	0.0575	4.844E+12
C-14	5.7162E-09	104.551	209.102	0.00E+00	5.98E-07	1.20E-06	0.0850	2.934E+12
Cl-36	1.3124E-32	104.551	209.102	0.00E+00	1.37E-30	2.74E-30	0.1250	2.011E+12
Cm-243	1.8568E-07	104.551	209.102	0.00E+00	1.94E-05	3.88E-05	0.2250	2.528E+12
Cm-244	3.5512E-05	104.551	209.102	0.00E+00	3.71E-03	7.43E-03	0.3750	1.107E+12
Co-60	1.0261E-05	104.551	209.102	0.00E+00	1.07E-03	2.15E-03	0.5750	1.797E+13
Cs-134	1.6931E-02	104.551	209.102	0.00E+00	1.77E+00	3.54E+00	0.8500	4.269E+11
Cs-135	3.4477E-06	104.551	209.102	0.00E+00	3.60E-04	7.21E-04	1.2500	2.157E+11
Cs-137	2.2800E+00	104.551	209.102	0.00E+00	2.38E+02	4.77E+02	1.7500	9.038E+09
Eu-154	3.6566E-02	104.551	209.102	0.00E+00	3.83E+00	7.66E+00	1.7500	1.131E+07
Eu-155	9.6841E-03	104.551	209.102	0.00E+00	1.01E+00	2.02E+00	2.7500	6.794E+05
Fe-55	4.6977E-04	104.551	209.102	0.00E+00	4.91E-02	9.82E-02	3.5000	4.320E+04
H-3	6.0485E-03	104.551	209.102	0.00E+00	6.32E-01	1.26E+00	5.0000	1.000E+02
I-129	7.5300E-07	104.551	209.102	0.00E+00	7.87E-05	1.57E-04	7.0000	1.108E+01
Kr-85	1.4989E-01	104.551	209.102	0.00E+00	1.57E+01	3.13E+01	11.0000	1.244E+00
Np-237	9.5534E-06	104.551	209.102	0.00E+00	9.99E-04	2.00E-03		
Pa-231	1.6550E-09	104.551	209.102	0.00E+00	1.73E-07	3.46E-07		
Pb-210	2.6631E-11	104.551	209.102	0.00E+00	2.78E-09	5.57E-09		
Pm-147	1.8156E-01	104.551	209.102	0.00E+00	1.90E+01	3.80E+01		
Pu-238	1.8990E-02	104.551	209.102	0.00E+00	1.99E+00	3.97E+00		
Pu-239	4.2838E-04	104.551	209.102	0.00E+00	4.48E-02	8.96E-02		
Pu-240	2.4379E-04	104.551	209.102	0.00E+00	2.55E-02	5.10E-02		
Pu-241	4.2511E-02	104.551	209.102	0.00E+00	4.44E+00	8.89E+00		
Pu-242	3.6329E-07	104.551	209.102	0.00E+00	3.80E-05	7.60E-05		
Ra-226	1.4725E-10	104.551	209.102	0.00E+00	1.54E-08	3.08E-08		
Ra-228	8.9760E-15	104.551	209.102	0.00E+00	9.38E-13	1.88E-12		
Ru-106	1.9752E-04	104.551	209.102	0.00E+00	2.07E-02	4.13E-02		
Se-79	1.2933E-05	104.551	209.102	0.00E+00	1.35E-03	2.70E-03		
Sn-126	1.1574E-05	104.551	209.102	0.00E+00	1.21E-03	2.42E-03		
Sr-90	2.1680E+00	104.551	209.102	0.00E+00	2.27E+02	4.53E+02		
Tc-99	4.2239E-04	104.551	209.102	0.00E+00	4.42E-02	8.83E-02		
Th-229	3.9270E-12	104.551	209.102	0.00E+00	4.11E-10	8.21E-10		
Th-230	3.3578E-08	104.551	209.102	0.00E+00	3.51E-06	7.02E-06		
Th-232	1.5452E-14	104.551	209.102	0.00E+00	1.62E-12	3.23E-12		
Ti-208	4.6705E-08	104.551	209.102	0.00E+00	4.88E-06	9.77E-06		
U-232	1.3045E-07	104.551	209.102	0.00E+00	1.36E-05	2.73E-05		
U-233	2.3739E-09	104.551	209.102	0.00E+00	2.48E-07	4.96E-07		
U-234	1.8423E-04	104.551	209.102	0.00E+00	1.93E-02	3.85E-02		
U-235	-2.7235E-06	104.551	0.000	5.11E-03	4.82E-03	5.11E-03		
U-236	1.5493E-05	104.551	209.102	0.00E+00	1.62E-03	3.24E-03		
U-238	-4.2851E-09	104.551	0.000	5.79E-05	5.75E-05	5.79E-05		
Y-90	2.1686E+00	104.551	209.102	0.00E+00	2.27E+02	4.53E+02		
Other Radionuclides							2.27E+02	4.53E+02

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.83E+00	5.66E+00
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-ALX	U	
	93.20235261	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		104.551	
Bounding:		209.102	

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:	0.13		
Bounding:	0.26		

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: IAN-R1 (COLUMBIA)
SNF ID #: 803

Fuel Units & Descr: 5 - MTR TYPE
Heavy Metal Mass: BOL=.69kg ; EOL=.69kg
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"
0.21

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	2.8404E-10	12.974	25.948	0.00E+00	3.69E-09	7.37E-09		
Am-241	1.4935E-03	12.974	25.948	0.00E+00	1.94E-02	3.88E-02	0.0150	3.529E+12
Am-242m	4.4390E-07	12.974	25.948	0.00E+00	5.76E-06	1.15E-05	0.0250	7.427E+11
Am-243	1.4913E-06	12.974	25.948	0.00E+00	1.93E-05	3.87E-05	0.0375	6.475E+11
C-14	5.7217E-09	12.974	25.948	0.00E+00	7.42E-08	1.48E-07	0.0575	6.840E+11
Cl-36	1.3124E-32	12.974	25.948	0.00E+00	1.70E-31	3.41E-31	0.0850	4.162E+11
Cm-243	2.0967E-07	12.974	25.948	0.00E+00	2.72E-06	5.44E-06	0.1250	2.911E+11
Cm-244	4.3001E-05	12.974	25.948	0.00E+00	5.58E-04	1.12E-03	0.2250	3.574E+11
Co-60	1.9798E-05	12.974	25.948	0.00E+00	2.57E-04	5.14E-04	0.3750	1.602E+11
Cs-134	9.0795E-02	12.974	25.948	0.00E+00	1.18E+00	2.36E+00	0.5750	2.600E+12
Cs-135	3.4477E-06	12.974	25.948	0.00E+00	4.47E-05	8.95E-05	0.8500	1.268E+11
Cs-137	2.5588E+00	12.974	25.948	0.00E+00	3.32E+01	6.64E+01	1.2500	4.129E+10
Eu-154	5.4847E-02	12.974	25.948	0.00E+00	7.12E-01	1.42E+00	1.7500	1.508E+09
Eu-155	1.9469E-02	12.974	25.948	0.00E+00	2.53E-01	5.05E-01	2.2500	9.967E+07
Fe-55	1.7797E-03	12.974	25.948	0.00E+00	2.31E-02	4.62E-02	2.7500	1.391E+06
H-3	8.0065E-03	12.974	25.948	0.00E+00	1.04E-01	2.08E-01	3.5000	1.656E+05
I-129	7.5300E-07	12.974	25.948	0.00E+00	9.77E-06	1.95E-05	5.0000	1.381E+01
Kr-85	2.0705E-01	12.974	25.948	0.00E+00	2.69E+00	5.37E+00	7.0000	1.534E+00
Np-237	9.5507E-06	12.974	25.948	0.00E+00	1.24E-04	2.48E-04	11.0000	1.728E-01
Pa-231	1.2740E-09	12.974	25.948	0.00E+00	1.65E-08	3.31E-08		
Pb-210	1.1838E-11	12.974	25.948	0.00E+00	1.54E-10	3.07E-10		
Pm-147	6.7974E-01	12.974	25.948	0.00E+00	8.82E+00	1.76E+01		
Pu-238	1.9755E-02	12.974	25.948	0.00E+00	2.56E-01	5.13E-01		
Pu-239	4.2838E-04	12.974	25.948	0.00E+00	5.56E-03	1.11E-02		
Pu-240	2.4390E-04	12.974	25.948	0.00E+00	3.16E-03	6.33E-03		
Pu-241	5.4058E-02	12.974	25.948	0.00E+00	7.01E-01	1.40E+00		
Pu-242	3.6329E-07	12.974	25.948	0.00E+00	4.71E-06	9.43E-06		
Ra-226	8.3742E-11	12.974	25.948	0.00E+00	1.09E-09	2.17E-09		
Ra-228	5.7734E-15	12.974	25.948	0.00E+00	7.49E-14	1.50E-13		
Ru-106	6.1356E-03	12.974	25.948	0.00E+00	7.96E-02	1.59E-01		
Se-79	1.2936E-05	12.974	25.948	0.00E+00	1.68E-04	3.36E-04		
Sn-126	1.1574E-05	12.974	25.948	0.00E+00	1.50E-04	3.00E-04		
Sr-90	2.4417E+00	12.974	25.948	0.00E+00	3.17E+01	6.34E+01		
Tc-99	4.2239E-04	12.974	25.948	0.00E+00	5.48E-03	1.10E-02		
Th-229	2.8568E-12	12.974	25.948	0.00E+00	3.71E-11	7.41E-11		
Th-230	2.5310E-08	12.974	25.948	0.00E+00	3.28E-07	6.57E-07		
Th-232	1.1631E-14	12.974	25.948	0.00E+00	1.51E-13	3.02E-13		
Tl-208	4.6705E-08	12.974	25.948	0.00E+00	6.06E-07	1.21E-06		
U-232	1.3151E-07	12.974	25.948	0.00E+00	1.71E-06	3.41E-06		
U-233	2.1650E-09	12.974	25.948	0.00E+00	2.81E-08	5.62E-08		
U-234	1.8399E-04	12.974	25.948	0.00E+00	2.39E-03	4.77E-03		
U-235	-2.7235E-06	12.974	0.000	1.38E-03	1.34E-03	1.38E-03		
U-236	1.5493E-05	12.974	25.948	0.00E+00	2.01E-04	4.02E-04		
U-238	-4.2851E-09	12.974	0.000	1.62E-05	1.62E-05	1.62E-05		
Y-90	2.4423E+00	12.974	25.948	0.00E+00	3.17E+01	6.34E+01		
Other Radionuclides					3.23E+01	6.45E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.11E-01	8.21E-01
Total	Total

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-ALX	U	
BOL Enrichment %:	92.95939437	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		12.974	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup assumed to be twice nominal burnup.
Bounding:		25.948	

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).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: IEA-R1 (BRAZIL)
 SNF ID #: 954
 Fuel Units & Descr: 43 - ASSEMBLY
 Heavy Metal Mass: BOL=8.29kg ; EOL=4.98kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1998
 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"
 1.19

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	2.8404E-10	3,143.726	6,287.451	0.00E+00	8.93E-07	1.79E-06	Avg. MeV	
Am-241	1.4935E-03	3,143.726	6,287.451	0.00E+00	4.70E+00	9.39E+00	0.0150	8.551E+14
Am-242m	4.4390E-07	3,143.726	6,287.451	0.00E+00	1.40E-03	2.79E-03	0.0250	1.800E+14
Am-243	1.4913E-06	3,143.726	6,287.451	0.00E+00	4.69E-03	9.38E-03	0.0375	1.569E+14
C-14	5.7217E-09	3,143.726	6,287.451	0.00E+00	1.80E-05	3.60E-05	0.0575	1.657E+14
Cl-36	1.3124E-32	3,143.726	6,287.451	0.00E+00	4.13E-29	8.25E-29	0.0850	1.008E+14
Cm-243	2.0967E-07	3,143.726	6,287.451	0.00E+00	6.59E-04	1.32E-03	0.1250	7.054E+13
Cm-244	4.3001E-05	3,143.726	6,287.451	0.00E+00	1.35E-01	2.70E-01	0.2250	8.660E+13
Co-60	1.9798E-05	3,143.726	6,287.451	0.00E+00	6.22E-02	1.24E-01	0.3750	3.881E+13
Cs-134	9.0795E-02	3,143.726	6,287.451	0.00E+00	2.85E+02	5.71E+02	0.5750	6.301E+14
Cs-135	3.4477E-06	3,143.726	6,287.451	0.00E+00	1.08E-02	2.17E-02	0.8500	3.073E+13
Cs-137	2.5588E+00	3,143.726	6,287.451	0.00E+00	8.04E+03	1.61E+04	1.2500	1.000E+13
Eu-154	5.4847E-02	3,143.726	6,287.451	0.00E+00	1.72E+02	3.45E+02	1.7500	3.653E+11
Eu-155	1.9469E-02	3,143.726	6,287.451	0.00E+00	6.12E+01	1.22E+02	2.2500	2.415E+10
Fe-55	1.7797E-03	3,143.726	6,287.451	0.00E+00	5.59E+00	1.12E+01	2.7500	3.369E+08
H-3	8.0065E-03	3,143.726	6,287.451	0.00E+00	2.52E+01	5.03E+01	3.5000	4.019E+07
I-129	7.5300E-07	3,143.726	6,287.451	0.00E+00	2.37E-03	4.73E-03	5.0000	3.333E+03
Kr-85	2.0705E-01	3,143.726	6,287.451	0.00E+00	6.51E+02	1.30E+03	7.0000	3.703E+02
Np-237	9.5507E-06	3,143.726	6,287.451	0.00E+00	3.00E-02	6.00E-02	11.0000	4.166E+01
Pa-231	1.2740E-09	3,143.726	6,287.451	0.00E+00	4.00E-06	8.01E-06		
Pb-210	1.1838E-11	3,143.726	6,287.451	0.00E+00	3.72E-08	7.44E-08		
Pm-147	6.7974E-01	3,143.726	6,287.451	0.00E+00	2.14E+03	4.27E+03		
Pu-238	1.9755E-02	3,143.726	6,287.451	0.00E+00	6.21E+01	1.24E+02		
Pu-239	4.2838E-04	3,143.726	6,287.451	0.00E+00	1.35E+00	2.69E+00		
Pu-240	2.4390E-04	3,143.726	6,287.451	0.00E+00	7.67E-01	1.53E+00		
Pu-241	5.4058E-02	3,143.726	6,287.451	0.00E+00	1.70E+02	3.40E+02		
Pu-242	3.6329E-07	3,143.726	6,287.451	0.00E+00	1.14E-03	2.28E-03		
Ra-226	8.3742E-11	3,143.726	6,287.451	0.00E+00	2.63E-07	5.27E-07		
Ra-228	5.7734E-15	3,143.726	6,287.451	0.00E+00	1.82E-11	3.63E-11		
Ru-106	6.1356E-03	3,143.726	6,287.451	0.00E+00	1.93E+01	3.86E+01		
Se-79	1.2936E-05	3,143.726	6,287.451	0.00E+00	4.07E-02	8.13E-02		
Sn-126	1.1574E-05	3,143.726	6,287.451	0.00E+00	3.64E-02	7.28E-02		
Sr-90	2.4417E+00	3,143.726	6,287.451	0.00E+00	7.68E+03	1.54E+04		
Tc-99	4.2239E-04	3,143.726	6,287.451	0.00E+00	1.33E+00	2.66E+00		
Th-229	2.8568E-12	3,143.726	6,287.451	0.00E+00	8.98E-09	1.80E-08		
Th-230	2.5310E-08	3,143.726	6,287.451	0.00E+00	7.96E-05	1.59E-04		
Th-232	1.1631E-14	3,143.726	6,287.451	0.00E+00	3.66E-11	7.31E-11		
Tl-208	4.6705E-08	3,143.726	6,287.451	0.00E+00	1.47E-04	2.94E-04		
U-232	1.3151E-07	3,143.726	6,287.451	0.00E+00	4.13E-04	8.27E-04		
U-233	2.1650E-09	3,143.726	6,287.451	0.00E+00	6.81E-06	1.36E-05		
U-234	1.8399E-04	3,143.726	6,287.451	0.00E+00	5.78E-01	1.16E+00		
U-235	2.7235E-06	3,143.726	0.000	1.67E-02	8.13E-03	1.67E-02		
U-236	1.5493E-05	3,143.726	6,287.451	0.00E+00	4.87E-02	9.74E-02		
U-238	-4.2851E-09	3,143.726	0.000	1.92E-04	1.79E-04	1.92E-04		
Y-90	2.4423E+00	3,143.726	6,287.451	0.00E+00	7.68E+03	1.54E+04		
Other Radionuclides					7.81E+03	1.56E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.95E+01	1.99E+02
Total	Total

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-ALX	U	
BOL Enrichment %:	93.10655847	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		3,143.726	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		6,287.451	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	1.20		1.04
Bounding:	2.41		

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: IEA-R1 (BRAZIL)
 SNF ID #: 545
 Fuel Units & Descr: 84 - ASSEMBLY
 Heavy Metal Mass: BOL=63.55kg ; EOL=61.73kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1998
 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"
 3.50

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	2.8404E-10	1,726.227	3,452.454	0.00E+00	4.90E-07	9.81E-07	0.0150	4.695E+14
Am-241	1.4935E-03	1,726.227	3,452.454	0.00E+00	2.58E+00	5.16E+00	0.0250	9.882E+13
Am-242m	4.4390E-07	1,726.227	3,452.454	0.00E+00	7.66E-04	1.53E-03	0.0375	8.616E+13
Am-243	1.4913E-06	1,726.227	3,452.454	0.00E+00	2.57E-03	5.15E-03	0.0575	9.101E+13
C-14	5.7217E-09	1,726.227	3,452.454	0.00E+00	9.88E-06	1.98E-05	0.0850	5.537E+13
Cl-36	1.3124E-32	1,726.227	3,452.454	0.00E+00	2.27E-29	4.53E-29	0.1250	3.873E+13
Cm-243	2.0967E-07	1,726.227	3,452.454	0.00E+00	3.62E-04	7.24E-04	0.2250	4.755E+13
Cm-244	4.3001E-05	1,726.227	3,452.454	0.00E+00	7.42E-02	1.48E-01	0.3750	2.131E+13
Co-60	1.9798E-05	1,726.227	3,452.454	0.00E+00	3.42E-02	6.84E-02	0.5750	3.460E+14
Cs-134	9.0795E-02	1,726.227	3,452.454	0.00E+00	1.57E+02	3.13E+02	0.8500	1.688E+13
Cs-135	3.4477E-06	1,726.227	3,452.454	0.00E+00	5.95E-03	1.19E-02	1.2500	5.493E+12
Cs-137	2.5588E+00	1,726.227	3,452.454	0.00E+00	4.42E+03	8.83E+03	1.7500	2.066E+11
Eu-154	5.4847E-02	1,726.227	3,452.454	0.00E+00	9.47E+01	1.89E+02	2.2500	1.326E+10
Eu-155	1.9469E-02	1,726.227	3,452.454	0.00E+00	3.36E+01	6.72E+01	2.7500	1.850E+08
Fe-55	1.7797E-03	1,726.227	3,452.454	0.00E+00	3.07E+00	6.14E+00	3.5000	2.203E+07
H-3	8.0065E-03	1,726.227	3,452.454	0.00E+00	1.38E+01	2.76E+01	5.0000	1.869E+03
I-129	7.5300E-07	1,726.227	3,452.454	0.00E+00	1.30E-03	2.60E-03	7.0000	2.079E+02
Kr-85	2.0705E-01	1,726.227	3,452.454	0.00E+00	3.57E+02	7.15E+02	11.0000	2.340E+01
Np-237	9.5507E-06	1,726.227	3,452.454	0.00E+00	1.65E-02	3.30E-02		
Pa-231	1.2740E-09	1,726.227	3,452.454	0.00E+00	2.20E-06	4.40E-06		
Pb-210	1.1838E-11	1,726.227	3,452.454	0.00E+00	2.04E-08	4.09E-08		
Pm-147	6.7974E-01	1,726.227	3,452.454	0.00E+00	1.17E+03	2.35E+03		
Pu-238	1.9755E-02	1,726.227	3,452.454	0.00E+00	3.41E+01	6.82E+01		
Pu-239	4.2838E-04	1,726.227	3,452.454	0.00E+00	7.39E-01	1.48E+00		
Pu-240	2.4390E-04	1,726.227	3,452.454	0.00E+00	4.21E-01	8.42E-01		
Pu-241	5.4058E-02	1,726.227	3,452.454	0.00E+00	9.33E+01	1.87E+02		
Pu-242	3.6329E-07	1,726.227	3,452.454	0.00E+00	6.27E-04	1.25E-03		
Ra-226	8.3742E-11	1,726.227	3,452.454	0.00E+00	1.45E-07	2.89E-07		
Ra-228	5.7734E-15	1,726.227	3,452.454	0.00E+00	9.97E-12	1.99E-11		
Ru-106	6.1356E-03	1,726.227	3,452.454	0.00E+00	1.06E+01	2.12E+01		
Se-79	1.2936E-05	1,726.227	3,452.454	0.00E+00	2.23E-02	4.47E-02		
Sn-126	1.1574E-05	1,726.227	3,452.454	0.00E+00	2.00E-02	4.00E-02		
Sr-90	2.4417E+00	1,726.227	3,452.454	0.00E+00	4.21E+03	8.43E+03		
Tc-99	4.2239E-04	1,726.227	3,452.454	0.00E+00	7.29E-01	1.46E+00		
Th-229	2.8568E-12	1,726.227	3,452.454	0.00E+00	4.93E-09	9.86E-09		
Th-230	2.5310E-08	1,726.227	3,452.454	0.00E+00	4.37E-05	8.74E-05		
Th-232	1.1631E-14	1,726.227	3,452.454	0.00E+00	2.01E-11	4.02E-11		
Tl-208	4.6705E-08	1,726.227	3,452.454	0.00E+00	8.06E-05	1.61E-04		
U-232	1.3151E-07	1,726.227	3,452.454	0.00E+00	2.27E-04	4.54E-04		
U-233	2.1650E-09	1,726.227	3,452.454	0.00E+00	3.74E-06	7.47E-06		
U-234	1.8399E-04	1,726.227	3,452.454	0.00E+00	3.18E-01	6.35E-01		
U-235	-2.7235E-06	1,726.227	0.000	2.70E-02	2.23E-02	2.70E-02		
U-236	1.5493E-05	1,726.227	3,452.454	0.00E+00	2.67E-02	5.35E-02		
U-238	-4.2851E-09	1,726.227	0.000	1.72E-02	1.72E-02	1.72E-02		
Y-90	2.4423E+00	1,726.227	3,452.454	0.00E+00	4.22E+03	8.43E+03		
Other Radionuclides					4.29E+03	8.58E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.46E+01	1.09E+02
Total	Total

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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	19.66156126	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		1,726.227	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		3,452.454	

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.09	
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: IEA-R1 (BRAZIL)
 SNF ID #: 1076
 Fuel Units & Descr: 39 - ASSEMBLY
 Heavy Metal Mass: BOL=29.51kg ; EOL=28.66kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1998
 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"
 1.63

Radionuclide	II. Estimates		x _b	b	y _n	y _b	Gamma Sources	
	m	x _n					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	2.8404E-10	801.463	1,602.925	0.00E+00	2.28E-07	4.55E-07	0.0150	2.180E+14
Am-241	1.4935E-03	801.463	1,602.925	0.00E+00	1.20E+00	2.39E+00	0.0250	4.588E+13
Am-242m	4.4390E-07	801.463	1,602.925	0.00E+00	3.56E-04	7.12E-04	0.0375	4.000E+13
Am-243	1.4913E-06	801.463	1,602.925	0.00E+00	1.20E-03	2.39E-03	0.0575	4.226E+13
C-14	5.7217E-09	801.463	1,602.925	0.00E+00	4.59E-06	9.17E-06	0.0850	2.571E+13
Cl-36	1.3124E-32	801.463	1,602.925	0.00E+00	1.05E-29	2.10E-29	0.1250	1.798E+13
Cm-243	2.0967E-07	801.463	1,602.925	0.00E+00	1.68E-04	3.36E-04	0.2250	2.208E+13
Cm-244	4.3001E-05	801.463	1,602.925	0.00E+00	3.45E-02	6.89E-02	0.3750	9.894E+12
Co-60	1.9798E-05	801.463	1,602.925	0.00E+00	1.59E-02	3.17E-02	0.5750	1.606E+14
Cs-134	9.0795E-02	801.463	1,602.925	0.00E+00	7.28E+01	1.46E+02	0.8500	7.835E+12
Cs-135	3.4477E-06	801.463	1,602.925	0.00E+00	2.76E-03	5.53E-03	1.2500	2.550E+12
Cs-137	2.5588E+00	801.463	1,602.925	0.00E+00	2.05E+03	4.10E+03	1.7500	9.313E+10
Eu-154	5.4847E-02	801.463	1,602.925	0.00E+00	4.40E+01	8.79E+01	2.2500	6.157E+09
Eu-155	1.9469E-02	801.463	1,602.925	0.00E+00	1.56E+01	3.12E+01	2.7500	8.590E+07
Fe-55	1.7797E-03	801.463	1,602.925	0.00E+00	1.43E+00	2.85E+00	3.5000	1.023E+07
H-3	8.0065E-03	801.463	1,602.925	0.00E+00	6.42E+00	1.28E+01	5.0000	8.678E+02
I-129	7.5300E-07	801.463	1,602.925	0.00E+00	6.03E-04	1.21E-03	7.0000	9.651E+01
Kr-85	2.0705E-01	801.463	1,602.925	0.00E+00	1.66E+02	3.32E+02	11.0000	1.086E+01
Np-237	9.5507E-06	801.463	1,602.925	0.00E+00	7.65E-03	1.53E-02		
Pa-231	1.2740E-09	801.463	1,602.925	0.00E+00	1.02E-06	2.04E-06		
Pb-210	1.1838E-11	801.463	1,602.925	0.00E+00	9.49E-09	1.90E-08		
Pm-147	6.7974E-01	801.463	1,602.925	0.00E+00	5.45E+02	1.09E+03		
Pu-238	1.9755E-02	801.463	1,602.925	0.00E+00	1.58E+01	3.17E+01		
Pu-239	4.2838E-04	801.463	1,602.925	0.00E+00	3.43E-01	6.87E-01		
Pu-240	2.4390E-04	801.463	1,602.925	0.00E+00	1.95E-01	3.91E-01		
Pu-241	5.4058E-02	801.463	1,602.925	0.00E+00	4.33E+01	8.67E+01		
Pu-242	3.6329E-07	801.463	1,602.925	0.00E+00	2.91E-04	5.82E-04		
Ra-226	8.3742E-11	801.463	1,602.925	0.00E+00	6.71E-08	1.34E-07		
Ra-228	5.7734E-15	801.463	1,602.925	0.00E+00	4.63E-12	9.25E-12		
Ru-106	6.1356E-03	801.463	1,602.925	0.00E+00	4.92E+00	9.83E+00		
Se-79	1.2936E-05	801.463	1,602.925	0.00E+00	1.04E-02	2.07E-02		
Sn-126	1.1574E-05	801.463	1,602.925	0.00E+00	9.28E-03	1.86E-02		
Sr-90	2.4417E+00	801.463	1,602.925	0.00E+00	1.96E+03	3.91E+03		
Tc-99	4.2239E-04	801.463	1,602.925	0.00E+00	3.39E-01	6.77E-01		
Th-229	2.8568E-12	801.463	1,602.925	0.00E+00	2.29E-09	4.58E-09		
Th-230	2.5310E-08	801.463	1,602.925	0.00E+00	2.03E-05	4.06E-05		
Th-232	1.1631E-14	801.463	1,602.925	0.00E+00	9.32E-12	1.86E-11		
Tl-208	4.6705E-08	801.463	1,602.925	0.00E+00	3.74E-05	7.49E-05		
U-232	1.3151E-07	801.463	1,602.925	0.00E+00	1.05E-04	2.11E-04		
U-233	2.1650E-09	801.463	1,602.925	0.00E+00	1.74E-06	3.47E-06		
U-234	1.8399E-04	801.463	1,602.925	0.00E+00	1.47E-01	2.95E-01		
U-235	-2.7235E-06	801.463	0.000	1.25E-02	1.04E-02	1.25E-02		
U-236	1.5493E-05	801.463	1,602.925	0.00E+00	1.24E-02	2.48E-02		
U-238	-4.2851E-09	801.463	0.000	7.97E-03	7.96E-03	7.97E-03		
Y-90	2.4423E+00	801.463	1,602.925	0.00E+00	1.96E+03	3.91E+03		
Other Radionuclides					1.99E+03	3.98E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.54E+01	5.07E+01
Total	Total

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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	19.66156126	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		801.463	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		1,602.925	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.09		1.00
Bounding:	0.17		

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: IOWA ST. UNIV.
 SNF ID #: 792
 Fuel Units & Descr: 22 - FLAT PLATES IN CAN
 Heavy Metal Mass: BOL=3.48kg ; EOL=3.47kg
 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"
 0.61

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	2.8404E-10	4.167	8.334	0.00E+00	1.18E-09	2.37E-09		
Am-241	1.4935E-03	4.167	8.334	0.00E+00	6.22E-03	1.24E-02	0.0150	1.134E+12
Am-242m	4.4390E-07	4.167	8.334	0.00E+00	1.85E-06	3.70E-06	0.0250	2.385E+11
Am-243	1.4913E-06	4.167	8.334	0.00E+00	6.21E-06	1.24E-05	0.0375	2.080E+11
C-14	5.7217E-09	4.167	8.334	0.00E+00	2.38E-08	4.77E-08	0.0575	2.197E+11
Cl-36	1.3124E-32	4.167	8.334	0.00E+00	5.47E-32	1.09E-31	0.0850	1.337E+11
Cm-243	2.0967E-07	4.167	8.334	0.00E+00	8.74E-07	1.75E-06	0.1250	9.354E+10
Cm-244	4.3001E-05	4.167	8.334	0.00E+00	1.79E-04	3.58E-04	0.2250	1.149E+11
Co-60	1.9798E-05	4.167	8.334	0.00E+00	8.25E-05	1.65E-04	0.3750	5.144E+10
Cs-134	9.0795E-02	4.167	8.334	0.00E+00	3.78E-01	7.57E-01	0.5750	8.352E+11
Cs-135	3.4477E-06	4.167	8.334	0.00E+00	1.44E-05	2.87E-05	0.8500	4.074E+10
Cs-137	2.5588E+00	4.167	8.334	0.00E+00	1.07E+01	2.13E+01	1.2500	1.326E+10
Eu-154	5.4847E-02	4.167	8.334	0.00E+00	2.29E-01	4.57E-01	1.7500	4.842E+08
Eu-155	1.9469E-02	4.167	8.334	0.00E+00	8.11E-02	1.62E-01	2.2500	3.201E+07
Fe-55	1.7797E-03	4.167	8.334	0.00E+00	7.42E-03	1.48E-02	2.7500	4.466E+05
H-3	8.0065E-03	4.167	8.334	0.00E+00	3.34E-02	6.67E-02	3.5000	5.319E+04
I-129	7.5300E-07	4.167	8.334	0.00E+00	3.14E-06	6.28E-06	5.0000	4.691E+00
Kr-85	2.0705E-01	4.167	8.334	0.00E+00	8.63E-01	1.73E+00	7.0000	5.217E-01
Np-237	9.5507E-06	4.167	8.334	0.00E+00	3.98E-05	7.96E-05	11.0000	5.872E-02
Pa-231	1.2740E-09	4.167	8.334	0.00E+00	5.31E-09	1.06E-08		
Pb-210	1.1838E-11	4.167	8.334	0.00E+00	4.93E-11	9.87E-11		
Pm-147	6.7974E-01	4.167	8.334	0.00E+00	2.83E+00	5.66E+00		
Pu-238	1.9755E-02	4.167	8.334	0.00E+00	8.23E-02	1.65E-01		
Pu-239	4.2838E-04	4.167	8.334	0.00E+00	1.78E-03	3.57E-03		
Pu-240	2.4390E-04	4.167	8.334	0.00E+00	1.02E-03	2.03E-03		
Pu-241	5.4058E-02	4.167	8.334	0.00E+00	2.25E-01	4.51E-01		
Pu-242	3.6329E-07	4.167	8.334	0.00E+00	1.51E-06	3.03E-06		
Ra-226	8.3742E-11	4.167	8.334	0.00E+00	3.49E-10	6.98E-10		
Ra-228	5.7734E-15	4.167	8.334	0.00E+00	2.41E-14	4.81E-14		
Ru-106	6.1356E-03	4.167	8.334	0.00E+00	2.56E-02	5.11E-02		
Se-79	1.2936E-05	4.167	8.334	0.00E+00	5.39E-05	1.08E-04		
Sn-126	1.1574E-05	4.167	8.334	0.00E+00	4.82E-05	9.65E-05		
Sr-90	2.4417E+00	4.167	8.334	0.00E+00	1.02E+01	2.03E+01		
Tc-99	4.2239E-04	4.167	8.334	0.00E+00	1.76E-03	3.52E-03		
Th-229	2.8568E-12	4.167	8.334	0.00E+00	1.19E-11	2.38E-11		
Th-230	2.5310E-08	4.167	8.334	0.00E+00	1.05E-07	2.11E-07		
Th-232	1.1631E-14	4.167	8.334	0.00E+00	4.85E-14	9.69E-14		
Tl-208	4.6705E-08	4.167	8.334	0.00E+00	1.95E-07	3.89E-07		
U-232	1.3151E-07	4.167	8.334	0.00E+00	5.48E-07	1.10E-06		
U-233	2.1650E-09	4.167	8.334	0.00E+00	9.02E-09	1.80E-08		
U-234	1.8399E-04	4.167	8.334	0.00E+00	7.67E-04	1.53E-03		
U-235	-2.7235E-06	4.167	0.000	7.01E-03	7.00E-03	7.01E-03		
U-236	1.5493E-05	4.167	8.334	0.00E+00	6.46E-05	1.29E-04		
U-238	-4.2851E-09	4.167	0.000	7.82E-05	7.82E-05	7.82E-05		
Y-90	2.4423E+00	4.167	8.334	0.00E+00	1.02E+01	2.04E+01		
Other Radionuclides					1.04E+01	2.07E+01		

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-ALX	U	
BOL Enrichment %:	93.30981127	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		4.167	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		8.334	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.00		
Bounding:	0.01		

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: IOWA ST. UNIV.
 SNF ID #: 953
 Fuel Units & Descr: 24 - 24 FLAT PLATES
 Heavy Metal Mass: BOL=19.20kg ; EOL=19.20kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1998
 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"
 0.67

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	2.8404E-10	9.091	18.183	0.00E+00	2.58E-09	5.16E-09	Avg. MeV	
Am-241	1.4935E-03	9.091	18.183	0.00E+00	1.36E-02	2.72E-02	0.0150	2.473E+12
Am-242m	4.4390E-07	9.091	18.183	0.00E+00	4.04E-06	8.07E-06	0.0250	5.204E+11
Am-243	1.4913E-06	9.091	18.183	0.00E+00	1.36E-05	2.71E-05	0.0375	4.538E+11
C-14	5.7217E-09	9.091	18.183	0.00E+00	5.20E-08	1.04E-07	0.0575	4.793E+11
Cl-36	1.3124E-32	9.091	18.183	0.00E+00	1.19E-31	2.39E-31	0.0850	2.916E+11
Cm-243	2.0967E-07	9.091	18.183	0.00E+00	1.91E-06	3.81E-06	0.1250	2.040E+11
Cm-244	4.3001E-05	9.091	18.183	0.00E+00	3.91E-04	7.82E-04	0.2250	2.506E+11
Co-60	1.9798E-05	9.091	18.183	0.00E+00	1.80E-04	3.60E-04	0.3750	1.122E+11
Cs-134	9.0795E-02	9.091	18.183	0.00E+00	8.25E-01	1.65E+00	0.5750	1.822E+12
Cs-135	3.4477E-06	9.091	18.183	0.00E+00	3.13E-05	6.27E-05	0.8500	8.888E+10
Cs-137	2.5588E+00	9.091	18.183	0.00E+00	2.33E+01	4.65E+01	1.2500	2.893E+10
Eu-154	5.4847E-02	9.091	18.183	0.00E+00	4.99E-01	9.97E-01	1.7500	1.056E+09
Eu-155	1.9469E-02	9.091	18.183	0.00E+00	1.77E-01	3.54E-01	2.2500	6.984E+07
Fe-55	1.7797E-03	9.091	18.183	0.00E+00	1.62E-02	3.24E-02	2.7500	9.744E+05
H-3	8.0065E-03	9.091	18.183	0.00E+00	7.28E-02	1.46E-01	3.5000	1.161E+05
I-129	7.5300E-07	9.091	18.183	0.00E+00	6.85E-06	1.37E-05	5.0000	2.161E+01
Kr-85	2.0705E-01	9.091	18.183	0.00E+00	1.88E+00	3.76E+00	7.0000	2.449E+00
Np-237	9.5507E-06	9.091	18.183	0.00E+00	8.68E-05	1.74E-04	11.0000	2.789E-01
Pa-231	1.2740E-09	9.091	18.183	0.00E+00	1.16E-08	2.32E-08		
Pb-210	1.1838E-11	9.091	18.183	0.00E+00	1.08E-10	2.15E-10		
Pm-147	6.7974E-01	9.091	18.183	0.00E+00	6.18E+00	1.24E+01		
Pu-238	1.9755E-02	9.091	18.183	0.00E+00	1.80E-01	3.59E-01		
Pu-239	4.2838E-04	9.091	18.183	0.00E+00	3.89E-03	7.79E-03		
Pu-240	2.4390E-04	9.091	18.183	0.00E+00	2.22E-03	4.43E-03		
Pu-241	5.4058E-02	9.091	18.183	0.00E+00	4.91E-01	9.83E-01		
Pu-242	3.6329E-07	9.091	18.183	0.00E+00	3.30E-06	6.61E-06		
Ra-226	8.3742E-11	9.091	18.183	0.00E+00	7.61E-10	1.52E-09		
Ra-228	5.7734E-15	9.091	18.183	0.00E+00	5.25E-14	1.05E-13		
Ru-106	6.1356E-03	9.091	18.183	0.00E+00	5.58E-02	1.12E-01		
Se-79	1.2936E-05	9.091	18.183	0.00E+00	1.18E-04	2.35E-04		
Sn-126	1.1574E-05	9.091	18.183	0.00E+00	1.05E-04	2.10E-04		
Sr-90	2.4417E+00	9.091	18.183	0.00E+00	2.22E+01	4.44E+01		
Tc-99	4.2239E-04	9.091	18.183	0.00E+00	3.84E-03	7.68E-03		
Th-229	2.8568E-12	9.091	18.183	0.00E+00	2.60E-11	5.19E-11		
Th-230	2.5310E-08	9.091	18.183	0.00E+00	2.30E-07	4.60E-07		
Th-232	1.1631E-14	9.091	18.183	0.00E+00	1.06E-13	2.11E-13		
Tl-208	4.6705E-08	9.091	18.183	0.00E+00	4.25E-07	8.49E-07		
U-232	1.3151E-07	9.091	18.183	0.00E+00	1.20E-06	2.39E-06		
U-233	2.1650E-09	9.091	18.183	0.00E+00	1.97E-08	3.94E-08		
U-234	1.8399E-04	9.091	18.183	0.00E+00	1.67E-03	3.35E-03		
U-235	-2.7235E-06	9.091	0.000	8.20E-03	8.18E-03	8.20E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.5493E-05	9.091	18.183	0.00E+00	1.41E-04	2.82E-04	2.88E-01	5.76E-01
U-238	-4.2851E-09	9.091	0.000	5.18E-03	5.18E-03	5.18E-03	Total	Total
Y-90	2.4423E+00	9.091	18.183	0.00E+00	2.22E+01	4.44E+01		
Other Radionuclides					2.26E+01	4.52E+01		

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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	ALUM (6061)	ALUM	
BOL HM Constituents:	U3Si2	U	
BOL Enrichment %:	19.76527712	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	0.019	9.091	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		18.183	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.00	473.39	1.00
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: JEN-1 (SPAIN)
 SNF ID #: 749
 Fuel Units & Descr: 18 - 16 CURVED PLATES
 Heavy Metal Mass: BOL=12.64kg : EOL=12.45kg
 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"
 0.75

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	182.396	364.792	0.00E+00	8.36E-08	1.67E-07	Avg. MeV	
Am-241	1.7832E-03	182.396	364.792	0.00E+00	3.25E-01	6.51E-01	0.0150	4.352E+13
Am-242m	4.3410E-07	182.396	364.792	0.00E+00	7.92E-05	1.58E-04	0.0250	9.076E+12
Am-243	1.4907E-06	182.396	364.792	0.00E+00	2.72E-04	5.44E-04	0.0375	7.925E+12
C-14	5.7162E-09	182.396	364.792	0.00E+00	1.04E-06	2.09E-06	0.0575	8.450E+12
Cl-36	1.3124E-32	182.396	364.792	0.00E+00	2.39E-30	4.79E-30	0.0850	5.118E+12
Cm-243	1.8568E-07	182.396	364.792	0.00E+00	3.39E-05	6.77E-05	0.1250	3.509E+12
Cm-244	3.5512E-05	182.396	364.792	0.00E+00	6.48E-03	1.30E-02	0.2250	4.410E+12
Co-60	1.0261E-05	182.396	364.792	0.00E+00	1.87E-03	3.74E-03	0.3750	1.932E+12
Cs-134	1.6931E-02	182.396	364.792	0.00E+00	3.09E+00	6.18E+00	0.5750	3.136E+13
Cs-135	3.4477E-06	182.396	364.792	0.00E+00	6.29E-04	1.26E-03	0.8500	7.448E+11
Cs-137	2.2800E+00	182.396	364.792	0.00E+00	4.16E+02	8.32E+02	1.2500	3.763E+11
Eu-154	3.6656E-02	182.396	364.792	0.00E+00	6.69E+00	1.34E+01	1.7500	1.577E+10
Eu-155	9.6841E-03	182.396	364.792	0.00E+00	1.77E+00	3.53E+00	2.2500	1.972E+07
Fe-55	4.6977E-04	182.396	364.792	0.00E+00	8.57E-02	1.71E-01	2.7500	1.185E+06
H-3	6.0485E-03	182.396	364.792	0.00E+00	1.10E+00	2.21E+00	3.5000	7.538E+04
I-129	7.5300E-07	182.396	364.792	0.00E+00	1.37E-04	2.75E-04	5.0000	1.821E+02
Kr-85	1.4989E-01	182.396	364.792	0.00E+00	2.73E+01	5.47E+01	7.0000	2.021E+01
Np-237	9.5534E-06	182.396	364.792	0.00E+00	1.74E-03	3.48E-03	11.0000	2.271E+00
Pa-231	1.6550E-09	182.396	364.792	0.00E+00	3.02E-07	6.04E-07		
Pb-210	2.6631E-11	182.396	364.792	0.00E+00	4.86E-09	9.71E-09		
Pm-147	1.8156E-01	182.396	364.792	0.00E+00	3.31E+01	6.62E+01		
Pu-238	1.8990E-02	182.396	364.792	0.00E+00	3.46E+00	6.93E+00		
Pu-239	4.2838E-04	182.396	364.792	0.00E+00	7.81E-02	1.56E-01		
Pu-240	2.4379E-04	182.396	364.792	0.00E+00	4.45E-02	8.89E-02		
Pu-241	4.2511E-02	182.396	364.792	0.00E+00	7.75E+00	1.55E+01		
Pu-242	3.6329E-07	182.396	364.792	0.00E+00	6.63E-05	1.33E-04		
Ra-226	1.4725E-10	182.396	364.792	0.00E+00	2.69E-08	5.37E-08		
Ra-228	8.9760E-15	182.396	364.792	0.00E+00	1.64E-12	3.27E-12		
Ru-106	1.9752E-04	182.396	364.792	0.00E+00	3.60E-02	7.21E-02		
Se-79	1.2933E-05	182.396	364.792	0.00E+00	2.36E-03	4.72E-03		
Sn-126	1.1574E-05	182.396	364.792	0.00E+00	2.11E-03	4.22E-03		
Sr-90	2.1680E+00	182.396	364.792	0.00E+00	3.95E+02	7.91E+02		
Tc-99	4.2239E-04	182.396	364.792	0.00E+00	7.70E-02	1.54E-01		
Th-229	3.9270E-12	182.396	364.792	0.00E+00	7.16E-10	1.43E-09		
Th-230	3.3578E-08	182.396	364.792	0.00E+00	6.12E-06	1.22E-05		
Th-232	1.5452E-14	182.396	364.792	0.00E+00	2.82E-12	5.64E-12		
Tl-208	4.6705E-08	182.396	364.792	0.00E+00	8.52E-06	1.70E-05		
U-232	1.3045E-07	182.396	364.792	0.00E+00	2.38E-05	4.76E-05		
U-233	2.3739E-09	182.396	364.792	0.00E+00	4.33E-07	8.66E-07		
U-234	1.8423E-04	182.396	364.792	0.00E+00	3.36E-02	6.72E-02		
U-235	-2.7235E-06	182.396	0.000	5.25E-03	4.75E-03	5.25E-03		
U-236	1.5493E-05	182.396	364.792	0.00E+00	2.83E-03	5.65E-03		
U-238	-4.2851E-09	182.396	0.000	3.43E-03	3.43E-03	3.43E-03		
Y-90	2.1686E+00	182.396	364.792	0.00E+00	3.96E+02	7.91E+02		
Other Radionuclides					3.97E+02	7.93E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.94E+00	9.87E+00
Total	Total

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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	19.22438767	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		182.396	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		364.792	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.05		
Bounding:	0.09		

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: JEN-1 (SPAIN)
 SNF ID #: 795
 Fuel Units & Descr: 23 - 16 CURVED PLATES
 Heavy Metal Mass: BOL=4.00kg ; EOL=3.78kg
 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"
 0.96

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	206.924	413.847	0.00E+00	9.49E-08	1.90E-07		
Am-241	1.7832E-03	206.924	413.847	0.00E+00	3.69E-01	7.38E-01	0.0150	4.937E+13
Am-242m	4.3410E-07	206.924	413.847	0.00E+00	8.98E-05	1.80E-04	0.0250	1.030E+13
Am-243	1.4907E-06	206.924	413.847	0.00E+00	3.08E-04	6.17E-04	0.0375	8.991E+12
C-14	5.7162E-09	206.924	413.847	0.00E+00	1.18E-06	2.37E-06	0.0575	9.587E+12
Cf-252	1.3124E-32	206.924	413.847	0.00E+00	2.72E-30	5.43E-30	0.0850	5.807E+12
Cm-243	1.8568E-07	206.924	413.847	0.00E+00	3.84E-05	7.68E-05	0.1250	3.981E+12
Cm-244	3.5512E-05	206.924	413.847	0.00E+00	7.35E-03	1.47E-02	0.2250	5.003E+12
Co-60	1.0261E-05	206.924	413.847	0.00E+00	2.12E-03	4.25E-03	0.3750	2.191E+12
Cs-134	1.6931E-02	206.924	413.847	0.00E+00	3.50E+00	7.01E+00	0.5750	3.557E+13
Cs-135	3.4477E-06	206.924	413.847	0.00E+00	7.13E-04	1.43E-03	0.8500	8.449E+11
Cs-137	2.2800E+00	206.924	413.847	0.00E+00	4.72E+02	9.44E+02	1.2500	4.269E+11
Eu-154	3.6656E-02	206.924	413.847	0.00E+00	7.58E+00	1.52E+01	1.7500	1.789E+10
Eu-155	9.6841E-03	206.924	413.847	0.00E+00	2.00E+00	4.01E+00	2.2500	2.238E+07
Fe-55	4.6977E-04	206.924	413.847	0.00E+00	9.72E-02	1.94E-01	2.7500	1.345E+06
H-3	6.0485E-03	206.924	413.847	0.00E+00	1.25E+00	2.50E+00	3.5000	8.549E+04
I-129	7.5300E-07	206.924	413.847	0.00E+00	1.56E-04	3.12E-04	5.0000	1.984E+02
Kr-85	1.4989E-01	206.924	413.847	0.00E+00	3.10E+01	6.20E+01	7.0000	2.198E+01
Np-237	9.5534E-06	206.924	413.847	0.00E+00	1.98E-03	3.95E-03	11.0000	2.468E+00
Pa-231	1.6550E-09	206.924	413.847	0.00E+00	3.42E-07	6.85E-07		
Pb-210	2.6631E-11	206.924	413.847	0.00E+00	5.51E-09	1.10E-08		
Pm-147	1.8156E-01	206.924	413.847	0.00E+00	3.76E+01	7.51E+01		
Pu-238	1.8990E-02	206.924	413.847	0.00E+00	3.93E+00	7.86E+00		
Pu-239	4.2838E-04	206.924	413.847	0.00E+00	8.86E-02	1.77E-01		
Pu-240	2.4379E-04	206.924	413.847	0.00E+00	5.04E-02	1.01E-01		
Pu-241	4.2511E-02	206.924	413.847	0.00E+00	8.80E+00	1.76E+01		
Pu-242	3.6329E-07	206.924	413.847	0.00E+00	7.52E-05	1.50E-04		
Ra-226	1.4725E-10	206.924	413.847	0.00E+00	3.05E-08	6.09E-08		
Ra-228	8.9760E-15	206.924	413.847	0.00E+00	1.86E-12	3.71E-12		
Ru-106	1.9752E-04	206.924	413.847	0.00E+00	4.09E-02	8.17E-02		
Se-79	1.2933E-05	206.924	413.847	0.00E+00	2.68E-03	5.35E-03		
Sn-126	1.1574E-05	206.924	413.847	0.00E+00	2.39E-03	4.79E-03		
Sr-90	2.1680E+00	206.924	413.847	0.00E+00	4.49E+02	8.97E+02		
Tc-99	4.2239E-04	206.924	413.847	0.00E+00	8.74E-02	1.75E-01		
Th-229	3.9270E-12	206.924	413.847	0.00E+00	8.13E-10	1.63E-09		
Th-230	3.3578E-08	206.924	413.847	0.00E+00	6.95E-06	1.39E-05		
Th-232	1.5452E-14	206.924	413.847	0.00E+00	3.20E-12	6.39E-12		
Tl-208	4.6705E-08	206.924	413.847	0.00E+00	9.66E-06	1.93E-05		
U-232	1.3045E-07	206.924	413.847	0.00E+00	2.70E-05	5.40E-05		
U-233	2.3739E-09	206.924	413.847	0.00E+00	4.91E-07	9.82E-07		
U-234	1.8423E-04	206.924	413.847	0.00E+00	3.81E-02	7.62E-02		
U-235	2.7235E-06	206.924	0.000	6.71E-03	6.15E-03	6.71E-03		
U-236	1.5493E-05	206.924	413.847	0.00E+00	3.21E-03	6.41E-03		
U-238	4.2851E-09	206.924	0.000	3.01E-04	3.01E-04	3.01E-04		
Y-90	2.1686E+00	206.924	413.847	0.00E+00	4.49E+02	8.97E+02		
Other Radionuclides					4.50E+02	9.00E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.60E+00	1.12E+01
Total	Total

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-ALX	U	
BOL Enrichment %:	77.5892697	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		206.924	
Bounding:		413.847	

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		
Bounding:	0.33		

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: JMTR (JAPAN)
 SNF ID #: 123
 Fuel Units & Descr: 152 - MTR TYPE
 Heavy Metal Mass: BOL=44.38kg ; EOL=37.21kg
 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"
 4.22

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	6.6313E-10	6,794.296	13,588.592	0.00E+00	4.51E-06	9.01E-06	0.0150	1.434E+15
Am-241	2.0060E-03	6,794.296	13,588.592	0.00E+00	1.36E+01	2.73E+01	0.0250	2.983E+14
Am-242m	4.2429E-07	6,794.296	13,588.592	0.00E+00	2.88E-03	5.77E-03	0.0375	2.602E+14
Am-243	1.4899E-06	6,794.296	13,588.592	0.00E+00	1.01E-02	2.02E-02	0.0575	2.786E+14
C-14	5.7135E-09	6,794.296	13,588.592	0.00E+00	3.88E-05	7.76E-05	0.0850	1.684E+14
Cl-36	1.3124E-32	6,794.296	13,588.592	0.00E+00	8.92E-29	1.78E-28	0.1250	1.139E+14
Cm-243	1.6443E-07	6,794.296	13,588.592	0.00E+00	1.12E-03	2.23E-03	0.2250	1.453E+14
Cm-244	2.9330E-05	6,794.296	13,588.592	0.00E+00	1.99E-01	3.99E-01	0.3750	6.324E+13
Co-60	5.3186E-06	6,794.296	13,588.592	0.00E+00	3.61E-02	7.23E-02	0.5750	1.032E+15
Cs-134	3.1563E-03	6,794.296	13,588.592	0.00E+00	2.14E+01	4.29E+01	0.8500	1.744E+13
Cs-135	3.4477E-06	6,794.296	13,588.592	0.00E+00	2.34E-02	4.68E-02	1.2500	9.960E+12
Cs-137	2.0313E+00	6,794.296	13,588.592	0.00E+00	1.38E+04	2.76E+04	1.7500	4.572E+11
Eu-154	2.4513E-02	6,794.296	13,588.592	0.00E+00	1.67E+02	3.33E+02	2.2500	4.011E+07
Eu-155	4.8175E-03	6,794.296	13,588.592	0.00E+00	3.27E+01	6.55E+01	2.7500	2.267E+07
Fe-55	1.2397E-04	6,794.296	13,588.592	0.00E+00	8.42E-01	1.68E+00	3.5000	1.042E+05
H-3	4.5697E-03	6,794.296	13,588.592	0.00E+00	3.10E+01	6.21E+01	5.0000	5.889E+03
I-129	7.5300E-07	6,794.296	13,588.592	0.00E+00	5.12E-03	1.02E-02	7.0000	6.502E+02
Kr-85	1.0850E-01	6,794.296	13,588.592	0.00E+00	7.37E+02	1.47E+03	11.0000	7.287E+01
Np-237	9.5561E-06	6,794.296	13,588.592	0.00E+00	6.49E-02	1.30E-01		
Pa-231	2.0359E-09	6,794.296	13,588.592	0.00E+00	1.38E-05	2.77E-05		
Pb-210	4.9728E-11	6,794.296	13,588.592	0.00E+00	3.38E-07	6.76E-07		
Pm-147	4.8502E-02	6,794.296	13,588.592	0.00E+00	3.30E+02	6.59E+02		
Pu-238	1.8254E-02	6,794.296	13,588.592	0.00E+00	1.24E+02	2.48E+02		
Pu-239	4.2810E-04	6,794.296	13,588.592	0.00E+00	2.91E+00	5.82E+00		
Pu-240	2.4368E-04	6,794.296	13,588.592	0.00E+00	1.66E+00	3.31E+00		
Pu-241	3.3415E-02	6,794.296	13,588.592	0.00E+00	2.27E+02	4.54E+02		
Pu-242	3.6329E-07	6,794.296	13,588.592	0.00E+00	2.47E-03	4.94E-03		
Ra-226	2.2854E-10	6,794.296	13,588.592	0.00E+00	1.55E-06	3.11E-06		
Ra-228	1.2426E-14	6,794.296	13,588.592	0.00E+00	8.44E-11	1.69E-10		
Ru-106	6.3589E-06	6,794.296	13,588.592	0.00E+00	4.32E-02	8.64E-02		
Se-79	1.2933E-05	6,794.296	13,588.592	0.00E+00	8.79E-02	1.76E-01		
Sn-126	1.1574E-05	6,794.296	13,588.592	0.00E+00	7.86E-02	1.57E-01		
Sr-90	1.9248E+00	6,794.296	13,588.592	0.00E+00	1.31E+04	2.62E+04		
Tc-99	4.2239E-04	6,794.296	13,588.592	0.00E+00	2.87E+00	5.74E+00		
Th-229	5.0953E-12	6,794.296	13,588.592	0.00E+00	3.46E-08	6.92E-08		
Th-230	4.1885E-08	6,794.296	13,588.592	0.00E+00	2.85E-04	5.69E-04		
Th-232	1.9270E-14	6,794.296	13,588.592	0.00E+00	1.31E-10	2.62E-10		
Tl-208	4.6024E-08	6,794.296	13,588.592	0.00E+00	3.13E-04	6.25E-04		
U-232	1.2582E-07	6,794.296	13,588.592	0.00E+00	8.55E-04	1.71E-03		
U-233	2.5825E-09	6,794.296	13,588.592	0.00E+00	1.75E-05	3.51E-05		
U-234	1.8450E-04	6,794.296	13,588.592	0.00E+00	1.25E+00	2.51E+00		
U-235	-2.7235E-06	6,794.296	0.000	8.94E-02	7.09E-02	8.94E-02		
U-236	1.5493E-05	6,794.296	13,588.592	0.00E+00	1.05E-01	2.11E-01		
U-238	-4.2851E-09	6,794.296	0.000	1.02E-03	9.87E-04	1.02E-03		
Y-90	1.9254E+00	6,794.296	13,588.592	0.00E+00	1.31E+04	2.62E+04		
Other Radionuclides					1.31E+04	2.63E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.62E+02	3.24E+02
Total	Total

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-ALX	U	
BOL Enrichment %:	93.18522593	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		6,794.296	
Bounding:		13,588.592	

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:	0.49	1.01
Bounding:	0.97	

Estimated EOL HM/Given EOL HM

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: JMTR (JAPAN)
 SNF ID #: 886
 Fuel Units & Descr: 570 - MTR TYPE
 Heavy Metal Mass: BOL=349.35kg ; EOL=323.59kg
 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"
 15.83

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	6.6313E-10	24,399.008	48,798.016	0.00E+00	1.62E-05	3.24E-05	0.0150	5.151E+15
Am-241	2.0060E-03	24,399.008	48,798.016	0.00E+00	4.89E+01	9.79E+01	0.0250	1.071E+15
Am-242m	4.2429E-07	24,399.008	48,798.016	0.00E+00	1.04E-02	2.07E-02	0.0375	9.343E+14
Am-243	1.4899E-06	24,399.008	48,798.016	0.00E+00	3.64E-02	7.27E-02	0.0575	1.001E+15
C-14	5.7135E-09	24,399.008	48,798.016	0.00E+00	1.39E-04	2.79E-04	0.0850	6.047E+14
Cl-36	1.3124E-32	24,399.008	48,798.016	0.00E+00	3.20E-28	6.40E-28	0.1250	4.092E+14
Cm-243	1.6443E-07	24,399.008	48,798.016	0.00E+00	4.01E-03	8.02E-03	0.2250	5.218E+14
Cm-244	2.9330E-05	24,399.008	48,798.016	0.00E+00	7.16E-01	1.43E+00	0.3750	2.271E+14
Co-60	5.3186E-06	24,399.008	48,798.016	0.00E+00	1.30E-01	2.60E-01	0.5750	3.705E+15
Cs-134	3.1563E-03	24,399.008	48,798.016	0.00E+00	7.70E+01	1.54E+02	0.8500	6.269E+13
Cs-135	3.4477E-06	24,399.008	48,798.016	0.00E+00	8.41E-02	1.68E-01	1.2500	3.579E+13
Cs-137	2.0313E+00	24,399.008	48,798.016	0.00E+00	4.96E+04	9.91E+04	1.7500	1.642E+12
Eu-154	2.4513E-02	24,399.008	48,798.016	0.00E+00	5.98E+02	1.20E+03	2.2500	1.440E+08
Eu-155	4.8175E-03	24,399.008	48,798.016	0.00E+00	1.18E+02	2.35E+02	2.7500	8.140E+07
Fe-55	1.2397E-04	24,399.008	48,798.016	0.00E+00	3.02E+00	6.05E+00	3.5000	3.744E+05
H-3	4.5697E-03	24,399.008	48,798.016	0.00E+00	1.11E+02	2.23E+02	5.0000	2.129E+04
I-129	7.5300E-07	24,399.008	48,798.016	0.00E+00	1.84E-02	3.67E-02	7.0000	2.351E+03
Kr-85	1.0850E-01	24,399.008	48,798.016	0.00E+00	2.65E+03	5.29E+03	11.0000	2.635E+02
Np-237	9.5561E-06	24,399.008	48,798.016	0.00E+00	2.33E-01	4.66E-01		
Pa-231	2.0359E-09	24,399.008	48,798.016	0.00E+00	4.97E-05	9.94E-05		
Pb-210	4.9728E-11	24,399.008	48,798.016	0.00E+00	1.21E-06	2.43E-06		
Pm-147	4.8502E-02	24,399.008	48,798.016	0.00E+00	1.18E+03	2.37E+03		
Pu-238	1.8254E-02	24,399.008	48,798.016	0.00E+00	4.45E+02	8.91E+02		
Pu-239	4.2810E-04	24,399.008	48,798.016	0.00E+00	1.04E+01	2.09E+01		
Pu-240	2.4368E-04	24,399.008	48,798.016	0.00E+00	5.95E+00	1.19E+01		
Pu-241	3.3415E-02	24,399.008	48,798.016	0.00E+00	8.15E+02	1.63E+03		
Pu-242	3.6329E-07	24,399.008	48,798.016	0.00E+00	8.86E-03	1.77E-02		
Ra-226	2.2854E-10	24,399.008	48,798.016	0.00E+00	5.58E-06	1.12E-05		
Ra-228	1.2426E-14	24,399.008	48,798.016	0.00E+00	3.03E-10	6.06E-10		
Ru-106	6.3589E-06	24,399.008	48,798.016	0.00E+00	1.55E-01	3.10E-01		
Se-79	1.2933E-05	24,399.008	48,798.016	0.00E+00	3.16E-01	6.31E-01		
Sn-126	1.1574E-05	24,399.008	48,798.016	0.00E+00	2.82E-01	5.65E-01		
Sr-90	1.9248E+00	24,399.008	48,798.016	0.00E+00	4.70E+04	9.39E+04		
Tc-99	4.2239E-04	24,399.008	48,798.016	0.00E+00	1.03E+01	2.06E+01		
Th-229	5.0953E-12	24,399.008	48,798.016	0.00E+00	1.24E-07	2.49E-07		
Th-230	4.1885E-08	24,399.008	48,798.016	0.00E+00	1.02E-03	2.04E-03		
Th-232	1.9270E-14	24,399.008	48,798.016	0.00E+00	4.70E-10	9.40E-10		
Ti-208	4.6024E-08	24,399.008	48,798.016	0.00E+00	1.12E-03	2.25E-03		
U-232	1.2582E-07	24,399.008	48,798.016	0.00E+00	3.07E-03	6.14E-03		
U-233	2.5825E-09	24,399.008	48,798.016	0.00E+00	6.30E-05	1.26E-04		
U-234	1.8450E-04	24,399.008	48,798.016	0.00E+00	4.50E+00	9.00E+00		
U-235	-2.7235E-06	24,399.008	0.000	3.40E-01	2.73E-01	3.40E-01		
U-236	1.5493E-05	24,399.008	48,798.016	0.00E+00	3.78E-01	7.56E-01		
U-238	-4.2851E-09	24,399.008	0.000	6.46E-02	6.45E-02	6.46E-02		
Y-90	1.9254E+00	24,399.008	48,798.016	0.00E+00	4.70E+04	9.40E+04		
Other Radionuclides					4.72E+04	9.44E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.82E+02	1.16E+03
Total	Total

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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	45.01144391	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		24,399.008	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		48,798.016	

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: JMTR (JAPAN) 1 Fuel decay start date: 1983
 SNF ID #: 507 Estimates as of: 2010
 Fuel Units & Descr: 574 - ASSEMBLY Template: ATR (Light Water, Alum., 60 to 100%, U)
 Heavy Metal Mass: BOL=1176.70kg ; EOL=1106.10kg 2 Template Burnup(MWd): 367.2
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated
 Canister usage:
 18"x10"
 23.92

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	1.1465E-09	66,861.467	133,722.933	0.00E+00	7.67E-05	1.53E-04	0.0150	1.251E+16
Am-241	2.3056E-03	66,861.467	133,722.933	0.00E+00	1.54E+02	3.08E+02	0.0250	2.600E+15
Am-242m	4.1476E-07	66,861.467	133,722.933	0.00E+00	2.77E-02	5.55E-02	0.0375	2.264E+15
Am-243	1.4894E-06	66,861.467	133,722.933	0.00E+00	9.96E-02	1.99E-01	0.0575	2.431E+15
C-14	5.7108E-09	66,861.467	133,722.933	0.00E+00	3.82E-04	7.64E-04	0.0850	1.467E+15
Cf-36	1.3124E-32	66,861.467	133,722.933	0.00E+00	8.77E-28	1.75E-27	0.1250	9.824E+14
Cm-243	1.4562E-07	66,861.467	133,722.933	0.00E+00	9.74E-03	1.95E-02	0.2250	1.266E+15
Cm-244	2.4221E-05	66,861.467	133,722.933	0.00E+00	1.62E+00	3.24E+00	0.3750	5.505E+14
Co-60	2.7560E-06	66,861.467	133,722.933	0.00E+00	1.84E-01	3.69E-01	0.5750	9.026E+15
Cs-134	5.8851E-04	66,861.467	133,722.933	0.00E+00	3.93E+01	7.87E+01	0.8500	1.301E+14
Cs-135	3.4477E-06	66,861.467	133,722.933	0.00E+00	2.31E-01	4.61E-01	1.2500	7.233E+13
Cs-137	1.8099E+00	66,861.467	133,722.933	0.00E+00	1.21E+05	2.42E+05	1.7500	3.574E+12
Eu-154	1.6386E-02	66,861.467	133,722.933	0.00E+00	1.10E+03	2.19E+03	2.2500	2.548E+08
Eu-155	2.3957E-03	66,861.467	133,722.933	0.00E+00	1.60E+02	3.20E+02	2.7500	2.085E+08
Fe-55	3.2707E-05	66,861.467	133,722.933	0.00E+00	2.19E+00	4.37E+00	3.5000	1.590E+05
H-3	3.4504E-03	66,861.467	133,722.933	0.00E+00	2.31E+02	4.61E+02	5.0000	5.364E+04
I-129	7.5300E-07	66,861.467	133,722.933	0.00E+00	5.03E-02	1.01E-01	7.0000	5.907E+03
Kr-85	7.8540E-02	66,861.467	133,722.933	0.00E+00	5.25E+03	1.05E+04	11.0000	6.610E+02
Np-237	9.5615E-06	66,861.467	133,722.933	0.00E+00	6.39E-01	1.28E+00		
Pa-231	2.7968E-09	66,861.467	133,722.933	0.00E+00	1.87E-04	3.74E-04		
Pb-210	1.2612E-10	66,861.467	133,722.933	0.00E+00	8.43E-06	1.69E-05		
Pm-147	1.2952E-02	66,861.467	133,722.933	0.00E+00	8.66E+02	1.73E+03		
Pu-238	1.7549E-02	66,861.467	133,722.933	0.00E+00	1.17E+03	2.35E+03		
Pu-239	4.2810E-04	66,861.467	133,722.933	0.00E+00	2.86E+01	5.72E+01		
Pu-240	2.4357E-04	66,861.467	133,722.933	0.00E+00	1.63E+01	3.26E+01		
Pu-241	2.6277E-02	66,861.467	133,722.933	0.00E+00	1.76E+03	3.51E+03		
Pu-242	3.6329E-07	66,861.467	133,722.933	0.00E+00	2.43E-02	4.86E-02		
Ra-226	4.4444E-10	66,861.467	133,722.933	0.00E+00	2.97E-05	5.94E-05		
Ra-228	1.9714E-14	66,861.467	133,722.933	0.00E+00	1.32E-09	2.64E-09		
Ru-106	2.0477E-07	66,861.467	133,722.933	0.00E+00	1.37E-02	2.74E-02		
Se-79	1.2933E-05	66,861.467	133,722.933	0.00E+00	8.65E-01	1.73E+00		
Sn-126	1.1574E-05	66,861.467	133,722.933	0.00E+00	7.74E-01	1.55E+00		
Sr-90	1.7092E+00	66,861.467	133,722.933	0.00E+00	1.14E+05	2.29E+05		
Tc-99	4.2239E-04	66,861.467	133,722.933	0.00E+00	2.82E+01	5.65E+01		
Th-229	7.7260E-12	66,861.467	133,722.933	0.00E+00	5.17E-07	1.03E-06		
Th-230	5.8497E-08	66,861.467	133,722.933	0.00E+00	3.91E-03	7.82E-03		
Th-232	2.6906E-14	66,861.467	133,722.933	0.00E+00	1.80E-09	3.60E-09		
Tl-208	4.4336E-08	66,861.467	133,722.933	0.00E+00	2.96E-03	5.93E-03		
U-232	1.2037E-07	66,861.467	133,722.933	0.00E+00	8.05E-03	1.61E-02		
U-233	3.0011E-09	66,861.467	133,722.933	0.00E+00	2.01E-04	4.01E-04		
U-234	1.8497E-04	66,861.467	133,722.933	0.00E+00	1.24E+01	2.47E+01		
U-235	-2.7235E-06	66,861.467	0.000	5.09E-01	3.26E-01	5.09E-01		
U-236	1.5493E-05	66,861.467	133,722.933	0.00E+00	1.04E+00	2.07E+00		
U-238	-4.2851E-09	66,861.467	0.000	3.16E-01	3.16E-01	3.16E-01		
Y-90	1.7094E+00	66,861.467	133,722.933	0.00E+00	1.14E+05	2.29E+05		
Other Radionuclides					1.15E+05	2.30E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.41E+03	2.83E+03
Total	Total

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.
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U3Si2	U	
BOL Enrichment %:	20.0000029	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:		66,861.467	
Bounding:		133,722.933	

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

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: JRR-2 (JAPAN)
 SNF ID #: 885
 Fuel Units & Descr: 144 - 12 CURVED PLATES
 Heavy Metal Mass: BOL=70.23kg ; EOL=62.50kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1989
 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: 20 years

Estimated
 Canister usage:
 18"x10"
 4.00

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	3.1355E-10	7,122.705	14,245.411	0.00E+00	2.23E-06	4.47E-06	0.0150	1.506E+15
Am-241	8.0194E-03	7,122.705	14,245.411	0.00E+00	5.71E+01	1.14E+02	0.0250	3.104E+14
Am-242m	1.3694E-06	7,122.705	14,245.411	0.00E+00	9.75E-03	1.95E-02	0.0375	2.758E+14
Am-243	3.7096E-05	7,122.705	14,245.411	0.00E+00	2.84E-01	5.28E-01	0.0575	2.920E+14
C-14	2.6464E-08	7,122.705	14,245.411	0.00E+00	1.88E-04	3.77E-04	0.0150	1.768E+14
Cl-36	4.4441E-31	7,122.705	14,245.411	0.00E+00	3.17E-27	6.33E-27	0.0850	1.252E+14
Cm-243	5.7029E-06	7,122.705	14,245.411	0.00E+00	4.06E-02	8.12E-02	0.2250	1.521E+14
Cm-244	4.6555E-03	7,122.705	14,245.411	0.00E+00	3.32E+01	6.63E+01	0.2250	1.521E+14
Co-60	4.8663E-05	7,122.705	14,245.411	0.00E+00	3.47E-01	6.93E-01	0.3750	6.584E+13
Cs-134	1.0638E-02	7,122.705	14,245.411	0.00E+00	7.58E+01	1.52E+02	0.5750	1.090E+15
Cs-135	4.2564E-06	7,122.705	14,245.411	0.00E+00	3.03E-02	2.90E-02	0.8500	2.854E+13
Cs-137	2.0358E+00	7,122.705	14,245.411	0.00E+00	1.45E+04	2.96E+04	1.2500	1.830E+13
Eu-154	5.1956E-02	7,122.705	14,245.411	0.00E+00	3.70E+02	7.40E+02	1.7500	7.052E+11
Eu-155	1.4295E-02	7,122.705	14,245.411	0.00E+00	1.02E+02	2.04E+02	2.2500	4.510E+07
Fe-55	1.3560E-03	7,122.705	14,245.411	0.00E+00	9.66E+00	1.93E+01	2.7500	2.638E+07
H-3	4.6258E-03	7,122.705	14,245.411	0.00E+00	3.29E+01	6.59E+01	3.5000	1.115E+06
I-129	6.6403E-07	7,122.705	14,245.411	0.00E+00	4.73E-03	9.46E-03	5.0000	4.286E+05
Kr-85	1.0808E-01	7,122.705	14,245.411	0.00E+00	7.70E+02	1.54E+03	7.0000	4.920E+04
Np-237	3.1537E-05	7,122.705	14,245.411	0.00E+00	2.25E-01	4.49E-01	11.0000	5.638E+03
Pa-231	9.7023E-10	7,122.705	14,245.411	0.00E+00	6.91E-06	1.38E-05		
Pb-210	1.1731E-11	7,122.705	14,245.411	0.00E+00	8.36E-08	1.67E-07		
Pm-147	2.4405E-02	7,122.705	14,245.411	0.00E+00	1.74E+02	3.48E+02		
Pu-238	1.5358E-01	7,122.705	14,245.411	0.00E+00	1.09E+03	2.19E+03		
Pu-239	6.9502E-04	7,122.705	14,245.411	0.00E+00	4.95E+00	9.90E+00		
Pu-240	3.7631E-04	7,122.705	14,245.411	0.00E+00	2.68E+00	5.36E+00		
Pu-241	1.3433E-01	7,122.705	14,245.411	0.00E+00	9.57E+02	1.91E+03		
Pu-242	3.0911E-06	7,122.705	14,245.411	0.00E+00	2.20E-02	4.40E-02		
Ra-226	5.5079E-11	7,122.705	14,245.411	0.00E+00	3.92E-07	7.85E-07		
Ra-228	1.3335E-14	7,122.705	14,245.411	0.00E+00	9.50E-11	1.90E-10		
Ru-106	7.3390E-06	7,122.705	14,245.411	0.00E+00	5.23E-02	1.05E-01		
Se-79	1.2339E-05	7,122.705	14,245.411	0.00E+00	8.79E-02	1.76E-01		
Sn-126	1.0194E-05	7,122.705	14,245.411	0.00E+00	7.26E-02	1.45E-01		
Sr-90	1.9064E+00	7,122.705	14,245.411	0.00E+00	1.36E+04	2.72E+04		
Tc-99	3.8056E-04	7,122.705	14,245.411	0.00E+00	2.71E+00	5.42E+00		
Th-229	4.9198E-12	7,122.705	14,245.411	0.00E+00	3.50E-08	7.01E-08		
Th-230	1.0547E-08	7,122.705	14,245.411	0.00E+00	7.51E-05	1.50E-04		
Th-232	2.0705E-14	7,122.705	14,245.411	0.00E+00	1.47E-10	2.95E-10		
Tl-208	4.8827E-08	7,122.705	14,245.411	0.00E+00	3.48E-04	6.96E-04		
U-232	1.3414E-07	7,122.705	14,245.411	0.00E+00	9.55E-04	1.91E-03		
U-233	3.7679E-09	7,122.705	14,245.411	0.00E+00	2.68E-05	5.37E-05		
U-234	5.2047E-05	7,122.705	14,245.411	0.00E+00	3.71E-01	7.41E-01		
U-235	-2.8661E-06	7,122.705	0.000	6.82E-02	4.78E-02	6.82E-02		
U-236	1.6701E-05	7,122.705	14,245.411	0.00E+00	1.19E-01	2.38E-01		
U-238	-9.4194E-09	7,122.705	0.000	1.30E-02	1.29E-02	1.30E-02		
Y-90	1.9070E+00	7,122.705	14,245.411	0.00E+00	1.36E+04	2.72E+04		
Other Radionuclides					1.39E+04	2.77E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.06E+02	4.12E+02
Total	Total

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-ALX	U	
BOL Enrichment %:	44.93930164	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		7,122.705	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		14,245.411	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EDL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.23		1.00
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: JRR-2 (JAPAN)
 SNF ID #: 606
 Fuel Units & Descr: 34 - 17 FLAT PLATES
 Heavy Metal Mass: BOL=6.94kg ; EOL=5.22kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1989
 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: 20 years

Estimated
 Canister usage:
 18"x10"
 0.94

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.1355E-10	1,584.666	3,169.331	0.00E+00	4.97E-07	9.94E-07	Avg. MeV	
Am-241	8.0194E-03	1,584.666	3,169.331	0.00E+00	1.27E+01	2.54E+01	0.0150	3.351E+14
Am-242m	1.3694E-06	1,584.666	3,169.331	0.00E+00	2.17E-03	4.34E-03	0.0250	6.906E+13
Am-243	3.7096E-05	1,584.666	3,169.331	0.00E+00	5.88E-02	1.18E-01	0.0375	6.136E+13
C-14	2.6464E-08	1,584.666	3,169.331	0.00E+00	4.19E-05	8.39E-05	0.0575	6.497E+13
Cl-36	4.4441E-31	1,584.666	3,169.331	0.00E+00	7.04E-28	1.41E-27	0.0850	3.932E+13
Cm-243	5.7029E-04	1,584.666	3,169.331	0.00E+00	9.04E-03	1.81E-02	0.1250	2.785E+13
Cm-244	4.6555E-03	1,584.666	3,169.331	0.00E+00	7.38E+00	1.48E+01	0.2250	3.385E+13
Co-60	4.8663E-05	1,584.666	3,169.331	0.00E+00	7.71E-02	1.54E-01	0.3750	1.465E+13
Cs-134	1.0638E-02	1,584.666	3,169.331	0.00E+00	1.69E+01	3.37E+01	0.5750	2.425E+14
Cs-135	4.2564E-06	1,584.666	3,169.331	0.00E+00	6.74E-03	1.35E-02	0.8500	6.350E+12
Cs-137	2.0358E+00	1,584.666	3,169.331	0.00E+00	3.23E+03	6.45E+03	1.2500	4.071E+12
Eu-154	5.1956E-02	1,584.666	3,169.331	0.00E+00	8.23E+01	1.65E+02	1.7500	1.569E+11
Eu-155	1.4295E-02	1,584.666	3,169.331	0.00E+00	2.27E+01	4.53E+01	2.2500	1.003E+07
Fe-55	1.3560E-03	1,584.666	3,169.331	0.00E+00	2.15E+00	4.30E+00	2.7500	5.869E+06
H-3	4.6258E-03	1,584.666	3,169.331	0.00E+00	7.33E+00	1.47E+01	3.5000	2.481E+05
I-129	6.6403E-07	1,584.666	3,169.331	0.00E+00	1.05E-03	2.10E-03	5.0000	9.535E+04
Kr-85	1.0808E-01	1,584.666	3,169.331	0.00E+00	1.71E+02	3.43E+02	7.0000	1.095E+04
Np-237	3.1537E-05	1,584.666	3,169.331	0.00E+00	5.00E-02	1.00E-01	11.0000	1.254E+03
Pa-231	9.7023E-10	1,584.666	3,169.331	0.00E+00	1.54E-06	3.07E-06		
Pb-210	1.1731E-11	1,584.666	3,169.331	0.00E+00	1.86E-08	3.72E-08		
Pm-147	2.4405E-02	1,584.666	3,169.331	0.00E+00	3.87E+01	7.73E+01		
Pu-238	1.5358E-01	1,584.666	3,169.331	0.00E+00	2.43E+02	4.87E+02		
Pu-239	6.9502E-04	1,584.666	3,169.331	0.00E+00	1.10E+00	2.20E+00		
Pu-240	3.7631E-04	1,584.666	3,169.331	0.00E+00	5.96E-01	1.19E+00		
Pu-241	1.3433E-01	1,584.666	3,169.331	0.00E+00	2.13E+02	4.26E+02		
Pu-242	3.0911E-06	1,584.666	3,169.331	0.00E+00	4.90E-03	9.80E-03		
Ra-226	5.5079E-11	1,584.666	3,169.331	0.00E+00	8.73E-08	1.75E-07		
Ra-228	1.3335E-14	1,584.666	3,169.331	0.00E+00	2.11E-11	4.23E-11		
Ru-106	7.3390E-06	1,584.666	3,169.331	0.00E+00	1.16E-02	2.33E-02		
Se-79	1.2339E-05	1,584.666	3,169.331	0.00E+00	1.96E-02	3.91E-02		
Sn-126	1.0194E-05	1,584.666	3,169.331	0.00E+00	1.62E-02	3.23E-02		
Sr-90	1.9064E+00	1,584.666	3,169.331	0.00E+00	3.02E+03	6.04E+03		
Tc-99	3.8056E-04	1,584.666	3,169.331	0.00E+00	6.03E-01	1.21E+00		
Th-229	4.9198E-12	1,584.666	3,169.331	0.00E+00	7.80E-09	1.56E-08		
Th-230	1.0547E-08	1,584.666	3,169.331	0.00E+00	1.67E-05	3.34E-05		
Th-232	2.0705E-14	1,584.666	3,169.331	0.00E+00	3.28E-11	6.56E-11		
Tl-208	4.8827E-08	1,584.666	3,169.331	0.00E+00	7.74E-05	1.55E-04		
U-232	1.3414E-07	1,584.666	3,169.331	0.00E+00	2.13E-04	4.25E-04		
U-233	3.7679E-09	1,584.666	3,169.331	0.00E+00	5.97E-06	1.19E-05		
U-234	5.2047E-05	1,584.666	3,169.331	0.00E+00	8.25E-02	1.65E-01		
U-235	-2.8661E-06	1,584.666	0.000	1.40E-02	9.41E-03	1.40E-02		
U-236	1.6701E-05	1,584.666	3,169.331	0.00E+00	2.65E-02	5.29E-02		
U-238	-9.4194E-09	1,584.666	0.000	1.63E-04	1.48E-04	1.63E-04		
Y-90	1.9070E+00	1,584.666	3,169.331	0.00E+00	3.02E+03	6.04E+03		
Other Radionuclides					3.09E+03	6.17E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.58E+01	9.17E+01
Total	Total

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-ALX	U	
BOL Enrichment %:	93.01903552	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		1,584.666	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		3,169.331	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.52		1.01
Bounding:	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: JRR-3M (JAPAN) 1Fuel decay start date: 1989
 SNF ID #: 1056 Estimates as of: 2010
 Fuel Units & Descr: 111 - 20 FLAT PLATES Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
 Heavy Metal Mass: BOL=165.70kg ; EOL=157.04kg 2Template Burnup(MWd): 15
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
4.63

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	8.5333E-10	8,229.124	16,458.248	0.00E+00	7.02E-06	1.40E-05	0.0150	1.668E+15
Am-241	2.2753E-02	8,229.124	16,458.248	0.00E+00	1.87E+02	3.74E+02	0.0250	3.464E+14
Am-242m	8.9133E-06	8,229.124	16,458.248	0.00E+00	7.33E-02	1.47E-01	0.0375	3.043E+14
Am-243	6.4007E-06	8,229.124	16,458.248	0.00E+00	5.27E-02	1.05E-01	0.0575	3.278E+14
C-14	2.9620E-08	8,229.124	16,458.248	0.00E+00	2.44E-04	4.87E-04	0.0850	1.951E+14
Cl-36	5.9513E-35	8,229.124	16,458.248	0.00E+00	4.90E-31	9.79E-31	0.1250	1.314E+14
Cm-243	2.2087E-06	8,229.124	16,458.248	0.00E+00	1.82E-02	3.64E-02	0.2250	1.682E+14
Cm-244	1.1007E-04	8,229.124	16,458.248	0.00E+00	9.06E-01	1.81E+00	0.3750	7.320E+13
Co-60	1.6340E-05	8,229.124	16,458.248	0.00E+00	1.34E-01	2.69E-01	0.8500	1.898E+13
Cs-134	2.1353E-03	8,229.124	16,458.248	0.00E+00	1.76E+01	3.51E+01	1.2500	1.069E+13
Cs-135	4.8607E-06	8,229.124	16,458.248	0.00E+00	4.00E-02	8.00E-02	1.7500	5.048E+11
Cs-137	2.0227E+00	8,229.124	16,458.248	0.00E+00	1.66E+04	3.33E+04	2.2500	4.734E+07
Eu-154	2.0887E-02	8,229.124	16,458.248	0.00E+00	1.72E+02	3.44E+02	2.7500	5.600E+06
Eu-155	4.0867E-03	8,229.124	16,458.248	0.00E+00	3.36E+01	6.73E+01	3.5000	2.271E+05
Fe-55	1.4167E-03	8,229.124	16,458.248	0.00E+00	1.17E+01	2.33E+01	5.0000	3.452E+04
H-3	4.6653E-03	8,229.124	16,458.248	0.00E+00	3.84E+01	7.68E+01	7.0000	3.906E+03
I-129	7.1600E-07	8,229.124	16,458.248	0.00E+00	5.89E-03	1.18E-02	11.0000	4.445E+02
Kr-85	1.0240E-01	8,229.124	16,458.248	0.00E+00	8.43E+02	1.69E+03		
Np-237	3.7227E-02	8,229.124	16,458.248	0.00E+00	3.06E-02	6.13E-02		
Pa-231	2.6727E-09	8,229.124	16,458.248	0.00E+00	2.20E-05	4.40E-05		
Pb-210	4.3313E-14	8,229.124	16,458.248	0.00E+00	3.56E-10	7.13E-10		
Pm-147	4.6307E-02	8,229.124	16,458.248	0.00E+00	3.81E+02	7.62E+02		
Pu-238	5.5273E-03	8,229.124	16,458.248	0.00E+00	4.55E+01	9.10E+01		
Pu-239	1.0313E-02	8,229.124	16,458.248	0.00E+00	8.49E+01	1.70E+02		
Pu-240	5.4180E-03	8,229.124	16,458.248	0.00E+00	4.46E+01	8.92E+01		
Pu-241	3.7573E-01	8,229.124	16,458.248	0.00E+00	3.09E+03	6.18E+03		
Pu-242	3.0713E-06	8,229.124	16,458.248	0.00E+00	2.53E-02	5.05E-02		
Ra-226	2.3807E-13	8,229.124	16,458.248	0.00E+00	1.96E-09	3.92E-09		
Ra-228	1.0607E-14	8,229.124	16,458.248	0.00E+00	8.73E-11	1.75E-10		
Ru-106	8.4800E-06	8,229.124	16,458.248	0.00E+00	6.98E-02	1.40E-01		
Se-79	1.2533E-05	8,229.124	16,458.248	0.00E+00	1.03E-01	2.06E-01		
Sn-126	1.1393E-05	8,229.124	16,458.248	0.00E+00	9.38E-02	1.88E-01		
Sr-90	1.8400E+00	8,229.124	16,458.248	0.00E+00	1.51E+04	3.03E+04		
Tc-99	4.3533E-04	8,229.124	16,458.248	0.00E+00	3.58E+00	7.16E+00		
Th-229	5.8947E-13	8,229.124	16,458.248	0.00E+00	4.85E-09	9.70E-09		
Th-230	5.9500E-11	8,229.124	16,458.248	0.00E+00	4.90E-07	9.79E-07		
Th-232	1.6360E-14	8,229.124	16,458.248	0.00E+00	1.35E-10	2.69E-10		
Tl-208	7.6000E-09	8,229.124	16,458.248	0.00E+00	6.25E-05	1.25E-04		
U-232	2.0747E-08	8,229.124	16,458.248	0.00E+00	1.71E-04	3.41E-04		
U-233	4.4013E-10	8,229.124	16,458.248	0.00E+00	3.62E-06	7.24E-06		
U-234	4.6500E-07	8,229.124	16,458.248	0.00E+00	3.83E-03	7.65E-03		
U-235	-2.5335E-06	8,229.124	0.000	7.10E-02	5.02E-02	7.10E-02		
U-236	1.3000E-05	8,229.124	16,458.248	0.00E+00	1.07E-01	2.14E-01		
U-238	-1.4207E-08	8,229.124	0.000	4.46E-02	4.45E-02	4.46E-02		
Y-90	1.8400E+00	8,229.124	16,458.248	0.00E+00	1.51E+04	3.03E+04		
Other Radionuclides					1.58E+04	3.16E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.97E+02	3.94E+02
Total	Total

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-ALX	U	
BOL Enrichment %:	19.83654568	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		8,229.124	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		16,458.248	Bounding burnup assumed to be twice nominal burnup.

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: JRR-4 (JAPAN)
 SNF ID #: 1070
 Fuel Units & Descr: 11 - ASSEMBLY
 Heavy Metal Mass: BOL=1.96kg ; EOL=1.62kg
 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"
 0.31

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	6.6313E-10	323.975	647.951	0.00E+00	2.15E-07	4.30E-07		
Am-241	2.0060E-03	323.975	647.951	0.00E+00	6.50E-01	1.30E+00	0.0150	6.840E+13
Am-242m	4.2429E-07	323.975	647.951	0.00E+00	1.37E-04	2.75E-04	0.0250	1.422E+13
Am-243	1.4899E-06	323.975	647.951	0.00E+00	4.83E-04	9.65E-04	0.0375	1.241E+13
C-14	5.7135E-09	323.975	647.951	0.00E+00	1.85E-06	3.70E-06	0.0575	1.329E+13
Cl-36	1.3124E-32	323.975	647.951	0.00E+00	4.25E-30	8.50E-30	0.0850	8.029E+12
Cm-243	1.6443E-07	323.975	647.951	0.00E+00	5.33E-05	1.07E-04	0.1250	5.438E+12
Cm-244	2.9330E-05	323.975	647.951	0.00E+00	9.50E-03	1.90E-02	0.2250	6.928E+12
Co-60	5.3186E-06	323.975	647.951	0.00E+00	1.72E-03	3.45E-03	0.3750	3.016E+12
Cs-134	3.1563E-03	323.975	647.951	0.00E+00	1.02E+00	2.05E+00	0.5750	4.919E+13
Cs-135	3.4477E-06	323.975	647.951	0.00E+00	1.12E-03	2.23E-03	0.8500	8.316E+11
Cs-137	2.0313E+00	323.975	647.951	0.00E+00	6.58E+02	1.32E+03	1.2500	4.748E+11
Eu-154	2.4513E-02	323.975	647.951	0.00E+00	7.94E+00	1.59E+01	1.7500	2.180E+10
Eu-155	4.8175E-03	323.975	647.951	0.00E+00	1.56E+00	3.12E+00	2.2500	1.913E+06
Fe-55	1.2397E-04	323.975	647.951	0.00E+00	4.02E-02	8.03E-02	2.7500	1.081E+06
H-3	4.5697E-03	323.975	647.951	0.00E+00	1.48E+00	2.96E+00	3.5000	4.967E+03
I-129	7.5300E-07	323.975	647.951	0.00E+00	2.44E-04	4.88E-04	5.0000	2.808E+02
Kr-85	1.0850E-01	323.975	647.951	0.00E+00	3.52E+01	7.03E+01	7.0000	3.100E+01
Np-237	9.5561E-06	323.975	647.951	0.00E+00	3.10E-03	6.19E-03	11.0000	3.475E+00
Pa-231	2.0359E-09	323.975	647.951	0.00E+00	6.60E-07	1.32E-06		
Pb-210	4.9728E-11	323.975	647.951	0.00E+00	1.61E-08	3.22E-08		
Pm-147	4.8502E-02	323.975	647.951	0.00E+00	1.57E+01	3.14E+01		
Pu-238	1.8254E-02	323.975	647.951	0.00E+00	5.91E+00	1.18E+01		
Pu-239	4.2810E-04	323.975	647.951	0.00E+00	1.39E-01	2.77E-01		
Pu-240	2.4368E-04	323.975	647.951	0.00E+00	7.89E-02	1.58E-01		
Pu-241	3.3415E-02	323.975	647.951	0.00E+00	1.08E+01	2.17E+01		
Pu-242	3.6329E-07	323.975	647.951	0.00E+00	1.18E-04	2.35E-04		
Ra-226	2.2854E-10	323.975	647.951	0.00E+00	7.40E-08	1.48E-07		
Ra-228	1.2426E-14	323.975	647.951	0.00E+00	4.03E-12	8.05E-12		
Ru-106	6.3589E-06	323.975	647.951	0.00E+00	2.06E-03	4.12E-03		
Se-79	1.2933E-05	323.975	647.951	0.00E+00	4.19E-03	8.38E-03		
Sn-126	1.1574E-05	323.975	647.951	0.00E+00	3.75E-03	7.50E-03		
Sr-90	1.9248E+00	323.975	647.951	0.00E+00	6.24E+02	1.25E+03		
Tc-99	4.2239E-04	323.975	647.951	0.00E+00	1.37E-01	2.74E-01		
Th-229	5.0953E-12	323.975	647.951	0.00E+00	1.65E-09	3.30E-09		
Th-230	4.1885E-08	323.975	647.951	0.00E+00	1.36E-05	2.71E-05		
Th-232	1.9270E-14	323.975	647.951	0.00E+00	6.24E-12	1.25E-11		
Ti-208	4.6024E-08	323.975	647.951	0.00E+00	1.49E-05	2.98E-05		
U-232	1.2582E-07	323.975	647.951	0.00E+00	4.08E-05	8.15E-05		
U-233	2.5825E-09	323.975	647.951	0.00E+00	8.37E-07	1.67E-06		
U-234	1.8450E-04	323.975	647.951	0.00E+00	5.98E-02	1.20E-01		
U-235	-2.7235E-06	323.975	0.000	3.95E-03	3.07E-03	3.95E-03		
U-236	1.5493E-05	323.975	647.951	0.00E+00	5.02E-03	1.00E-02		
U-238	-4.2851E-09	323.975	0.000	4.60E-05	4.46E-05	4.60E-05	7.72E+00	1.54E+01
Y-90	1.9254E+00	323.975	647.951	0.00E+00	6.24E+02	1.25E+03	Total	Total
Other Radionuclides					6.27E+02	1.25E+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	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	93.03204799	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		323.975	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		647.951	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.52		1.01
Bounding:	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: JRR-4 (JAPAN)
 SNF ID #: 1071
 Fuel Units & Descr: 47 - ASSEMBLY
 Heavy Metal Mass: BOL=47.00kg ; EOL=44.65kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1999
 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"
 1.96

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	6.6313E-10	2,221.045	4,442.089	0.00E+00	1.47E-06	2.95E-06	Avg. MeV	
Am-241	2.0060E-03	2,221.045	4,442.089	0.00E+00	4.46E+00	8.91E+00	0.0150	4.689E+14
Am-242m	4.2429E-07	2,221.045	4,442.089	0.00E+00	9.42E-04	1.88E-03	0.0250	9.751E+13
Am-243	1.4899E-06	2,221.045	4,442.089	0.00E+00	3.31E-03	6.62E-03	0.0375	8.505E+13
C-14	5.7135E-09	2,221.045	4,442.089	0.00E+00	1.27E-05	2.54E-05	0.0575	9.109E+13
Cl-36	1.3124E-32	2,221.045	4,442.089	0.00E+00	2.91E-29	5.83E-29	0.0850	5.504E+13
Co-243	1.6443E-07	2,221.045	4,442.089	0.00E+00	3.65E-04	7.30E-04	0.1250	3.725E+13
Co-244	2.9330E-05	2,221.045	4,442.089	0.00E+00	6.51E-02	1.30E-01	0.2250	4.750E+13
Co-60	5.3186E-06	2,221.045	4,442.089	0.00E+00	1.18E-02	2.36E-02	0.3750	2.067E+13
Cs-134	3.1563E-03	2,221.045	4,442.089	0.00E+00	7.01E+00	1.40E+01	0.5750	3.373E+14
Cs-135	3.4477E-06	2,221.045	4,442.089	0.00E+00	7.66E-03	1.53E-02	0.8500	5.701E+12
Cs-137	2.0313E+00	2,221.045	4,442.089	0.00E+00	4.51E+03	9.02E+03	1.2500	3.256E+12
Eu-154	2.4513E-02	2,221.045	4,442.089	0.00E+00	5.44E+01	1.09E+02	1.7500	1.495E+11
Eu-155	4.8175E-03	2,221.045	4,442.089	0.00E+00	1.07E+01	2.14E+01	2.2500	1.311E+07
Fe-55	1.2397E-04	2,221.045	4,442.089	0.00E+00	2.75E-01	5.51E-01	2.7500	7.410E+06
H-3	4.5697E-03	2,221.045	4,442.089	0.00E+00	1.01E+01	2.03E+01	3.5000	3.412E+04
I-129	7.5300E-07	2,221.045	4,442.089	0.00E+00	1.67E-03	3.34E-03	5.0000	1.953E+03
Kr-85	1.0850E-01	2,221.045	4,442.089	0.00E+00	2.41E+02	4.82E+02	7.0000	2.158E+02
Np-237	9.5561E-06	2,221.045	4,442.089	0.00E+00	2.12E-02	4.24E-02	11.0000	2.419E+01
Pa-231	2.0359E-09	2,221.045	4,442.089	0.00E+00	4.52E-06	9.04E-06		
Pb-210	4.9728E-11	2,221.045	4,442.089	0.00E+00	1.10E-07	2.21E-07		
Pm-147	4.8502E-02	2,221.045	4,442.089	0.00E+00	1.08E+02	2.15E+02		
Pu-238	1.8254E-02	2,221.045	4,442.089	0.00E+00	4.05E+01	8.11E+01		
Pu-239	4.2810E-04	2,221.045	4,442.089	0.00E+00	9.51E-01	1.90E+00		
Pu-240	2.4368E-04	2,221.045	4,442.089	0.00E+00	5.41E-01	1.08E+00		
Pu-241	3.3415E-02	2,221.045	4,442.089	0.00E+00	7.42E+01	1.48E+02		
Pu-242	3.6329E-07	2,221.045	4,442.089	0.00E+00	8.07E-04	1.61E-03		
Ra-226	2.2854E-10	2,221.045	4,442.089	0.00E+00	5.08E-07	1.02E-06		
Ra-228	1.2426E-14	2,221.045	4,442.089	0.00E+00	2.76E-11	5.52E-11		
Ru-106	6.3589E-06	2,221.045	4,442.089	0.00E+00	1.41E-02	2.82E-02		
Se-79	1.2933E-05	2,221.045	4,442.089	0.00E+00	2.87E-02	5.74E-02		
Sn-126	1.1574E-05	2,221.045	4,442.089	0.00E+00	2.57E-02	5.14E-02		
Sr-90	1.9248E+00	2,221.045	4,442.089	0.00E+00	4.28E+03	8.55E+03		
Tc-99	4.2239E-04	2,221.045	4,442.089	0.00E+00	9.38E-01	1.88E+00		
Th-229	5.0953E-12	2,221.045	4,442.089	0.00E+00	1.13E-08	2.26E-08		
Th-230	4.1885E-08	2,221.045	4,442.089	0.00E+00	9.30E-05	1.86E-04		
Th-232	1.9270E-14	2,221.045	4,442.089	0.00E+00	4.28E-11	8.56E-11		
Ti-208	4.6024E-08	2,221.045	4,442.089	0.00E+00	1.02E-04	2.04E-04		
U-232	1.2582E-07	2,221.045	4,442.089	0.00E+00	2.79E-04	5.59E-04		
U-233	2.5825E-09	2,221.045	4,442.089	0.00E+00	5.74E-06	1.15E-05		
U-234	1.8450E-04	2,221.045	4,442.089	0.00E+00	4.10E-01	8.20E-01		
U-235	-2.7235E-06	2,221.045	0.000	2.03E-02	1.43E-02	2.03E-02		
U-236	1.5493E-05	2,221.045	4,442.089	0.00E+00	3.44E-02	6.88E-02		
U-238	-4.2851E-09	2,221.045	0.000	1.26E-02	1.26E-02	1.26E-02		
Y-90	1.9254E+00	2,221.045	4,442.089	0.00E+00	4.28E+03	8.55E+03		
Other Radionuclides					4.30E+03	8.59E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.29E+01	1.06E+02
Total	Total

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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U3Si2	U	
BOL Enrichment %:	20	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		2,221.045	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		4,442.089	

Checks		
	Burnup Multiplier	Estimated Burnup/Given Burnup
Nominal:	0.15	
Bounding:	0.30	
		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: JRR-4 (JAPAN) *Fuel decay start date: 1989
SNF ID #: 505 Estimates as of: 2010
Fuel Units & Descr: 43 - ASSEMBLY Template: ATR (Light Water, Alum., 60 to 100%, U)
Heavy Metal Mass: BOL=7.68kg ; EOL=6.34kg *Template Burnup(MWd): 367.2
ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated
 Canister usage:
 18" x 10"
 1.19

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	1,266.449	2,532.898	0.00E+00	8.40E-07	1.68E-06	Avg. MeV	
Am-241	2.0060E-03	1,266.449	2,532.898	0.00E+00	2.54E+00	5.08E+00	0.0150	2.674E+14
Am-242m	4.2429E-07	1,266.449	2,532.898	0.00E+00	5.37E-04	1.07E-03	0.0250	5.560E+13
Am-243	1.4899E-06	1,266.449	2,532.898	0.00E+00	1.89E-03	3.77E-03	0.0375	4.850E+13
C-14	5.7135E-09	1,266.449	2,532.898	0.00E+00	7.24E-06	1.45E-05	0.0575	5.194E+13
Cl-36	1.3124E-32	1,266.449	2,532.898	0.00E+00	1.66E-29	3.32E-29	0.0850	3.139E+13
Cm-243	1.6443E-07	1,266.449	2,532.898	0.00E+00	2.08E-04	4.16E-04	0.1250	1.224E+13
Cm-244	2.9330E-05	1,266.449	2,532.898	0.00E+00	3.71E-02	7.43E-02	0.2250	2.708E+13
Co-60	5.3186E-06	1,266.449	2,532.898	0.00E+00	6.74E-03	1.35E-02	0.3750	1.179E+13
Cs-134	3.1563E-03	1,266.449	2,532.898	0.00E+00	4.00E+00	7.99E+00	0.5750	1.923E+14
Cs-135	3.4477E-06	1,266.449	2,532.898	0.00E+00	4.37E-03	8.73E-03	0.8500	3.251E+12
Cs-137	2.0313E+00	1,266.449	2,532.898	0.00E+00	2.57E+03	5.15E+03	1.2500	1.857E+12
Eu-154	2.4513E-02	1,266.449	2,532.898	0.00E+00	3.10E+01	6.21E+01	1.7500	8.522E+10
Eu-155	4.8175E-03	1,266.449	2,532.898	0.00E+00	6.10E+00	1.22E+01	2.2500	7.476E+06
Fe-55	1.2397E-04	1,266.449	2,532.898	0.00E+00	1.57E-01	3.14E-01	2.7500	4.225E+06
H-3	4.5697E-03	1,266.449	2,532.898	0.00E+00	5.79E+00	1.16E+01	3.5000	1.942E+04
I-129	7.5300E-07	1,266.449	2,532.898	0.00E+00	9.54E-04	1.91E-03	5.0000	1.098E+03
Kr-85	1.0850E-01	1,266.449	2,532.898	0.00E+00	1.37E+02	2.75E+02	7.0000	1.212E+02
Np-237	9.5561E-06	1,266.449	2,532.898	0.00E+00	1.21E-02	2.42E-02	11.0000	1.358E+01
Pa-231	2.0359E-09	1,266.449	2,532.898	0.00E+00	2.58E-06	5.16E-06		
Pb-210	4.9728E-11	1,266.449	2,532.898	0.00E+00	6.30E-08	1.26E-07		
Pm-147	4.8502E-02	1,266.449	2,532.898	0.00E+00	6.14E+01	1.23E+02		
Pu-238	1.8254E-02	1,266.449	2,532.898	0.00E+00	2.31E+01	4.62E+01		
Pu-239	4.2810E-04	1,266.449	2,532.898	0.00E+00	5.42E-01	1.08E+00		
Pu-240	2.4368E-04	1,266.449	2,532.898	0.00E+00	3.09E-01	6.17E-01		
Pu-241	3.3415E-02	1,266.449	2,532.898	0.00E+00	4.23E+01	8.46E+01		
Pu-242	3.6329E-07	1,266.449	2,532.898	0.00E+00	4.60E-04	9.20E-04		
Ra-226	2.2854E-10	1,266.449	2,532.898	0.00E+00	2.89E-07	5.79E-07		
Ra-228	1.2426E-14	1,266.449	2,532.898	0.00E+00	1.57E-11	3.15E-11		
Ru-106	6.3589E-06	1,266.449	2,532.898	0.00E+00	8.05E-03	1.61E-02		
Se-79	1.2933E-05	1,266.449	2,532.898	0.00E+00	1.64E-02	3.28E-02		
Sn-126	1.1574E-05	1,266.449	2,532.898	0.00E+00	1.47E-02	2.93E-02		
Sr-90	1.9248E+00	1,266.449	2,532.898	0.00E+00	2.44E+03	4.88E+03		
Tc-99	4.2239E-04	1,266.449	2,532.898	0.00E+00	5.35E-01	1.07E+00		
Th-229	5.0953E-12	1,266.449	2,532.898	0.00E+00	6.45E-09	1.29E-08		
Th-230	4.1885E-08	1,266.449	2,532.898	0.00E+00	5.30E-05	1.06E-04		
Th-232	1.9270E-14	1,266.449	2,532.898	0.00E+00	2.44E-11	4.88E-11		
Tl-208	4.6024E-08	1,266.449	2,532.898	0.00E+00	5.83E-05	1.17E-04		
U-232	1.2582E-07	1,266.449	2,532.898	0.00E+00	1.59E-04	3.19E-04		
U-233	2.5825E-09	1,266.449	2,532.898	0.00E+00	3.27E-06	6.54E-06		
U-234	1.8450E-04	1,266.449	2,532.898	0.00E+00	2.34E-01	4.67E-01		
U-235	-2.7235E-06	1,266.449	0.000	1.54E-02	1.20E-02	1.54E-02		
U-236	1.5493E-05	1,266.449	2,532.898	0.00E+00	1.96E-02	3.92E-02		
U-238	-4.2851E-09	1,266.449	0.000	1.80E-04	1.74E-04	1.80E-04		
Y-90	1.9254E+00	1,266.449	2,532.898	0.00E+00	2.44E+03	4.88E+03		
Other Radionuclides					2.45E+03	4.90E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.02E+01	6.04E+01
Total	Total

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-ALX	U	
BOL Enrichment %:	93.03204799	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		1,266.449	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,532.898	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.52		1.01
Bounding:	1.05		

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: KEMA
 SNF ID #: 861
 Fuel Units & Descr: 14 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=243.78kg ; EOL=243.76kg
 ROD Storage Sit: INEEL

¹Fuel decay start date: 1979
 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: 25 years

Estimated
 Canister usage:
 18"x10"
 1.00

Radionuclide	m		x _n		x _b		b		y _n		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	8.3425E-05	27.249	54.497	0.00E+00	2.27E-03	4.55E-03	Avg. MeV							
Am-241	2.2387E-04	27.249	54.497	0.00E+00	6.10E-03	1.22E-02	0.0150	5.963E+12						
Am-242m	1.5512E-06	27.249	54.497	0.00E+00	4.23E-05	8.45E-05	0.0250	1.178E+12						
Am-243	3.1181E-07	27.249	54.497	0.00E+00	8.50E-06	1.70E-05	0.0375	1.011E+12						
C-14	9.2539E-05	27.249	54.497	0.00E+00	2.52E-03	5.04E-03	0.0575	1.100E+12						
Cl-36	1.8103E-06	27.249	54.497	0.00E+00	4.93E-05	9.87E-05	0.0850	6.989E+11						
Cm-243	3.9020E-07	27.249	54.497	0.00E+00	1.06E-05	2.13E-05	0.1250	4.479E+11						
Cm-244	2.0742E-05	27.249	54.497	0.00E+00	5.65E-04	1.13E-03	0.2250	6.241E+11						
Co-60	3.2554E-03	27.249	54.497	0.00E+00	8.87E-02	1.77E-01	0.3750	2.532E+11						
Cs-134	7.3823E-04	27.249	54.497	0.00E+00	2.01E-02	4.02E-02	0.5750	3.828E+12						
Cs-135	2.8639E-05	27.249	54.497	0.00E+00	7.80E-04	1.56E-03	0.8500	7.574E+10						
Cs-137	1.8609E+00	27.249	54.497	0.00E+00	5.07E+01	1.01E+02	1.2500	4.791E+10						
Eu-154	1.9262E-02	27.249	54.497	0.00E+00	5.25E-01	1.05E+00	1.7500	4.569E+09						
Eu-155	2.6721E-03	27.249	54.497	0.00E+00	7.28E-02	1.46E-01	2.2500	1.854E+05						
Fe-55	3.3099E-05	27.249	54.497	0.00E+00	9.02E-04	1.80E-03	2.7500	2.944E+10						
H-3	3.7296E-03	27.249	54.497	0.00E+00	1.02E-01	2.03E-01	3.5000	6.749E+02						
I-129	1.5853E-06	27.249	54.497	0.00E+00	4.32E-05	8.64E-05	5.0000	2.031E+02						
Kr-85	1.1958E-01	27.249	54.497	0.00E+00	3.26E+00	6.52E+00	7.0000	1.357E+01						
Np-237	1.2513E-07	27.249	54.497	0.00E+00	3.41E-06	6.82E-06	11.0000	9.047E-01						
Pa-231	1.2017E-04	27.249	54.497	0.00E+00	3.27E-03	6.55E-03								
Pb-210	1.1939E-08	27.249	54.497	0.00E+00	3.25E-07	6.51E-07								
Pm-147	3.6819E-03	27.249	54.497	0.00E+00	1.00E-01	2.01E-01								
Pu-238	4.5953E-04	27.249	54.497	0.00E+00	1.25E-02	2.50E-02								
Pu-239	2.7529E-05	27.249	54.497	0.00E+00	7.50E-04	1.50E-03								
Pu-240	1.6184E-05	27.249	54.497	0.00E+00	4.41E-04	8.82E-04								
Pu-241	2.3780E-03	27.249	54.497	0.00E+00	6.48E-02	1.30E-01								
Pu-242	4.0821E-08	27.249	54.497	0.00E+00	1.11E-06	2.22E-06								
Ra-226	1.4471E-08	27.249	54.497	0.00E+00	3.94E-07	7.89E-07								
Ra-228	4.5651E-06	27.249	54.497	0.00E+00	1.24E-04	2.49E-04								
Ru-106	3.8971E-08	27.249	54.497	0.00E+00	1.06E-06	2.12E-06								
Se-79	3.5417E-05	27.249	54.497	0.00E+00	9.65E-04	1.93E-03								
Sn-126	3.9848E-05	27.249	54.497	0.00E+00	1.09E-03	2.17E-03								
Sr-90	1.8940E+00	27.249	54.497	0.00E+00	5.16E+01	1.03E+02								
Tc-99	3.2534E-04	27.249	54.497	0.00E+00	8.87E-03	1.77E-02								
Th-229	4.6839E-05	27.249	54.497	0.00E+00	1.28E-03	2.55E-03								
Th-230	1.0322E-06	27.249	54.497	0.00E+00	2.81E-05	5.63E-05								
Th-232	9.0328E-08	27.249	0.000	2.57E-02	2.57E-02	2.57E-02								
Tl-208	1.5386E-02	27.249	54.497	0.00E+00	4.19E-01	8.38E-01								
U-232	4.1639E-02	27.249	54.497	0.00E+00	1.13E+00	2.27E+00								
U-233	3.3244E-03	27.249	0.000	8.66E+01	8.65E+01	8.66E+01								
U-234	8.1769E-04	27.249	54.497	0.00E+00	2.23E-02	4.46E-02								
U-235	5.7813E-08	27.249	54.497	1.77E-05	1.93E-05	2.09E-05								
U-236	1.3273E-07	27.249	54.497	0.00E+00	3.62E-06	7.23E-06								
U-238	3.1121E-10	27.249	0.000	1.13E-05	1.13E-05	1.13E-05								
Y-90	1.8940E+00	27.249	54.497	0.00E+00	5.16E+01	1.03E+02								
Other Radionuclides					5.61E+01	1.12E+02								

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.40E+00	4.28E+00
Total	Total

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.
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	NONE	ZIRC	
BOL HM Constituents:	ThO2-UO2	Th and U	
BOL Enrichment %:	89.89548858	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:		27.249	
Bounding:		54.497	

Checks			Estimated EOL HM/Given EOL HM 1.00
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.01		
Bounding:	0.01		

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: KURR (JAPAN)
 SNF ID #: 601
 Fuel Units & Descr: 240 - 18 CURVED PLATES
 Heavy Metal Mass: BOL=40.82kg ; EOL=33.48kg
 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"
 6.67

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	6,954.910	13,909.821	0.00E+00	1.01E-06	2.02E-06	0.0150	2.684E+15
Am-241	1.1190E-03	6,954.910	13,909.821	0.00E+00	7.78E+00	1.56E+01	0.0250	5.781E+14
Am-242m	4.5425E-07	6,954.910	13,909.821	0.00E+00	3.16E-03	6.32E-03	0.0375	5.335E+14
Am-243	1.4921E-06	6,954.910	13,909.821	0.00E+00	1.04E-02	2.08E-02	0.0575	5.246E+14
C-14	5.7244E-09	6,954.910	13,909.821	0.00E+00	3.98E-05	7.96E-05	0.0850	2.896E+14
Cl-36	1.3124E-32	6,954.910	13,909.821	0.00E+00	9.13E-29	1.83E-28	0.1250	2.834E+14
Cm-238	2.3676E-07	6,954.910	13,909.821	0.00E+00	1.65E-03	3.29E-03	0.2250	2.834E+14
Cm-244	5.2042E-05	6,954.910	13,909.821	0.00E+00	3.62E-01	7.24E-01	0.3750	1.372E+14
Co-60	3.8208E-05	6,954.910	13,909.821	0.00E+00	2.66E-01	5.31E-01	0.5750	1.885E+15
Cs-134	4.8693E-01	6,954.910	13,909.821	0.00E+00	3.39E+03	6.77E+03	0.8500	2.639E+14
Cs-135	3.4477E-06	6,954.910	13,909.821	0.00E+00	2.40E-02	4.80E-02	1.2500	4.910E+13
Cs-137	2.8731E+00	6,954.910	13,909.821	0.00E+00	2.00E+04	4.00E+04	1.7500	2.059E+12
Eu-154	8.2053E-02	6,954.910	13,909.821	0.00E+00	5.71E+02	1.14E+03	2.2500	4.319E+12
Eu-155	3.9134E-02	6,954.910	13,909.821	0.00E+00	2.72E+02	5.44E+02	2.7500	2.485E+10
Fe-55	6.7429E-03	6,954.910	13,909.821	0.00E+00	4.69E+01	9.38E+01	3.5000	2.757E+09
H-3	1.0599E-02	6,954.910	13,909.821	0.00E+00	7.37E+01	1.47E+02	5.0000	8.240E+03
I-129	7.5300E-07	6,954.910	13,909.821	0.00E+00	5.24E-03	1.05E-02	7.0000	9.188E+02
Kr-85	2.8595E-01	6,954.910	13,909.821	0.00E+00	1.99E+03	3.98E+03	11.0000	1.036E+02
Np-237	9.5479E-06	6,954.910	13,909.821	0.00E+00	6.64E-02	1.33E-01		
Pa-231	8.9297E-10	6,954.910	13,909.821	0.00E+00	6.21E-06	1.24E-05		
Pb-210	3.7609E-12	6,954.910	13,909.821	0.00E+00	2.62E-08	5.23E-08		
Pm-147	2.5452E+00	6,954.910	13,909.821	0.00E+00	1.77E+04	3.54E+04		
Pu-238	2.0550E-02	6,954.910	13,909.821	0.00E+00	1.43E+02	2.86E+02		
Pu-239	4.2838E-04	6,954.910	13,909.821	0.00E+00	2.98E+00	5.96E+00		
Pu-240	2.4401E-04	6,954.910	13,909.821	0.00E+00	1.70E+00	3.39E+00		
Pu-241	6.8764E-02	6,954.910	13,909.821	0.00E+00	4.78E+02	9.56E+02		
Pu-242	3.6329E-07	6,954.910	13,909.821	0.00E+00	2.53E-03	5.05E-03		
Ra-226	3.8045E-11	6,954.910	13,909.821	0.00E+00	2.65E-07	5.29E-07		
Ra-228	2.9902E-15	6,954.910	13,909.821	0.00E+00	2.08E-11	4.16E-11		
Ru-106	1.9055E-01	6,954.910	13,909.821	0.00E+00	1.33E+03	2.65E+03		
Se-79	1.2936E-05	6,954.910	13,909.821	0.00E+00	9.00E-02	1.80E-01		
Sn-126	1.1574E-05	6,954.910	13,909.821	0.00E+00	8.05E-02	1.61E-01		
Sr-90	2.7505E+00	6,954.910	13,909.821	0.00E+00	1.91E+04	3.83E+04		
Tc-99	4.2239E-04	6,954.910	13,909.821	0.00E+00	2.94E+00	5.88E+00		
Th-229	1.8848E-12	6,954.910	13,909.821	0.00E+00	1.31E-08	2.62E-08		
Th-230	1.7042E-08	6,954.910	13,909.821	0.00E+00	1.19E-04	2.37E-04		
Th-232	7.8132E-15	6,954.910	13,909.821	0.00E+00	5.43E-11	1.09E-10		
Tl-208	4.4063E-08	6,954.910	13,909.821	0.00E+00	3.06E-04	6.13E-04		
U-232	1.3151E-07	6,954.910	13,909.821	0.00E+00	9.15E-04	1.83E-03		
U-233	1.9564E-09	6,954.910	13,909.821	0.00E+00	1.36E-05	2.72E-05		
U-234	1.8371E-04	6,954.910	13,909.821	0.00E+00	1.28E+00	2.56E+00		
U-235	-2.7235E-06	6,954.910	0.000	8.22E-02	6.33E-02	8.22E-02		
U-236	1.5493E-05	6,954.910	13,909.821	0.00E+00	1.08E-01	2.16E-01		
U-238	-4.2851E-09	6,954.910	0.000	9.36E-04	9.07E-04	9.36E-04		
Y-90	2.7505E+00	6,954.910	13,909.821	0.00E+00	1.91E+04	3.83E+04		
Other Radionuclides					3.58E+04	7.15E+04		

Thermal Power
 Nominal Heat Bounding
 (Watts) (Watts)
 3.53E+02 7.05E+02
 Total Total

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-ALX	U	
BOL Enrichment %:	93.1749132	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		6,954.910	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		13,909.821	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.54		
Bounding:	1.08		

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: LOFT CENTER FUEL MODULE (A1,A2,A3,F1)
 SNF ID #: 127
 Fuel Units & Descr: 4 - 15 X 15 ROD ARRAY
 Heavy Metal Mass: BOL=814.00kg ; EOL=813.29kg
 ROD Storage Sits: INEEL

¹Fuel decay start date: 1975
 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"
 4.00

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	8.7758E-10	803.419	1,358.721	0.00E+00	7.05E-07	1.19E-06	0.0150	7.311E+13
Am-241	1.4352E-01	803.419	1,358.721	0.00E+00	1.15E+02	1.95E+02	0.0250	1.474E+13
Am-242m	2.8698E-04	803.419	1,358.721	0.00E+00	2.31E-01	3.90E-01	0.0375	1.406E+13
Am-243	6.2565E-04	803.419	1,358.721	0.00E+00	5.03E-01	8.50E-01	0.0575	1.625E+13
C-14	4.7901E-05	803.419	1,358.721	0.00E+00	3.85E-02	6.51E-02	0.0850	8.180E+12
Cl-36	8.0297E-07	803.419	1,358.721	0.00E+00	6.45E-04	1.09E-03	0.1250	5.677E+12
Cm-243	2.5081E-04	803.419	1,358.721	0.00E+00	2.02E-01	3.41E-01	0.2250	7.016E+12
Cm-244	4.9015E-02	803.419	1,358.721	0.00E+00	3.94E+01	6.66E+01	0.3750	3.016E+12
Co-60	2.5581E-03	803.419	1,358.721	0.00E+00	2.06E+00	3.48E+00	0.5750	7.016E+12
Cs-134	4.0536E-05	803.419	1,358.721	0.00E+00	3.26E-02	5.51E-02	0.8500	9.705E+11
Cs-135	1.4433E-05	803.419	1,358.721	0.00E+00	1.16E-02	1.96E-02	1.2500	9.534E+11
Cs-137	1.3979E+00	803.419	1,358.721	0.00E+00	1.12E+03	1.90E+03	1.7500	2.855E+10
Eu-154	2.0203E-02	803.419	1,358.721	0.00E+00	1.62E+01	2.75E+01	2.2500	4.600E+06
Eu-155	1.7684E-03	803.419	1,358.721	0.00E+00	1.42E+00	2.40E+00	2.7500	9.419E+06
Fe-55	4.3136E-05	803.419	1,358.721	0.00E+00	3.47E-02	5.86E-02	3.5000	9.713E+05
H-3	2.0769E-02	803.419	1,358.721	0.00E+00	1.67E+01	2.82E+01	5.0000	4.152E+05
I-129	9.8288E-07	803.419	1,358.721	0.00E+00	7.90E-04	1.34E-03	7.0000	4.786E+04
Kr-85	2.8214E-02	803.419	1,358.721	0.00E+00	2.27E+01	3.83E+01	11.0000	5.496E+03
Np-237	1.1218E-05	803.419	1,358.721	0.00E+00	9.01E-03	1.52E-02		
Pa-231	1.3036E-09	803.419	1,358.721	0.00E+00	1.05E-06	1.77E-06		
Pb-210	8.5078E-11	803.419	1,358.721	0.00E+00	6.84E-08	1.16E-07		
Pm-147	3.6531E-04	803.419	1,358.721	0.00E+00	2.93E-01	4.96E-01		
Pu-238	7.4564E-02	803.419	1,358.721	0.00E+00	5.99E+01	1.01E+02		
Pu-239	1.1623E-02	803.419	1,358.721	0.00E+00	9.34E+00	1.58E+01		
Pu-240	1.5132E-02	803.419	1,358.721	0.00E+00	1.22E+01	2.06E+01		
Pu-241	9.0036E-01	803.419	1,358.721	0.00E+00	7.23E+02	1.22E+03		
Pu-242	6.4260E-05	803.419	1,358.721	0.00E+00	5.16E-02	8.73E-02		
Ra-226	2.2804E-10	803.419	1,358.721	0.00E+00	1.83E-07	3.10E-07		
Ra-228	5.2713E-12	803.419	1,358.721	0.00E+00	4.24E-09	7.16E-09		
Ru-106	6.1160E-10	803.419	1,358.721	0.00E+00	4.91E-07	8.31E-07		
Se-79	1.2377E-05	803.419	1,358.721	0.00E+00	9.94E-03	1.68E-02		
Sn-126	2.5210E-05	803.419	1,358.721	0.00E+00	2.03E-02	3.43E-02		
Sr-90	9.1667E-01	803.419	1,358.721	0.00E+00	7.36E+02	1.25E+03		
Tc-99	3.9357E-04	803.419	1,358.721	0.00E+00	3.16E-01	5.35E-01		
Th-229	1.2057E-10	803.419	1,358.721	0.00E+00	9.69E-08	1.64E-07		
Th-230	2.1043E-08	803.419	1,358.721	0.00E+00	1.69E-05	2.86E-05		
Th-232	5.2972E-12	803.419	1,358.721	0.00E+00	4.26E-09	7.20E-09		
Tl-208	1.7474E-07	803.419	1,358.721	0.00E+00	1.40E-04	2.37E-04		
U-232	4.7368E-07	803.419	1,358.721	0.00E+00	3.81E-04	6.44E-04		
U-233	2.5097E-08	803.419	1,358.721	0.00E+00	2.02E-05	3.41E-05		
U-234	5.0000E-05	803.419	1,358.721	0.00E+00	4.02E-02	6.79E-02		
U-235	-1.4489E-06	803.419	0.000	7.12E-02	7.00E-02	7.12E-02		
U-236	7.5824E-06	803.419	1,358.721	0.00E+00	6.09E-03	1.03E-02		
U-238	-2.6129E-07	803.419	0.000	2.63E-01	2.62E-01	2.63E-01		
Y-90	9.1699E-01	803.419	1,358.721	0.00E+00	7.37E+02	1.25E+03		
Other Radionuclides					1.08E+03	1.82E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.85E+01	3.13E+01
Total	Total

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-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	4.046614577	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	803.419	679.361	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	1,108.669	1,358.721	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.03	0.85	1.00
Bounding:	0.05	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: LOFT CENTER FUEL MODULE (FP-1)
 SNF ID #: 1061
 Fuel Units & Descr: 1 - 15 X 15 ROD ARRAY
 Heavy Metal Mass: BOL=203.50kg ; EOL=203.32kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1975
 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"
 0.50

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	8.7758E-10	200.855	339.680	0.00E+00	1.76E-07	2.98E-07	Avg. MeV	
Am-241	1.4352E-01	200.855	339.680	0.00E+00	2.88E+01	4.88E+01	0.0150	1.828E+13
Am-242m	2.8698E-04	200.855	339.680	0.00E+00	5.76E-02	9.75E-02	0.0250	3.686E+12
Am-243	6.2565E-04	200.855	339.680	0.00E+00	1.26E-01	2.13E-01	0.0375	3.515E+12
C-14	4.7901E-05	200.855	339.680	0.00E+00	9.62E-03	1.63E-02	0.0575	4.061E+12
Cl-36	8.0297E-07	200.855	339.680	0.00E+00	1.61E-04	2.73E-04	0.0850	2.045E+12
Cm-243	2.5081E-04	200.855	339.680	0.00E+00	5.04E-02	8.52E-02	0.1250	1.419E+12
Cm-244	4.9015E-02	200.855	339.680	0.00E+00	9.84E+00	1.66E+01	0.2250	1.754E+12
Co-60	2.5581E-03	200.855	339.680	0.00E+00	5.14E-01	8.69E-01	0.3750	7.540E+11
Cs-134	4.0536E-05	200.855	339.680	0.00E+00	8.14E-03	1.38E-02	0.5750	1.754E+11
Cs-135	1.4433E-05	200.855	339.680	0.00E+00	2.90E-03	4.90E-03	0.8500	2.426E+11
Cs-137	1.9979E+00	200.855	339.680	0.00E+00	2.81E+02	4.75E+02	1.2500	2.383E+11
Eu-154	2.0203E-02	200.855	339.680	0.00E+00	4.06E+00	6.86E+00	1.7500	7.138E+09
Eu-155	1.7684E-03	200.855	339.680	0.00E+00	3.55E-01	6.01E-01	2.2500	1.150E+06
Fe-55	4.3136E-05	200.855	339.680	0.00E+00	8.66E-03	1.47E-02	2.7500	2.355E+06
H-3	2.0769E-02	200.855	339.680	0.00E+00	4.17E+00	7.05E+00	3.5000	2.428E+05
I-129	9.8288E-07	200.855	339.680	0.00E+00	1.97E-04	3.34E-04	5.0000	1.038E+05
Kr-85	2.8214E-02	200.855	339.680	0.00E+00	5.67E+00	9.58E+00	7.0000	1.196E+04
Np-237	1.1218E-05	200.855	339.680	0.00E+00	2.25E-03	3.81E-03	11.0000	1.374E+03
Pa-231	1.3036E-09	200.855	339.680	0.00E+00	2.62E-07	4.43E-07		
Pb-210	8.5078E-11	200.855	339.680	0.00E+00	1.71E-08	2.89E-08		
Pm-147	3.6531E-04	200.855	339.680	0.00E+00	7.34E-02	1.24E-01		
Pu-238	7.4564E-02	200.855	339.680	0.00E+00	1.50E+01	2.53E+01		
Pu-239	1.1623E-02	200.855	339.680	0.00E+00	2.33E+00	3.95E+00		
Pu-240	1.5132E-02	200.855	339.680	0.00E+00	3.04E+00	5.14E+00		
Pu-241	9.0036E-01	200.855	339.680	0.00E+00	1.81E+02	3.06E+02		
Pu-242	6.4260E-05	200.855	339.680	0.00E+00	1.29E-02	2.18E-02		
Ra-226	2.2804E-10	200.855	339.680	0.00E+00	4.58E-08	7.75E-08		
Ra-228	5.2713E-12	200.855	339.680	0.00E+00	1.06E-09	1.79E-09		
Ru-106	6.1160E-10	200.855	339.680	0.00E+00	1.23E-07	2.08E-07		
Se-79	1.2377E-05	200.855	339.680	0.00E+00	2.49E-03	4.20E-03		
Sn-126	2.5210E-05	200.855	339.680	0.00E+00	5.06E-03	8.56E-03		
Sr-90	9.1667E-01	200.855	339.680	0.00E+00	1.84E+02	3.11E+02		
Tc-99	3.9357E-04	200.855	339.680	0.00E+00	7.91E-02	1.34E-01		
Th-229	1.2057E-10	200.855	339.680	0.00E+00	2.42E-08	4.10E-08		
Th-230	2.1043E-08	200.855	339.680	0.00E+00	4.23E-06	7.15E-06		
Th-232	5.2972E-12	200.855	339.680	0.00E+00	1.06E-09	1.80E-09		
Tl-208	1.7474E-07	200.855	339.680	0.00E+00	3.51E-05	5.94E-05		
U-232	4.7368E-07	200.855	339.680	0.00E+00	9.51E-05	1.61E-04		
U-233	2.5097E-08	200.855	339.680	0.00E+00	5.04E-06	8.52E-06		
U-234	5.0000E-05	200.855	339.680	0.00E+00	1.00E-02	1.70E-02		
U-235	-1.4489E-06	200.855	0.000	1.78E-02	1.75E-02	1.78E-02		
U-236	7.5824E-06	200.855	339.680	0.00E+00	1.52E-03	2.58E-03		
U-238	-2.6129E-07	200.855	0.000	6.56E-02	6.56E-02	6.56E-02		
Y-90	9.1699E-01	200.855	339.680	0.00E+00	1.84E+02	3.11E+02		
Other Radionuclides					2.70E+02	4.56E+02		

Thermal Power		
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
4.62E+00	7.82E+00	
Total	Total	

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-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	4.048614577	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	200.855	169.840	
Bounding:	277.167	339.680	

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:	0.03	0.85	1.00
Bounding:	0.05	1.23	

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: LOFT CENTER FUEL MODULE FP-2 REMAINS
 SNF ID #: 923
 Fuel Units & Descr: 10 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=99.95kg ; EOL=99.90kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1975
 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"
 1.00

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	8.7758E-10	49.450	98.899	0.00E+00	4.34E-08	8.68E-08		
Am-241	1.4352E-01	49.450	98.899	0.00E+00	7.10E+00	1.42E+01	0.0150	5.322E+12
Am-242m	2.8698E-04	49.450	98.899	0.00E+00	1.42E-02	2.84E-02	0.0250	1.073E+12
Am-243	6.2565E-04	49.450	98.899	0.00E+00	3.09E-02	6.19E-02	0.0375	1.023E+12
C-14	4.7901E-05	49.450	98.899	0.00E+00	2.37E-03	4.74E-03	0.0575	1.182E+12
Cl-36	8.0297E-07	49.450	98.899	0.00E+00	3.97E-05	7.94E-05	0.0850	5.955E+11
Cm-243	2.5081E-04	49.450	98.899	0.00E+00	1.24E-02	2.48E-02	0.1250	4.133E+11
Cm-244	4.9015E-02	49.450	98.899	0.00E+00	2.42E+00	4.85E+00	0.2250	5.110E+11
Co-60	2.5581E-03	49.450	98.899	0.00E+00	1.26E-01	2.53E-01	0.3750	2.195E+11
Cs-134	4.0536E-05	49.450	98.899	0.00E+00	2.00E-03	4.01E-03	0.5750	5.106E+12
Cs-135	1.4433E-05	49.450	98.899	0.00E+00	7.14E-04	1.43E-03	0.8500	7.064E+10
Cs-137	1.3979E+00	49.450	98.899	0.00E+00	6.91E+01	1.38E+02	1.2500	6.939E+10
Eu-154	2.0203E-02	49.450	98.899	0.00E+00	9.99E-01	2.00E+00	1.7500	2.078E+09
Eu-155	1.7684E-03	49.450	98.899	0.00E+00	8.74E-02	1.75E-01	2.2500	3.350E+05
Fe-55	4.3136E-05	49.450	98.899	0.00E+00	2.13E-03	4.27E-03	2.7500	6.857E+05
H-3	2.0769E-02	49.450	98.899	0.00E+00	1.03E+00	2.05E+00	3.5000	7.076E+04
I-129	9.8288E-07	49.450	98.899	0.00E+00	4.86E-05	9.72E-05	5.0000	3.025E+04
Kr-85	2.8214E-02	49.450	98.899	0.00E+00	1.40E+00	2.79E+00	7.0000	3.486E+03
Np-237	1.1218E-05	49.450	98.899	0.00E+00	5.55E-04	1.11E-03	11.0000	4.004E+02
Pa-231	1.3036E-09	49.450	98.899	0.00E+00	6.45E-08	1.29E-07		
Pb-210	8.5078E-11	49.450	98.899	0.00E+00	4.21E-09	8.41E-09		
Pm-147	3.6531E-04	49.450	98.899	0.00E+00	1.81E-02	3.61E-02		
Pu-238	7.4564E-02	49.450	98.899	0.00E+00	3.69E+00	7.37E+00		
Pu-239	1.1623E-02	49.450	98.899	0.00E+00	5.75E-01	1.15E+00		
Pu-240	1.5132E-02	49.450	98.899	0.00E+00	7.48E-01	1.50E+00		
Pu-241	9.0036E-01	49.450	98.899	0.00E+00	4.45E+01	8.90E+01		
Pu-242	6.4260E-05	49.450	98.899	0.00E+00	3.18E-03	6.36E-03		
Ra-226	2.2804E-10	49.450	98.899	0.00E+00	1.13E-08	2.26E-08		
Ra-228	5.2713E-12	49.450	98.899	0.00E+00	2.61E-10	5.21E-10		
Ru-106	6.1160E-10	49.450	98.899	0.00E+00	3.02E-08	6.05E-08		
Se-79	1.2377E-05	49.450	98.899	0.00E+00	6.12E-04	1.22E-03		
Sn-126	2.5210E-05	49.450	98.899	0.00E+00	1.25E-03	2.49E-03		
Sr-90	9.1667E-01	49.450	98.899	0.00E+00	4.53E+01	9.07E+01		
Tc-99	3.9357E-04	49.450	98.899	0.00E+00	1.95E-02	3.89E-02		
Th-229	1.2057E-10	49.450	98.899	0.00E+00	5.96E-09	1.19E-08		
Th-230	2.1043E-08	49.450	98.899	0.00E+00	1.04E-06	2.08E-06		
Th-232	5.2972E-12	49.450	98.899	0.00E+00	2.62E-10	5.24E-10		
Tl-208	1.7474E-07	49.450	98.899	0.00E+00	8.64E-06	1.73E-05		
U-232	4.7368E-07	49.450	98.899	0.00E+00	2.34E-05	4.68E-05		
U-233	2.5097E-08	49.450	98.899	0.00E+00	1.24E-06	2.48E-06		
U-234	5.0000E-05	49.450	98.899	0.00E+00	2.47E-03	4.94E-03		
U-235	-1.4489E-06	49.450	0.000	2.10E-02	2.10E-02	2.10E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	7.5824E-06	49.450	98.899	0.00E+00	3.75E-04	7.50E-04	1.14E+00	2.28E+00
U-238	-2.6129E-07	49.450	0.000	3.03E-02	3.03E-02	3.03E-02	Total	Total
Y-90	9.1699E-01	49.450	98.899	0.00E+00	4.53E+01	9.07E+01		
Other Radionuclides					6.64E+01	1.33E+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	This Template was used for the following reasons: This fuel matches PWR Template on all but one parameter (enrichment) making PWR a reasonable match.
Fuel Cladding:	ZIRC-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	9.739772489	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	47.477	49.450	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		98.899	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.01	1.04	1.00
Bounding:	0.03		

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: LOFT CORNER FUEL MODULE
 SNF ID #: 128
 Fuel Units & Descr: 4 - 11 X 11 ROD ARRAY
 Heavy Metal Mass: BOL=279.86kg : EOL=279.05kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1975
 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"
 2.00

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	8.7758E-10	780.261	1,560.522	0.00E+00	6.85E-07	1.37E-06	0.0150	8.396E+13
Am-241	1.4352E-01	780.261	1,560.522	0.00E+00	1.12E+02	2.24E+02	0.0250	1.693E+13
Am-242m	2.8698E-04	780.261	1,560.522	0.00E+00	2.24E-01	4.48E-01	0.0375	1.615E+13
Am-243	6.2565E-04	780.261	1,560.522	0.00E+00	4.88E-01	9.76E-01	0.0575	1.866E+13
C-14	4.7901E-05	780.261	1,560.522	0.00E+00	3.74E-02	7.47E-02	0.0850	9.395E+12
Cl-36	8.0297E-07	780.261	1,560.522	0.00E+00	6.27E-04	1.25E-03	0.1250	6.520E+12
Cm-243	2.5081E-04	780.261	1,560.522	0.00E+00	1.96E-01	3.91E-01	0.2250	8.057E+12
Cm-244	4.9015E-02	780.261	1,560.522	0.00E+00	3.82E+01	7.65E+01	0.3750	3.464E+12
Co-60	2.5581E-03	780.261	1,560.522	0.00E+00	2.00E+00	3.99E+00	0.5750	8.057E+13
Cs-134	4.0536E-05	780.261	1,560.522	0.00E+00	3.16E-02	6.33E-02	0.8500	1.115E+12
Cs-135	1.4433E-05	780.261	1,560.522	0.00E+00	1.13E-02	2.25E-02	1.2500	1.095E+12
Cs-137	1.3979E+00	780.261	1,560.522	0.00E+00	1.09E+03	2.18E+03	1.7500	3.279E+10
Eu-154	2.0203E-02	780.261	1,560.522	0.00E+00	1.58E+01	3.15E+01	2.2500	5.281E+06
Eu-155	1.7684E-03	780.261	1,560.522	0.00E+00	1.38E+00	2.76E+00	2.7500	1.082E+07
Fe-55	4.3136E-05	780.261	1,560.522	0.00E+00	3.37E-02	6.73E-02	3.5000	1.114E+06
H-3	2.0769E-02	780.261	1,560.522	0.00E+00	1.62E+01	3.24E+01	5.0000	4.764E+05
I-129	9.8288E-07	780.261	1,560.522	0.00E+00	7.67E-04	1.53E-03	7.0000	5.491E+04
Kr-85	2.8214E-02	780.261	1,560.522	0.00E+00	2.20E+01	4.40E+01	11.0000	6.306E+03
Np-237	1.1218E-05	780.261	1,560.522	0.00E+00	8.75E-03	1.75E-02		
Pa-231	1.3036E-09	780.261	1,560.522	0.00E+00	1.02E-06	2.03E-06		
Pb-210	8.5078E-11	780.261	1,560.522	0.00E+00	6.64E-08	1.33E-07		
Pm-147	3.6531E-04	780.261	1,560.522	0.00E+00	2.85E-01	5.70E-01		
Pu-238	7.4564E-02	780.261	1,560.522	0.00E+00	5.82E+01	1.16E+02		
Pu-239	1.1623E-02	780.261	1,560.522	0.00E+00	9.07E+00	1.81E+01		
Pu-240	1.5132E-02	780.261	1,560.522	0.00E+00	1.18E+01	2.36E+01		
Pu-241	9.0036E-01	780.261	1,560.522	0.00E+00	7.03E+02	1.41E+03		
Pu-242	6.4260E-05	780.261	1,560.522	0.00E+00	5.01E-02	1.00E-01		
Ra-226	2.2804E-10	780.261	1,560.522	0.00E+00	1.78E-07	3.56E-07		
Ra-228	5.2713E-12	780.261	1,560.522	0.00E+00	4.11E-09	8.23E-09		
Ru-106	6.1160E-10	780.261	1,560.522	0.00E+00	4.77E-07	9.54E-07		
Se-79	1.2377E-05	780.261	1,560.522	0.00E+00	9.66E-03	1.93E-02		
Sn-126	2.5210E-05	780.261	1,560.522	0.00E+00	1.97E-02	3.93E-02		
Sr-90	9.1667E-01	780.261	1,560.522	0.00E+00	7.15E+02	1.43E+03		
Tc-99	3.9357E-04	780.261	1,560.522	0.00E+00	3.07E-01	6.14E-01		
Th-229	1.2057E-10	780.261	1,560.522	0.00E+00	9.41E-08	1.88E-07		
Th-230	2.1043E-08	780.261	1,560.522	0.00E+00	1.64E-05	3.28E-05		
Th-232	5.2972E-12	780.261	1,560.522	0.00E+00	4.13E-09	8.27E-09		
Th-208	1.7474E-07	780.261	1,560.522	0.00E+00	1.36E-04	2.73E-04		
U-232	4.7368E-07	780.261	1,560.522	0.00E+00	3.70E-04	7.39E-04		
U-233	2.5097E-08	780.261	1,560.522	0.00E+00	1.96E-05	3.92E-05		
U-234	5.0000E-05	780.261	1,560.522	0.00E+00	3.90E-02	7.80E-02		
U-235	-1.4489E-06	780.261	0.000	2.42E-02	2.31E-02	2.42E-02		
U-236	7.5824E-06	780.261	1,560.522	0.00E+00	5.92E-03	1.18E-02		
U-238	-2.6129E-07	780.261	0.000	9.03E-02	9.01E-02	9.03E-02		
Y-90	9.1699E-01	780.261	1,560.522	0.00E+00	7.15E+02	1.43E+03		
Other Radionuclides					1.05E+03	2.09E+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	
Fuel Cladding:	ZIRC-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	4.000514536	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	780.261	771.413	
Bounding:		1,560.522	

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:	0.08	0.99	
Bounding:	0.16		

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: LOFT FUEL RODS
 SNF ID #: 924
 Fuel Units & Descr: 2 - ROD
 Heavy Metal Mass: BOL= : EOL=1.90kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1975
 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"
 0.67

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	8.7758E-10	11.826	23.652	0.00E+00	1.04E-08	2.08E-08	0.0150	1.273E+12
Am-241	1.4352E-01	11.826	23.652	0.00E+00	1.70E+00	3.39E+00	0.0250	2.566E+11
Am-242m	2.8698E-04	11.826	23.652	0.00E+00	3.39E-03	6.79E-03	0.0375	2.448E+11
Am-243	6.2565E-04	11.826	23.652	0.00E+00	7.40E-03	1.48E-02	0.0575	2.828E+11
C-14	4.7901E-05	11.826	23.652	0.00E+00	5.66E-04	1.13E-03	0.0850	1.424E+11
Cl-36	8.0297E-07	11.826	23.652	0.00E+00	9.50E-06	1.90E-05	0.1250	9.881E+10
Cm-243	2.5081E-04	11.826	23.652	0.00E+00	2.97E-03	5.93E-03	0.2250	1.221E+11
Cm-244	4.9015E-02	11.826	23.652	0.00E+00	5.80E-01	1.16E+00	0.3750	5.250E+10
Co-60	2.5581E-03	11.826	23.652	0.00E+00	3.03E-02	6.05E-02	0.5750	1.221E+12
Cs-134	4.0536E-05	11.826	23.652	0.00E+00	4.79E-04	9.59E-04	0.8500	1.689E+10
Cs-135	1.4433E-05	11.826	23.652	0.00E+00	1.71E-04	3.41E-04	1.2500	1.660E+10
Cs-137	1.3979E+00	11.826	23.652	0.00E+00	1.65E+01	3.31E+01	1.7500	4.970E+08
Eu-154	2.0203E-02	11.826	23.652	0.00E+00	2.39E-01	4.78E-01	2.2500	8.004E+04
Eu-155	1.7684E-03	11.826	23.652	0.00E+00	2.09E-02	4.18E-02	2.7500	1.639E+05
Fe-55	4.3136E-05	11.826	23.652	0.00E+00	5.10E-04	1.02E-03	3.5000	1.689E+04
H-3	2.0769E-02	11.826	23.652	0.00E+00	2.46E-01	4.91E-01	5.0000	7.219E+03
I-129	9.8288E-07	11.826	23.652	0.00E+00	1.16E-05	2.32E-05	7.0000	8.320E+02
Kr-85	2.8214E-02	11.826	23.652	0.00E+00	3.34E-01	6.67E-01	11.0000	9.556E+01
Np-237	1.1218E-05	11.826	23.652	0.00E+00	1.33E-04	2.65E-04		
Pa-231	1.3036E-09	11.826	23.652	0.00E+00	1.54E-08	3.08E-08		
Pb-210	8.5078E-11	11.826	23.652	0.00E+00	1.01E-09	2.01E-09		
Pm-147	3.6531E-04	11.826	23.652	0.00E+00	4.32E-03	8.64E-03		
Pu-238	7.4564E-02	11.826	23.652	0.00E+00	8.82E-01	1.76E+00		
Pu-239	1.1623E-02	11.826	23.652	0.00E+00	1.37E-01	2.75E-01		
Pu-240	1.5132E-02	11.826	23.652	0.00E+00	1.79E-01	3.58E-01		
Pu-241	9.0036E-01	11.826	23.652	0.00E+00	1.06E+01	2.13E+01		
Pu-242	6.4260E-05	11.826	23.652	0.00E+00	7.60E-04	1.52E-03		
Ra-226	2.2804E-10	11.826	23.652	0.00E+00	2.70E-09	5.39E-09		
Ra-228	5.2713E-12	11.826	23.652	0.00E+00	6.23E-11	1.25E-10		
Ru-106	6.1160E-10	11.826	23.652	0.00E+00	7.23E-09	1.45E-08		
Se-79	1.2377E-05	11.826	23.652	0.00E+00	1.46E-04	2.93E-04		
Sn-126	2.5210E-05	11.826	23.652	0.00E+00	2.98E-04	5.96E-04		
Sr-90	9.1667E-01	11.826	23.652	0.00E+00	1.08E+01	2.17E+01		
Tc-99	3.9357E-04	11.826	23.652	0.00E+00	4.65E-03	9.31E-03		
Th-229	1.2057E-10	11.826	23.652	0.00E+00	1.43E-09	2.85E-09		
Th-230	2.1043E-08	11.826	23.652	0.00E+00	2.49E-07	4.98E-07		
Th-232	5.2972E-12	11.826	23.652	0.00E+00	6.26E-11	1.25E-10		
Ti-208	1.7474E-07	11.826	23.652	0.00E+00	2.07E-06	4.13E-06		
U-232	4.7368E-07	11.826	23.652	0.00E+00	5.60E-06	1.12E-05		
U-233	2.5097E-08	11.826	23.652	0.00E+00	2.97E-07	5.94E-07		
U-234	5.0000E-05	11.826	23.652	0.00E+00	5.91E-04	1.18E-03		
U-235	-1.4489E-06	11.826	0.000	1.32E-04	1.15E-04	1.32E-04		
U-236	7.5824E-06	11.826	23.652	0.00E+00	8.97E-05	1.79E-04		
U-238	-2.6129E-07	11.826	0.000	6.20E-04	6.17E-04	6.20E-04		
Y-90	9.1699E-01	11.826	23.652	0.00E+00	1.08E+01	2.17E+01		
Other Radionuclides					1.59E+01	3.17E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.72E-01	5.44E-01
Total	Total

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).
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ZIRC-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup taken from SFD and converted to MWd using BOL=1.907kg Bounding burnup assumed to be twice nominal burnup.
	From SFD	Estimated	
Nominal:		11.826	
Bounding:		23.652	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.18		1.00
Bounding:	0.35		

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: LOFT SQUARE FUEL MODULE
 SNF ID #: 129
 Fuel Units & Descr: 4 - 15 X 15 ROD ARRAY
 Heavy Metal Mass: BOL=815.60kg ; EOL=813.03kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1975
 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"
 4.00

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	8.7758E-10	2,447.372	4,894.744	0.00E+00	2.15E-06	4.30E-06	Avg. MeV	
Am-241	1.4352E-01	2,447.372	4,894.744	0.00E+00	3.51E+02	7.03E+02	0.0150	2.634E+14
Am-242m	2.8698E-04	2,447.372	4,894.744	0.00E+00	7.02E-01	1.40E+00	0.0250	5.311E+13
Am-243	6.2565E-04	2,447.372	4,894.744	0.00E+00	1.53E+00	3.06E+00	0.0375	5.065E+13
C-14	4.7901E-05	2,447.372	4,894.744	0.00E+00	1.17E-01	2.34E-01	0.0575	5.852E+13
Cl-36	8.0297E-07	2,447.372	4,894.744	0.00E+00	1.97E-03	3.93E-03	0.0850	2.947E+13
Cm-243	2.5081E-04	2,447.372	4,894.744	0.00E+00	6.14E-01	1.23E+00	0.1250	2.045E+13
Cm-244	4.9015E-02	2,447.372	4,894.744	0.00E+00	1.20E+02	2.40E+02	0.2250	2.527E+13
Co-60	2.5581E-03	2,447.372	4,894.744	0.00E+00	6.26E+00	1.25E+01	0.3750	1.087E+13
Cs-134	4.0536E-05	2,447.372	4,894.744	0.00E+00	9.92E-02	1.98E-01	0.5750	2.527E+14
Cs-135	1.4433E-05	2,447.372	4,894.744	0.00E+00	3.53E-02	7.06E-02	0.8500	3.496E+12
Cs-137	1.3979E+00	2,447.372	4,894.744	0.00E+00	3.42E+03	6.84E+03	1.2500	3.434E+12
Eu-154	2.0203E-02	2,447.372	4,894.744	0.00E+00	4.94E+01	9.89E+01	1.7500	1.029E+11
Eu-155	1.7684E-03	2,447.372	4,894.744	0.00E+00	4.33E+00	8.66E+00	2.2500	1.656E+07
Fe-55	4.3136E-05	2,447.372	4,894.744	0.00E+00	1.06E-01	2.11E-01	2.7500	3.393E+07
H-3	2.0769E-02	2,447.372	4,894.744	0.00E+00	5.08E+01	1.02E+02	3.5000	3.496E+06
I-129	9.8288E-07	2,447.372	4,894.744	0.00E+00	2.41E-03	4.81E-03	5.0000	1.494E+06
Kr-85	2.8214E-02	2,447.372	4,894.744	0.00E+00	6.90E+01	1.38E+02	7.0000	1.722E+05
Np-237	1.1218E-05	2,447.372	4,894.744	0.00E+00	2.75E-02	5.49E-02	11.0000	1.978E+04
Pa-231	1.3036E-09	2,447.372	4,894.744	0.00E+00	3.19E-06	6.38E-06		
Pb-210	8.5078E-11	2,447.372	4,894.744	0.00E+00	2.08E-07	4.16E-07		
Pm-147	3.6531E-04	2,447.372	4,894.744	0.00E+00	8.94E-01	1.79E+00		
Pu-238	7.4564E-02	2,447.372	4,894.744	0.00E+00	1.82E+02	3.65E+02		
Pu-239	1.1623E-02	2,447.372	4,894.744	0.00E+00	2.84E+01	5.69E+01		
Pu-240	1.5132E-02	2,447.372	4,894.744	0.00E+00	3.70E+01	7.41E+01		
Pu-241	9.0036E-01	2,447.372	4,894.744	0.00E+00	2.20E+03	4.41E+03		
Pu-242	6.4260E-05	2,447.372	4,894.744	0.00E+00	1.57E-01	3.15E-01		
Ra-226	2.2804E-10	2,447.372	4,894.744	0.00E+00	5.58E-07	1.12E-06		
Ra-228	5.2713E-12	2,447.372	4,894.744	0.00E+00	1.29E-08	2.58E-08		
Ru-106	6.1160E-10	2,447.372	4,894.744	0.00E+00	1.50E-06	2.99E-06		
Se-79	1.2377E-05	2,447.372	4,894.744	0.00E+00	3.03E-02	6.06E-02		
Sn-126	2.5210E-05	2,447.372	4,894.744	0.00E+00	6.17E-02	1.23E-01		
Sr-90	9.1667E-01	2,447.372	4,894.744	0.00E+00	2.24E+03	4.49E+03		
Tc-99	3.9357E-04	2,447.372	4,894.744	0.00E+00	9.63E-01	1.93E+00		
Th-229	1.2057E-10	2,447.372	4,894.744	0.00E+00	2.95E-07	5.90E-07		
Th-230	2.1043E-08	2,447.372	4,894.744	0.00E+00	5.15E-05	1.03E-04		
Th-232	5.2972E-12	2,447.372	4,894.744	0.00E+00	1.30E-08	2.59E-08		
Tl-208	1.7474E-07	2,447.372	4,894.744	0.00E+00	4.28E-04	8.55E-04		
U-232	4.7368E-07	2,447.372	4,894.744	0.00E+00	1.16E-03	2.32E-03		
U-233	2.5097E-08	2,447.372	4,894.744	0.00E+00	6.14E-05	1.23E-04		
U-234	5.0000E-05	2,447.372	4,894.744	0.00E+00	1.22E-01	2.45E-01		
U-235	-1.4489E-06	2,447.372	0.000	7.05E-02	6.70E-02	7.05E-02		
U-236	7.5824E-06	2,447.372	4,894.744	0.00E+00	1.86E-02	3.71E-02		
U-238	-2.6129E-07	2,447.372	0.000	2.63E-01	2.63E-01	2.63E-01		
Y-90	9.1699E-01	2,447.372	4,894.744	0.00E+00	2.24E+03	4.49E+03		
Other Radionuclides					3.29E+03	6.57E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.63E+01	1.13E+02
Total	Total

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-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	4	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	2,418.254	2,447.372	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,894.744	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.09	1.01	1.00
Bounding:	0.17		

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: LOOSE FUEL ROD STORAGE BASKET (LFRSB)
 SNF ID #: 126
 Fuel Units & Descr: 1 - SCRAP
 Heavy Metal Mass: BOL = : EOL=311.11kg
 ROD Storage Sit: INEEL

¹Fuel decay start date: 1983
 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: 25 years

Estimated
 Canister usage:
 18"x15"
 1.00

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	1.3562E-08	293,891.204	293,891.204	0.00E+00	3.99E-03	3.99E-03	0.0150	2.796E+16
Am-241	1.0168E-04	293,891.204	293,891.204	0.00E+00	2.99E+01	2.99E+01	0.0250	5.810E+15
Am-242m	8.9052E-09	293,891.204	293,891.204	0.00E+00	2.62E-03	2.62E-03	0.0375	5.015E+15
Am-243	9.8602E-10	293,891.204	293,891.204	0.00E+00	2.90E-04	2.90E-04	0.0575	5.411E+15
C-14	2.3045E-04	293,891.204	293,891.204	0.00E+00	6.77E+01	6.77E+01	0.0850	3.272E+15
Cl-36	1.2261E-06	293,891.204	293,891.204	0.00E+00	3.60E-01	3.60E-01	0.1250	2.125E+15
Cm-243	3.1730E-10	293,891.204	293,891.204	0.00E+00	9.33E-05	9.33E-05	0.2250	2.807E+15
Cm-244	3.3977E-09	293,891.204	293,891.204	0.00E+00	9.99E-04	9.99E-04	0.3750	1.225E+15
Co-60	2.6373E-01	293,891.204	293,891.204	0.00E+00	7.75E+04	7.75E+04	0.5750	2.001E+16
Cs-134	8.7072E-05	293,891.204	293,891.204	0.00E+00	2.56E+01	2.56E+01	0.8500	2.086E+14
Cs-135	3.0316E-05	293,891.204	293,891.204	0.00E+00	8.91E+00	8.91E+00	1.2500	5.812E+15
Cs-137	1.8286E+00	293,891.204	293,891.204	0.00E+00	5.37E+05	5.37E+05	1.7500	5.377E+12
Eu-154	1.4982E-03	293,891.204	293,891.204	0.00E+00	4.40E+02	4.40E+02	2.2500	3.096E+10
Eu-155	2.8236E-03	293,891.204	293,891.204	0.00E+00	8.30E+02	8.30E+02	2.7500	3.407E+08
Fe-55	1.7687E-02	293,891.204	293,891.204	0.00E+00	5.20E+03	5.20E+03	3.5000	7.199E+04
H-3	4.4043E-03	293,891.204	293,891.204	0.00E+00	1.29E+03	1.29E+03	5.0000	7.291E+03
I-129	7.3195E-07	293,891.204	293,891.204	0.00E+00	2.15E-01	2.15E-01	7.0000	8.050E+02
Kr-85	7.8769E-02	293,891.204	293,891.204	0.00E+00	2.31E+04	2.31E+04	11.0000	9.032E+01
Np-237	1.1484E-06	293,891.204	293,891.204	0.00E+00	3.38E-01	3.38E-01		
Pa-231	3.2396E-08	293,891.204	293,891.204	0.00E+00	9.52E-03	9.52E-03		
Pb-210	2.4409E-13	293,891.204	293,891.204	0.00E+00	7.17E-08	7.17E-08		
Pm-147	1.6331E-02	293,891.204	293,891.204	0.00E+00	4.80E+03	4.80E+03		
Pu-238	3.1947E-04	293,891.204	293,891.204	0.00E+00	9.39E+01	9.39E+01		
Pu-239	6.6789E-04	293,891.204	293,891.204	0.00E+00	1.96E+02	1.96E+02		
Pu-240	8.6922E-05	293,891.204	293,891.204	0.00E+00	2.55E+01	2.55E+01		
Pu-241	1.1567E-03	293,891.204	293,891.204	0.00E+00	3.40E+02	3.40E+02		
Pu-242	1.9717E-09	293,891.204	293,891.204	0.00E+00	5.79E-04	5.79E-04		
Ra-226	8.6190E-13	293,891.204	293,891.204	0.00E+00	2.53E-07	2.53E-07		
Ra-228	8.1498E-12	293,891.204	293,891.204	0.00E+00	2.40E-06	2.40E-06		
Ru-106	1.7770E-07	293,891.204	293,891.204	0.00E+00	5.22E-02	5.22E-02		
Se-79	1.3225E-05	293,891.204	293,891.204	0.00E+00	3.89E+00	3.89E+00		
Sn-126	1.1493E-05	293,891.204	293,891.204	0.00E+00	3.38E+00	3.38E+00		
Sr-90	1.7321E+00	293,891.204	293,891.204	0.00E+00	5.09E+05	5.09E+05		
Tc-99	4.6656E-04	293,891.204	293,891.204	0.00E+00	1.37E+02	1.37E+02		
Th-229	1.0110E-11	293,891.204	293,891.204	0.00E+00	2.97E-06	2.97E-06		
Th-230	1.1466E-10	293,891.204	293,891.204	0.00E+00	3.37E-05	3.37E-05		
Th-232	8.3245E-12	293,891.204	293,891.204	0.00E+00	2.45E-06	2.45E-06		
Tl-208	2.3860E-08	293,891.204	293,891.204	0.00E+00	7.01E-03	7.01E-03		
U-232	6.4576E-08	293,891.204	293,891.204	0.00E+00	1.90E-02	1.90E-02		
U-233	3.1082E-09	293,891.204	293,891.204	0.00E+00	9.13E-04	9.13E-04		
U-234	3.7587E-07	293,891.204	293,891.204	0.00E+00	1.10E-01	1.10E-01		
U-235	-2.7761E-06	293,891.204	0.000	1.26E+00	4.41E-01	1.26E+00		
U-236	1.6190E-05	293,891.204	293,891.204	0.00E+00	4.76E+00	4.76E+00		
U-238	-2.8547E-09	293,891.204	0.000	1.36E-02	1.27E-02	1.36E-02		
Y-90	1.7321E+00	293,891.204	293,891.204	0.00E+00	5.09E+05	5.09E+05		
Other Radionuclides					5.96E+05	5.96E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.29E+03	7.29E+03
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	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 %:	UO2	U	
		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		293,891.204	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		293,891.204	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	10.12		1.02
Bounding:	10.12		

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: LWR COMMERCIAL FUEL
 SNF ID #: 130
 Fuel Units & Descr: 6 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL = : EOL=63.89kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1982
 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:
 HIC
 3.00

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	6.6376E-10	60,759.031	60,759.031	0.00E+00	4.03E-05	4.03E-05	0.0150	4.132E+15
Am-241	1.3144E-01	60,759.031	60,759.031	0.00E+00	7.99E+03	7.99E+03	0.0250	8.368E+14
Am-242m	3.0039E-04	60,759.031	60,759.031	0.00E+00	1.83E+01	1.83E+01	0.0375	8.099E+14
Am-243	6.2629E-04	60,759.031	60,759.031	0.00E+00	3.81E+01	3.81E+01	0.0575	8.835E+14
C-14	4.7965E-05	60,759.031	60,759.031	0.00E+00	2.91E+00	2.91E+00	0.0850	4.681E+14
Cl-36	8.0297E-07	60,759.031	60,759.031	0.00E+00	4.88E-02	4.88E-02	0.1250	3.420E+14
Cm-243	3.1993E-04	60,759.031	60,759.031	0.00E+00	1.94E+01	1.94E+01	0.2250	4.019E+14
Cm-244	7.1851E-02	60,759.031	60,759.031	0.00E+00	4.37E+03	4.37E+03	0.3750	1.724E+14
Co-60	9.5220E-03	60,759.031	60,759.031	0.00E+00	5.79E+02	5.79E+02	0.5750	3.963E+15
Cs-134	1.1662E-03	60,759.031	60,759.031	0.00E+00	7.09E+01	7.09E+01	0.8500	7.821E+13
Cs-135	1.4433E-05	60,759.031	60,759.031	0.00E+00	8.77E-01	8.77E-01	1.2500	1.057E+14
Cs-137	1.7603E+00	60,759.031	60,759.031	0.00E+00	1.07E+05	1.07E+05	1.7500	2.315E+12
Eu-154	4.5203E-02	60,759.031	60,759.031	0.00E+00	2.75E+03	2.75E+03	2.2500	4.276E+08
Eu-155	7.1479E-03	60,759.031	60,759.031	0.00E+00	4.34E+02	4.34E+02	2.7500	4.805E+08
Fe-55	6.1919E-04	60,759.031	60,759.031	0.00E+00	3.76E+01	3.76E+01	3.5000	6.298E+07
H-3	3.6386E-02	60,759.031	60,759.031	0.00E+00	2.21E+03	2.21E+03	5.0000	2.691E+07
I-129	9.8288E-07	60,759.031	60,759.031	0.00E+00	5.97E-02	5.97E-02	7.0000	3.102E+06
Kr-85	5.3844E-02	60,759.031	60,759.031	0.00E+00	3.27E+03	3.27E+03	11.0000	3.564E+05
Np-237	1.0546E-05	60,759.031	60,759.031	0.00E+00	6.41E-01	6.41E-01		
Pa-231	1.1370E-09	60,759.031	60,759.031	0.00E+00	6.91E-05	6.91E-05		
Pb-210	3.3624E-11	60,759.031	60,759.031	0.00E+00	2.04E-06	2.04E-06		
Pm-147	5.1211E-03	60,759.031	60,759.031	0.00E+00	3.11E+02	3.11E+02		
Pu-238	8.0669E-02	60,759.031	60,759.031	0.00E+00	4.90E+03	4.90E+03		
Pu-239	1.1626E-02	60,759.031	60,759.031	0.00E+00	7.06E+02	7.06E+02		
Pu-240	1.5097E-02	60,759.031	60,759.031	0.00E+00	9.17E+02	9.17E+02		
Pu-241	1.4567E+00	60,759.031	60,759.031	0.00E+00	8.85E+04	8.85E+04		
Pu-242	6.4260E-05	60,759.031	60,759.031	0.00E+00	3.90E+00	3.90E+00		
Ra-226	1.1392E-10	60,759.031	60,759.031	0.00E+00	6.92E-06	6.92E-06		
Ra-228	5.1841E-12	60,759.031	60,759.031	0.00E+00	3.15E-07	3.15E-07		
Ru-106	5.9012E-07	60,759.031	60,759.031	0.00E+00	3.59E-02	3.59E-02		
Se-79	1.2379E-05	60,759.031	60,759.031	0.00E+00	7.52E-01	7.52E-01		
Sn-126	2.5210E-05	60,759.031	60,759.031	0.00E+00	1.53E+00	1.53E+00		
Sr-90	1.1630E+00	60,759.031	60,759.031	0.00E+00	7.07E+04	7.07E+04		
Tc-99	3.9357E-04	60,759.031	60,759.031	0.00E+00	2.39E+01	2.39E+01		
Th-229	8.5691E-11	60,759.031	60,759.031	0.00E+00	5.21E-06	5.21E-06		
Th-230	1.4493E-08	60,759.031	60,759.031	0.00E+00	8.81E-04	8.81E-04		
Th-232	5.2923E-12	60,759.031	60,759.031	0.00E+00	3.22E-07	3.22E-07		
Th-208	1.9202E-07	60,759.031	60,759.031	0.00E+00	1.17E-02	1.17E-02		
U-232	5.2083E-07	60,759.031	60,759.031	0.00E+00	3.16E-02	3.16E-02		
U-233	2.4386E-08	60,759.031	60,759.031	0.00E+00	1.48E-03	1.48E-03		
U-234	4.7012E-05	60,759.031	60,759.031	0.00E+00	2.86E+00	2.86E+00		
U-235	-1.4492E-06	60,759.031	0.000	8.84E-03	0.00E+00	8.84E-03		
U-236	7.5759E-06	60,759.031	60,759.031	0.00E+00	4.60E-01	4.60E-01		
U-238	-2.6129E-07	60,759.031	0.000	4.16E-02	2.57E-02	4.16E-02		
Y-90	1.1631E+00	60,759.031	60,759.031	0.00E+00	7.07E+04	7.07E+04		
Other Radionuclides					1.03E+05	1.03E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: LIGHT WATER	Used: LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ZIRC	ZIRC	This fuel matches on all parameters except enrichment (unknown).
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD: 60,759.031	Estimated: 60,759.031	Nominal burnup set equal to bounding burnup.
Bounding:		60,759.031	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks		
Nominal:	Burnup Multiplier: 13.58	Estimated Burnup/Given Burnup: 1.59
Bounding:	13.58	

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: LWR SAMPLES (MOX)
 SNF ID #: 134
 Fuel Units & Descr: 5 - ROD
 Heavy Metal Masa: BOL = 12.74kg
 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"x15"
 0.18

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	2.3072E-06	12,107.491	12,107.491	0.00E+00	2.79E-02	2.79E-02		
Am-241	8.4448E+00	12,107.491	12,107.491	0.00E+00	1.02E+05	1.02E+05	0.0150	1.484E+16
Am-242m	1.6848E-02	12,107.491	12,107.491	0.00E+00	2.04E+02	2.04E+02	0.0250	2.953E+15
Am-243	1.6320E-02	12,107.491	12,107.491	0.00E+00	1.98E+02	1.98E+02	0.0375	2.579E+15
C-14	1.2090E-01	12,107.491	12,107.491	0.00E+00	1.46E+03	1.46E+03	0.0575	4.058E+15
Ci-36	2.2849E-03	12,107.491	12,107.491	0.00E+00	2.77E+01	2.77E+01	0.0850	1.584E+15
Cm-243	8.6624E-04	12,107.491	12,107.491	0.00E+00	1.05E+01	1.05E+01	0.1250	1.241E+15
Cm-244	1.6848E-01	12,107.491	12,107.491	0.00E+00	2.04E+03	2.04E+03	0.2250	1.372E+15
Co-60	2.8086E+01	12,107.491	12,107.491	0.00E+00	3.40E+05	3.40E+05	0.3750	5.869E+14
Cs-134	3.4148E-04	12,107.491	12,107.491	0.00E+00	4.13E+00	4.13E+00	0.5750	9.544E+15
Cs-135	4.3976E-04	12,107.491	12,107.491	0.00E+00	5.32E+00	5.32E+00	0.8500	3.647E+14
Cs-137	2.1049E+01	12,107.491	12,107.491	0.00E+00	2.55E+05	2.55E+05	1.2500	2.549E+16
Eu-154	1.2500E+00	12,107.491	12,107.491	0.00E+00	1.51E+04	1.51E+04	1.7500	1.128E+13
Eu-155	6.8986E-02	12,107.491	12,107.491	0.00E+00	8.35E+02	8.35E+02	2.2500	1.337E+11
Fe-55	2.9308E-01	12,107.491	12,107.491	0.00E+00	3.55E+03	3.55E+03	2.7500	3.767E+10
H-3	2.4311E-01	12,107.491	12,107.491	0.00E+00	2.94E+03	2.94E+03	3.5000	3.016E+07
I-129	1.0618E-05	12,107.491	12,107.491	0.00E+00	1.29E-01	1.29E-01	5.0000	1.280E+07
Kr-85	5.9882E-01	12,107.491	12,107.491	0.00E+00	7.25E+03	7.25E+03	7.0000	1.466E+06
Np-237	1.5668E-04	12,107.491	12,107.491	0.00E+00	1.90E+00	1.90E+00	11.0000	1.678E+05
Pa-231	2.8656E-06	12,107.491	12,107.491	0.00E+00	3.47E-02	3.47E-02		
Pb-210	2.3918E-08	12,107.491	12,107.491	0.00E+00	2.90E-04	2.90E-04		
Pm-147	1.6900E-02	12,107.491	12,107.491	0.00E+00	2.05E+02	2.05E+02		
Pu-238	-8.6123E-01	12,107.491	0.000	3.27E+03	0.00E+00	3.27E+03		
Pu-239	-4.8440E-02	12,107.491	0.000	3.96E+02	0.00E+00	3.96E+02		
Pu-240	-3.0095E-01	12,107.491	0.000	5.06E+02	0.00E+00	5.06E+02		
Pu-241	-1.0411E+02	12,107.491	0.000	1.30E+05	0.00E+00	1.30E+05		
Pu-242	-1.1381E-04	12,107.491	0.000	2.19E+00	8.12E-01	2.19E+00		
Ra-226	6.4400E-08	12,107.491	12,107.491	0.00E+00	7.80E-04	7.80E-04		
Ra-228	5.9952E-07	12,107.491	12,107.491	0.00E+00	7.26E-03	7.26E-03		
Ru-106	8.5526E-07	12,107.491	12,107.491	0.00E+00	1.04E-02	1.04E-02		
Se-79	1.9181E-04	12,107.491	12,107.491	0.00E+00	2.32E+00	2.32E+00		
Sn-126	1.6671E-04	12,107.491	12,107.491	0.00E+00	2.02E+00	2.02E+00		
Sr-90	1.9799E+01	12,107.491	12,107.491	0.00E+00	2.40E+05	2.40E+05		
Tc-99	6.7678E-03	12,107.491	12,107.491	0.00E+00	8.19E+01	8.19E+01		
Th-229	1.7488E-06	12,107.491	12,107.491	0.00E+00	2.12E-02	2.12E-02		
Th-230	5.8704E-06	12,107.491	12,107.491	0.00E+00	7.11E-02	7.11E-02		
Th-232	6.0208E-07	12,107.491	12,107.491	0.00E+00	7.29E-03	7.29E-03		
Th-208	8.7573E-05	12,107.491	12,107.491	0.00E+00	1.06E+00	1.06E+00		
U-232	2.3706E-04	12,107.491	12,107.491	0.00E+00	2.87E+00	2.87E+00		
U-233	3.6128E-04	12,107.491	12,107.491	0.00E+00	4.37E+00	4.37E+00		
U-234	1.2788E-02	12,107.491	12,107.491	0.00E+00	1.55E+02	1.55E+02		
U-235	5.7486E-04	12,107.491	12,107.491	1.10E-02	6.97E+00	6.97E+00		
U-236	2.3485E-04	12,107.491	12,107.491	0.00E+00	2.84E+00	2.84E+00		
U-238	1.1581E-04	12,107.491	12,107.491	1.36E-03	1.40E+00	1.40E+00		
Y-90	1.9804E+01	12,107.491	12,107.491	0.00E+00	2.40E+05	2.40E+05		
Other Radionuclides					7.47E+05	7.47E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.19E+04	1.21E+04
Total	Total

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 Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	ZIRC OR SST	SST/Inconel	
BOL HM Constituents:	PuO2-UO2	U, Th, & Pu	
BOL Enrichment %:		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		12,107.491	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		12,107.491	

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	14.21	
Bounding:	14.21	
		Estimated EOL HM/ Given EOL HM
		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: LWR SCRAP
 SNF ID #: 309
 Fuel Units & Descr: 1 - SCRAP
 Heavy Metal Mass: BOL=76.55kg ; EOL=75.31kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1963
 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:
 HIC
 1.00

Radionuclide	II. Estimates		Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
	m	x _n						Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	2,143.506	2,449.722	0.00E+00	1.88E-06	2.15E-06	Avg. MeV		
Am-241	1.4352E-01	2,143.506	2,449.722	0.00E+00	3.08E+02	3.52E+02	0.0150	1.318E+14	
Am-242m	2.8698E-04	2,143.506	2,449.722	0.00E+00	6.15E-01	7.03E-01	0.0250	2.658E+13	
Am-243	6.2565E-04	2,143.506	2,449.722	0.00E+00	1.34E+00	1.53E+00	0.0375	2.535E+13	
C-14	4.7901E-05	2,143.506	2,449.722	0.00E+00	1.03E-01	1.17E-01	0.0575	2.929E+13	
Cl-36	8.0297E-07	2,143.506	2,449.722	0.00E+00	1.72E-03	1.97E-03	0.0850	1.475E+13	
Cm-243	2.5081E-04	2,143.506	2,449.722	0.00E+00	5.38E-01	6.14E-01	0.1250	1.023E+13	
Cm-244	4.9015E-02	2,143.506	2,449.722	0.00E+00	1.05E+02	1.20E+02	0.2250	1.265E+13	
Co-60	2.5581E-03	2,143.506	2,449.722	0.00E+00	5.48E+00	6.27E+00	0.3750	5.438E+12	
Cs-134	4.0536E-05	2,143.506	2,449.722	0.00E+00	8.69E-02	9.93E-02	0.5750	1.265E+14	
Cs-135	1.4433E-05	2,143.506	2,449.722	0.00E+00	3.09E-02	3.54E-02	0.8500	1.750E+12	
Cs-137	1.3979E+00	2,143.506	2,449.722	0.00E+00	3.00E+03	3.42E+03	1.2500	1.719E+12	
Eu-154	2.0203E-02	2,143.506	2,449.722	0.00E+00	4.33E+01	4.95E+01	1.7500	5.148E+10	
Eu-155	1.7684E-03	2,143.506	2,449.722	0.00E+00	3.79E+00	4.33E+00	2.2500	8.289E+06	
Fe-55	4.3136E-05	2,143.506	2,449.722	0.00E+00	9.25E-02	1.06E-01	2.7500	1.698E+07	
H-3	2.0769E-02	2,143.506	2,449.722	0.00E+00	4.45E+01	5.09E+01	3.5000	1.749E+06	
I-129	9.8288E-07	2,143.506	2,449.722	0.00E+00	2.11E-03	2.41E-03	5.0000	7.476E+05	
Kr-85	2.8214E-02	2,143.506	2,449.722	0.00E+00	6.05E+01	6.91E+01	7.0000	8.617E+04	
Np-237	1.1218E-05	2,143.506	2,449.722	0.00E+00	2.40E-02	2.75E-02	11.0000	9.896E+03	
Pa-231	1.3036E-09	2,143.506	2,449.722	0.00E+00	2.79E-06	3.19E-06			
Pb-210	8.5078E-11	2,143.506	2,449.722	0.00E+00	1.82E-07	2.08E-07			
Pm-147	3.6531E-04	2,143.506	2,449.722	0.00E+00	7.83E-01	8.95E-01			
Pu-238	7.4564E-02	2,143.506	2,449.722	0.00E+00	1.60E+02	1.83E+02			
Pu-239	1.1623E-02	2,143.506	2,449.722	0.00E+00	2.49E+01	2.85E+01			
Pu-240	1.5132E-02	2,143.506	2,449.722	0.00E+00	3.24E+01	3.71E+01			
Pu-241	9.0036E-01	2,143.506	2,449.722	0.00E+00	1.93E+03	2.21E+03			
Pu-242	6.4260E-05	2,143.506	2,449.722	0.00E+00	1.38E-01	1.57E-01			
Ra-226	2.2804E-10	2,143.506	2,449.722	0.00E+00	4.89E-07	5.59E-07			
Ra-228	5.2713E-12	2,143.506	2,449.722	0.00E+00	1.13E-08	1.29E-08			
Ru-106	6.1160E-10	2,143.506	2,449.722	0.00E+00	1.31E-06	1.50E-06			
Se-79	1.2377E-05	2,143.506	2,449.722	0.00E+00	2.65E-02	3.03E-02			
Sn-126	2.5210E-05	2,143.506	2,449.722	0.00E+00	5.40E-02	6.18E-02			
Sr-90	9.1667E-01	2,143.506	2,449.722	0.00E+00	1.96E+03	2.25E+03			
Tc-99	3.9357E-04	2,143.506	2,449.722	0.00E+00	8.44E-01	9.64E-01			
Th-229	1.2057E-10	2,143.506	2,449.722	0.00E+00	2.58E-07	2.95E-07			
Th-230	2.1043E-08	2,143.506	2,449.722	0.00E+00	4.51E-05	5.16E-05			
Th-232	5.2972E-12	2,143.506	2,449.722	0.00E+00	1.14E-08	1.30E-08			
Th-208	1.7474E-07	2,143.506	2,449.722	0.00E+00	3.75E-04	4.28E-04			
U-232	4.7368E-07	2,143.506	2,449.722	0.00E+00	1.02E-03	1.16E-03			
U-233	2.5097E-08	2,143.506	2,449.722	0.00E+00	5.38E-05	6.15E-05			
U-234	5.0000E-05	2,143.506	2,449.722	0.00E+00	1.07E-01	1.22E-01			
U-235	-1.4489E-06	2,143.506	0.000	4.58E-03	1.47E-03	4.58E-03			
U-236	7.5824E-06	2,143.506	2,449.722	0.00E+00	1.63E-02	1.86E-02			
U-238	-2.6129E-07	2,143.506	0.000	2.50E-02	2.45E-02	2.50E-02			
Y-90	9.1699E-01	2,143.506	2,449.722	0.00E+00	1.97E+03	2.25E+03			
Other Radionuclides					2.88E+03	3.29E+03			

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.93E+01	5.63E+01
Total	Total

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-2	ZIRC	
BOL HM Constituents:	UO ₂	U	
BOL Enrichment %:	2.766740402	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	2,143.506	1,182.795	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup taken directly from SFD (converted to MWd).
Bounding:	2,449.722	2,365.590	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.80	0.55	
Bounding:	0.91	0.97	

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: LWR SNF SCRAP
 SNF ID #: 940
 Fuel Units & Descr: 9 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=161.86kg ; EOL=154.22kg
 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"
 0.69

Radionuclide	II. Estimates		x _b	b	y _n	y _b	Gamma Sources	
	m	x _n					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	6.6376E-10	7,263.662	14,527.324	0.00E+00	4.82E-06	9.64E-06	0.0150	9.879E+14
Am-241	1.3144E-01	7,263.662	14,527.324	0.00E+00	9.55E+02	1.91E+03	0.0250	2.001E+14
Am-242m	3.0039E-04	7,263.662	14,527.324	0.00E+00	2.18E+00	4.36E+00	0.0375	1.936E+14
Am-243	6.2629E-04	7,263.662	14,527.324	0.00E+00	4.55E+00	9.10E+00	0.0575	2.112E+14
C-14	4.7965E-05	7,263.662	14,527.324	0.00E+00	3.48E-01	6.97E-01	0.0850	1.119E+14
Cl-36	8.0297E-07	7,263.662	14,527.324	0.00E+00	5.83E-03	1.17E-02	0.1250	8.177E+13
Cm-243	3.1993E-04	7,263.662	14,527.324	0.00E+00	2.32E+00	4.65E+00	0.2250	9.609E+13
Cm-244	7.1851E-02	7,263.662	14,527.324	0.00E+00	5.22E+02	1.04E+03	0.3750	4.123E+13
Co-60	9.5220E-03	7,263.662	14,527.324	0.00E+00	6.92E+01	1.38E+02	0.5750	9.474E+14
Cs-134	1.1662E-03	7,263.662	14,527.324	0.00E+00	8.47E+00	1.69E+01	0.8500	1.870E+13
Cs-135	1.4433E-05	7,263.662	14,527.324	0.00E+00	1.05E-01	2.10E-01	1.2500	2.526E+13
Cs-137	1.7603E+00	7,263.662	14,527.324	0.00E+00	1.28E+04	2.56E+04	1.7500	5.535E+11
Eu-154	4.5203E-02	7,263.662	14,527.324	0.00E+00	3.28E+02	6.57E+02	2.2500	1.022E+08
Eu-155	7.1479E-04	7,263.662	14,527.324	0.00E+00	5.19E+01	1.04E+02	2.7500	1.149E+08
Fe-55	6.1919E-04	7,263.662	14,527.324	0.00E+00	4.50E+00	9.00E+00	3.5000	1.506E+07
H-3	3.6386E-02	7,263.662	14,527.324	0.00E+00	2.64E+02	5.29E+02	5.0000	6.434E+06
I-129	9.8288E-07	7,263.662	14,527.324	0.00E+00	7.14E-03	1.43E-02	7.0000	7.418E+05
Kr-85	5.3844E-02	7,263.662	14,527.324	0.00E+00	3.91E+02	7.82E+02	11.0000	8.521E+04
Np-237	1.0546E-05	7,263.662	14,527.324	0.00E+00	7.66E-02	1.53E-01		
Pa-231	1.1370E-09	7,263.662	14,527.324	0.00E+00	8.26E-06	1.65E-05		
Pb-210	3.3624E-11	7,263.662	14,527.324	0.00E+00	2.44E-07	4.88E-07		
Pm-147	5.1211E-03	7,263.662	14,527.324	0.00E+00	3.72E+01	7.44E+01		
Pu-238	8.0669E-02	7,263.662	14,527.324	0.00E+00	5.86E+02	1.17E+03		
Pu-239	1.1626E-02	7,263.662	14,527.324	0.00E+00	8.44E+01	1.69E+02		
Pu-240	1.5097E-02	7,263.662	14,527.324	0.00E+00	1.10E+02	2.19E+02		
Pu-241	1.4567E+00	7,263.662	14,527.324	0.00E+00	1.06E+04	2.12E+04		
Pu-242	6.4260E-05	7,263.662	14,527.324	0.00E+00	4.67E-01	9.34E-01		
Ra-226	1.1392E-10	7,263.662	14,527.324	0.00E+00	8.27E-07	1.65E-06		
Ra-228	5.1841E-12	7,263.662	14,527.324	0.00E+00	3.77E-08	7.53E-08		
Ru-106	5.9012E-07	7,263.662	14,527.324	0.00E+00	4.29E-03	8.57E-03		
Se-79	1.2379E-05	7,263.662	14,527.324	0.00E+00	8.99E-02	1.80E-01		
Sn-126	2.5210E-05	7,263.662	14,527.324	0.00E+00	1.83E-01	3.66E-01		
Sr-90	1.1630E+00	7,263.662	14,527.324	0.00E+00	8.45E+03	1.69E+04		
Tc-99	3.9357E-04	7,263.662	14,527.324	0.00E+00	2.86E+00	5.72E+00		
Th-229	8.5691E-11	7,263.662	14,527.324	0.00E+00	6.22E-07	1.24E-06		
Th-230	1.4493E-08	7,263.662	14,527.324	0.00E+00	1.05E-04	2.11E-04		
Th-232	5.2923E-12	7,263.662	14,527.324	0.00E+00	3.84E-08	7.69E-08		
Tl-208	1.9202E-07	7,263.662	14,527.324	0.00E+00	1.39E-03	2.79E-03		
U-232	5.2083E-07	7,263.662	14,527.324	0.00E+00	3.78E-03	7.57E-03		
U-233	2.4386E-08	7,263.662	14,527.324	0.00E+00	1.77E-04	3.54E-04		
U-234	4.7012E-05	7,263.662	14,527.324	0.00E+00	3.41E-01	6.83E-01		
U-235	-1.4492E-06	7,263.662	0.000	1.37E-02	3.20E-03	1.37E-02		
U-236	7.5759E-06	7,263.662	14,527.324	0.00E+00	5.50E-02	1.10E-01		
U-238	-2.6129E-07	7,263.662	0.000	5.23E-02	5.04E-02	5.23E-02		
Y-90	1.1631E+00	7,263.662	14,527.324	0.00E+00	8.45E+03	1.69E+04		
Other Radionuclides					1.23E+04	2.45E+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	This Template was used for the following reasons: This fuel matches on all parameters except possibly cladding.
Fuel Cladding:	ZIRC OR SST	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	3.923246114	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		7,263.662	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		14,527.324	Bounding burnup assumed to be twice nominal burnup.

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

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: MACMASTER (CANADA)	¹ Fuel decay start date: 2006	Estimated Canister usage: 18"x10" 2.31
SNF ID #: 614	Estimates as of: 2010	
Fuel Units & Descr: 83 - 18 CURVED PLATES	Template: ATR (Light Water, Alum., 60 to 100%, U)	
Heavy Metal Mass: BOL=14.78kg ; EOL=10.43kg	² Template Burnup(MWd): 367.2	
ROD Storage Site: SRS	Template BOL Heavy Metal Mass (MT): 0.00116689	
	Template Decay Time: 5 years	

Radionuclide	II. Estimates		Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
	m	x _n						Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	4,118.777	8,237.554	0.00E+00	5.99E-07	1.20E-06	Avg. MeV		
Am-241	1.1190E-03	4,118.777	8,237.554	0.00E+00	4.61E+00	9.22E+00	0.0150	1.589E+15	
Am-242m	4.5425E-07	4,118.777	8,237.554	0.00E+00	1.87E-03	3.74E-03	0.0250	3.424E+14	
Am-243	1.4921E-06	4,118.777	8,237.554	0.00E+00	6.15E-03	1.23E-02	0.0375	3.160E+14	
C-14	5.7244E-09	4,118.777	8,237.554	0.00E+00	2.36E-05	4.72E-05	0.0575	3.107E+14	
Cl-36	1.3124E-32	4,118.777	8,237.554	0.00E+00	5.41E-29	1.08E-28	0.0850	1.980E+14	
Cm-243	2.3676E-07	4,118.777	8,237.554	0.00E+00	9.75E-04	1.95E-03	0.1250	1.715E+14	
Cm-244	5.2042E-05	4,118.777	8,237.554	0.00E+00	2.14E-01	4.29E-01	0.2250	1.679E+14	
Co-60	3.8208E-05	4,118.777	8,237.554	0.00E+00	1.57E-01	3.15E-01	0.3750	8.125E+13	
Cs-134	4.8693E-01	4,118.777	8,237.554	0.00E+00	2.01E+03	4.01E+03	0.5750	1.116E+15	
Cs-135	3.4477E-06	4,118.777	8,237.554	0.00E+00	1.42E-02	2.84E-02	0.8500	1.563E+14	
Cs-137	2.8731E+00	4,118.777	8,237.554	0.00E+00	1.18E+04	2.37E+04	1.2500	2.908E+13	
Eu-154	8.2053E-02	4,118.777	8,237.554	0.00E+00	3.38E+02	6.76E+02	1.7500	1.220E+12	
Eu-155	3.9134E-02	4,118.777	8,237.554	0.00E+00	1.61E+02	3.22E+02	2.2500	2.558E+12	
Fe-55	6.7429E-03	4,118.777	8,237.554	0.00E+00	2.78E+01	5.55E+01	2.7500	1.471E+10	
H-3	1.0599E-02	4,118.777	8,237.554	0.00E+00	4.37E+01	8.73E+01	3.5000	1.632E+09	
I-129	7.5300E-07	4,118.777	8,237.554	0.00E+00	3.10E-03	6.20E-03	5.0000	4.879E+03	
Kr-85	2.8595E-01	4,118.777	8,237.554	0.00E+00	1.18E+03	2.36E+03	7.0000	5.440E+02	
Np-237	9.5479E-06	4,118.777	8,237.554	0.00E+00	3.93E-02	7.87E-02	11.0000	6.132E+01	
Pa-231	8.9297E-10	4,118.777	8,237.554	0.00E+00	3.68E-06	7.36E-06			
Pb-210	3.7609E-12	4,118.777	8,237.554	0.00E+00	1.55E-08	3.10E-08			
Pm-147	2.5452E+00	4,118.777	8,237.554	0.00E+00	1.05E+04	2.10E+04			
Pu-238	2.0550E-02	4,118.777	8,237.554	0.00E+00	8.46E+01	1.69E+02			
Pu-239	4.2838E-04	4,118.777	8,237.554	0.00E+00	1.76E+00	3.53E+00			
Pu-240	2.4401E-04	4,118.777	8,237.554	0.00E+00	1.01E+00	2.01E+00			
Pu-241	6.8764E-02	4,118.777	8,237.554	0.00E+00	2.83E+02	5.66E+02			
Pu-242	3.6329E-07	4,118.777	8,237.554	0.00E+00	1.50E-03	2.99E-03			
Ra-226	3.8045E-11	4,118.777	8,237.554	0.00E+00	1.57E-07	3.13E-07			
Ra-228	2.9902E-15	4,118.777	8,237.554	0.00E+00	1.23E-11	2.46E-11			
Ru-106	1.9055E-01	4,118.777	8,237.554	0.00E+00	7.85E+02	1.57E+03			
Se-79	1.2936E-05	4,118.777	8,237.554	0.00E+00	5.33E-02	1.07E-01			
Sn-126	1.1574E-05	4,118.777	8,237.554	0.00E+00	4.77E-02	9.53E-02			
Sr-90	2.7505E+00	4,118.777	8,237.554	0.00E+00	1.13E+04	2.27E+04			
Tc-99	4.2239E-04	4,118.777	8,237.554	0.00E+00	1.74E+00	3.48E+00			
Th-229	1.8848E-12	4,118.777	8,237.554	0.00E+00	7.76E-09	1.55E-08			
Th-230	1.7042E-08	4,118.777	8,237.554	0.00E+00	7.02E-05	1.40E-04			
Th-232	7.8132E-15	4,118.777	8,237.554	0.00E+00	3.22E-11	6.44E-11			
Th-208	4.4063E-08	4,118.777	8,237.554	0.00E+00	1.81E-04	3.63E-04			
U-232	1.3151E-07	4,118.777	8,237.554	0.00E+00	5.42E-04	1.08E-03			
U-233	1.9564E-09	4,118.777	8,237.554	0.00E+00	8.06E-06	1.61E-05			
U-234	1.8371E-04	4,118.777	8,237.554	0.00E+00	7.57E-01	1.51E+00			
U-235	-2.7235E-06	4,118.777	0.000	2.97E-02	1.85E-02	2.97E-02			
U-236	1.5493E-05	4,118.777	8,237.554	0.00E+00	6.38E-02	1.28E-01			
U-238	-4.2851E-09	4,118.777	0.000	3.42E-04	3.24E-04	3.42E-04			
Y-90	2.7505E+00	4,118.777	8,237.554	0.00E+00	1.13E+04	2.27E+04			
Other Radionuclides					2.12E+04	4.24E+04			

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.09E+02	4.18E+02
Total	Total

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-ALX	U	
BOL Enrichment %:	93.11672336	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		4,118.777	
Bounding:		8,237.554	

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:	0.89	
Bounding:	1.77	

Estimated EOL HM/ Given EOL HM: 1.02

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: MISCELLANEOUS RSWF FUEL
 SNF ID #: 366
 Fuel Units & Descr: 1 - UNKNOWN
 Heavy Metal Mass: BOL= ; EOL=4161.52kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1963
 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: 35 years

Estimated
 Canister usage:
 18"x10"
 2.00

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	6.1822E-12	12,522.182	28,967.981	0.00E+00	7.74E-08	1.79E-07	0.0150	9.471E+14
Am-241	1.2332E-01	12,522.182	28,967.981	0.00E+00	1.54E+03	3.57E+03	0.0250	1.885E+14
Am-242m	1.9247E-03	12,522.182	28,967.981	0.00E+00	2.41E+01	5.58E+01	0.0375	2.189E+14
Am-243	1.0740E-04	12,522.182	28,967.981	0.00E+00	1.34E+00	3.11E+00	0.0575	2.188E+14
C-14	2.6042E-05	12,522.182	28,967.981	0.00E+00	3.26E-01	7.54E-01	0.0850	1.048E+14
Cl-36	3.4243E-10	12,522.182	28,967.981	0.00E+00	4.29E-06	9.92E-06	0.1250	7.377E+13
Cm-243	4.0629E-04	12,522.182	28,967.981	0.00E+00	5.09E+00	1.18E+01	0.2250	8.461E+13
Cm-244	1.6024E-03	12,522.182	28,967.981	0.00E+00	2.01E+01	4.64E+01	0.3750	3.667E+13
Co-60	3.4283E-03	12,522.182	28,967.981	0.00E+00	4.29E+01	9.93E+01	0.5750	1.486E+15
Cs-134	1.5565E-03	12,522.182	28,967.981	0.00E+00	1.95E+01	4.51E+01	0.8500	1.552E+13
Cs-135	4.7693E-05	12,522.182	28,967.981	0.00E+00	5.97E-01	1.38E+00	1.2500	1.858E+13
Cs-137	1.4007E+00	12,522.182	28,967.981	0.00E+00	1.75E+04	4.06E+04	1.7500	4.204E+11
Eu-154	1.6184E-02	12,522.182	28,967.981	0.00E+00	2.03E+02	4.69E+02	2.2500	8.435E+07
Eu-155	1.3775E-02	12,522.182	28,967.981	0.00E+00	1.72E+02	3.99E+02	2.7500	4.801E+08
Fe-55	3.8035E-04	12,522.182	28,967.981	0.00E+00	4.76E+00	1.10E+01	3.5000	2.372E+06
H-3	3.8454E-03	12,522.182	28,967.981	0.00E+00	4.82E+01	1.11E+02	5.0000	8.154E+05
I-129	1.2891E-06	12,522.182	28,967.981	0.00E+00	1.61E-02	3.73E-02	7.0000	9.315E+04
Kr-85	2.7858E-02	12,522.182	28,967.981	0.00E+00	3.49E+02	8.07E+02	11.0000	1.066E+04
Np-237	3.7516E-06	12,522.182	28,967.981	0.00E+00	4.70E-02	1.09E-01		
Pa-231	1.2488E-11	12,522.182	28,967.981	0.00E+00	1.56E-07	3.62E-07		
Pb-210	2.4206E-12	12,522.182	28,967.981	0.00E+00	3.03E-08	7.01E-08		
Pm-147	1.5671E-02	12,522.182	28,967.981	0.00E+00	1.96E+02	4.54E+02		
Pu-238	1.4877E-02	12,522.182	28,967.981	0.00E+00	1.86E+02	4.31E+02		
Pu-239	6.8447E-02	12,522.182	28,967.981	0.00E+00	8.57E+02	1.98E+03		
Pu-240	7.3535E-02	12,522.182	28,967.981	0.00E+00	9.21E+02	2.13E+03		
Pu-241	8.9200E-01	12,522.182	28,967.981	0.00E+00	1.12E+04	2.58E+04		
Pu-242	2.5343E-05	12,522.182	28,967.981	0.00E+00	3.17E-01	7.34E-01		
Ra-226	7.8524E-12	12,522.182	28,967.981	0.00E+00	9.83E-08	2.27E-07		
Ra-228	2.4086E-16	12,522.182	28,967.981	0.00E+00	3.02E-12	6.98E-12		
Ru-106	1.5066E-05	12,522.182	28,967.981	0.00E+00	1.89E-01	4.36E-01		
Se-79	1.0127E-05	12,522.182	28,967.981	0.00E+00	1.27E-01	2.93E-01		
Sn-126	4.3902E-05	12,522.182	28,967.981	0.00E+00	5.50E-01	1.27E+00		
Sr-90	5.0088E-01	12,522.182	28,967.981	0.00E+00	6.27E+03	1.45E+04		
Tc-99	3.9412E-04	12,522.182	28,967.981	0.00E+00	4.94E+00	1.14E+01		
Th-229	2.7219E-12	12,522.182	28,967.981	0.00E+00	3.41E-08	7.88E-08		
Th-230	1.0441E-09	12,522.182	28,967.981	0.00E+00	1.31E-05	3.02E-05		
Th-232	3.1689E-16	12,522.182	28,967.981	0.00E+00	3.97E-12	9.18E-12		
Tl-208	4.6636E-07	12,522.182	28,967.981	0.00E+00	5.84E-03	1.35E-02		
U-232	1.2638E-06	12,522.182	28,967.981	0.00E+00	1.58E-02	3.66E-02		
U-233	5.7451E-10	12,522.182	28,967.981	0.00E+00	7.19E-06	1.66E-05		
U-234	4.3044E-06	12,522.182	28,967.981	0.00E+00	5.39E-02	1.25E-01		
U-235	-7.7765E-09	12,522.182	0.000	1.36E-02	1.35E-02	1.36E-02		
U-236	1.8050E-07	12,522.182	28,967.981	0.00E+00	2.26E-03	5.23E-03		
U-238	-1.7914E-07	12,522.182	0.000	9.87E-01	9.85E-01	9.87E-01		
Y-90	5.0088E-01	12,522.182	28,967.981	0.00E+00	6.27E+03	1.45E+04		
Other Radionuclides					1.77E+04	4.10E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.44E+02	5.65E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: FAST	Used: FAST	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown)
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U METAL	Pu and U	
BOL Enrichment %:		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD: 12,522.182	Estimated: 12,522.182	Nominal burnup taken from SFD and converted to MWd using BOL=4174.061kg Bounding burnup taken from SFD and converted to MWd using BOL=4174.061kg
Bounding:	28,967.981	28,967.981	

Checks		
Nominal:	Burnup Multiplier: 0.02	Estimated Burnup/Given Burnup: 0.71
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: MISCELLANEOUS TREAT FUEL
 SNF ID #: 369
 Fuel Units & Descr: 1 - UNKNOWN
 Heavy Metal Mass: BOL = 12kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1994
 Estimates as of: 2010
 Template: (Worst Case)
²Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 15 years

Estimated
 Canister usage:
 18"x10"
 0.01

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	1.4157E-06	114.137	114.137	0.00E+00	1.62E-04	1.62E-04		0.0150
Am-241	6.2608E+00	114.137	114.137	0.00E+00	7.15E+02	7.15E+02		2.995E+14
Am-242m	1.8448E-02	114.137	114.137	0.00E+00	2.11E+00	2.11E+00		5.846E+13
Am-243	1.6352E-02	114.137	114.137	0.00E+00	1.87E+00	1.87E+00		0.0375
C-14	1.2112E-01	114.137	114.137	0.00E+00	1.38E+01	1.38E+01		5.229E+13
Cl-36	2.2860E-03	114.137	114.137	0.00E+00	2.61E-01	2.61E-01		0.0575
Cm-243	1.4088E-03	114.137	114.137	0.00E+00	1.61E-01	1.61E-01		0.0850
Cm-244	3.6224E-01	114.137	114.137	0.00E+00	4.13E+01	4.13E+01		0.1250
Co-60	3.8998E+02	114.137	114.137	0.00E+00	4.45E+04	4.45E+04		2.823E+13
Cs-134	2.8276E-01	114.137	114.137	0.00E+00	3.23E+01	3.23E+01		0.2250
Cs-135	4.3976E-04	114.137	114.137	0.00E+00	5.02E-02	5.02E-02		0.3750
Cs-137	3.3405E+01	114.137	114.137	0.00E+00	3.81E+03	3.81E+03		9.529E+12
Eu-154	6.2585E+00	114.137	114.137	0.00E+00	7.14E+02	7.14E+02		0.5750
Eu-155	1.1271E+00	114.137	114.137	0.00E+00	1.29E+02	1.29E+02		1.464E+14
Fe-55	6.0624E+01	114.137	114.137	0.00E+00	6.92E+03	6.92E+03		0.8500
H-3	7.4678E-01	114.137	114.137	0.00E+00	8.52E+01	8.52E+01		1.526E+13
I-129	1.0618E-05	114.137	114.137	0.00E+00	1.21E-03	1.21E-03		1.2500
Kr-85	2.1802E+00	114.137	114.137	0.00E+00	2.49E+02	2.49E+02		3.308E+15
Np-237	1.5626E-04	114.137	114.137	0.00E+00	1.78E-02	1.78E-02		1.7500
Pa-231	2.8608E-06	114.137	114.137	0.00E+00	3.27E-04	3.27E-04		2.2500
Pb-210	2.0448E-09	114.137	114.137	0.00E+00	2.33E-07	2.33E-07		1.755E+10
Pm-147	3.3212E+00	114.137	114.137	0.00E+00	3.79E+02	3.79E+02		2.7500
Pu-238	-3.5403E-01	114.137	0.000	3.09E+01	0.00E+00	3.09E+01		4.829E+08
Pu-239	-4.8280E-02	114.137	0.000	3.74E+00	0.00E+00	3.74E+00		3.5000
Pu-240	-3.0095E-01	114.137	0.000	4.77E+00	0.00E+00	4.77E+00		5.0000
Pu-241	-2.5280E+01	114.137	0.000	1.23E+03	0.00E+00	1.23E+03		7.0000
Pu-242	-1.1381E-04	114.137	0.000	2.06E-02	7.66E-03	2.06E-02		11.0000
Ra-226	1.0977E-08	114.137	114.137	0.00E+00	1.25E-06	1.25E-06		
Ra-228	5.4624E-07	114.137	114.137	0.00E+00	6.23E-05	6.23E-05		
Ru-106	3.7939E-03	114.137	114.137	0.00E+00	4.33E-01	4.33E-01		
Se-79	1.9186E-04	114.137	114.137	0.00E+00	2.19E-02	2.19E-02		
Sn-126	1.6673E-04	114.137	114.137	0.00E+00	1.90E-02	1.90E-02		
Sr-90	3.1860E+01	114.137	114.137	0.00E+00	3.64E+03	3.64E+03		
Tc-99	6.7678E-03	114.137	114.137	0.00E+00	7.72E-01	7.72E-01		
Th-229	7.2928E-07	114.137	114.137	0.00E+00	8.32E-05	8.32E-05		
Th-230	2.4191E-06	114.137	114.137	0.00E+00	2.76E-04	2.76E-04		
Th-232	6.0208E-07	114.137	114.137	0.00E+00	6.87E-05	6.87E-05		
Tl-208	1.0599E-04	114.137	114.137	0.00E+00	1.21E-02	1.21E-02		
U-232	2.8743E-04	114.137	114.137	0.00E+00	3.28E-02	3.28E-02		
U-233	3.6128E-04	114.137	114.137	0.00E+00	4.12E-02	4.12E-02		
U-234	1.2788E-02	114.137	114.137	0.00E+00	1.46E+00	1.46E+00		
U-235	5.7486E-04	114.137	114.137	1.03E-04	6.57E-02	6.57E-02		
U-236	2.3485E-04	114.137	114.137	0.00E+00	2.68E-02	2.68E-02		
U-238	1.1581E-04	114.137	114.137	1.29E-05	1.32E-02	1.32E-02		
Y-90	3.1860E+01	114.137	114.137	0.00E+00	3.64E+03	3.64E+03		
Other Radionuclides					9.17E+03	9.17E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.74E+02	7.75E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	GRAPHITE	(Worst Case)	This Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	UNKNOWN	SST/Inconel	
BOL HM Constituents:	PuO2-UO2	U, Th, & Pu	
BOL Enrichment %:		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		114.137	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		114.137	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	14.21		
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: MISCELLANEOUS TREAT FUEL
 SNF ID #: 905
 Fuel Units & Descr: 1 - UNKNOWN
 Heavy Metal Mass: BOL = : EOL = 12kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1994
 Estimates as of: 2010
 Template: N-Reactor (Graphite, Zirc, 0 to 5%, U)
²Template Burnup(MWd): 69600
 Template BOL Heavy Metal Mass (MT): 11.6
 Template Decay Time: 15 years

Estimated
 Canister usage:
 18"x10"
 0.01

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	0.0000E+00	126.700	126.700	0.00E+00	0.00E+00	0.00E+00		
Am-241	7.2313E-02	126.700	126.700	0.00E+00	9.16E+00	9.16E+00	0.0150	8.322E+12
Am-242m	6.2011E-05	126.700	126.700	0.00E+00	7.86E-03	7.86E-03	0.0250	1.708E+12
Am-243	4.6336E-05	126.700	126.700	0.00E+00	5.87E-03	5.87E-03	0.0375	1.593E+12
C-14	9.2170E-05	126.700	126.700	0.00E+00	1.17E-02	1.17E-02	0.0575	1.710E+12
Cf-252	0.0000E+00	126.700	126.700	0.00E+00	0.00E+00	0.00E+00	0.0850	9.536E+11
Cm-243	0.0000E+00	126.700	126.700	0.00E+00	0.00E+00	0.00E+00	0.1250	6.513E+11
Cm-244	7.4511E-04	126.700	126.700	0.00E+00	9.44E-02	9.44E-02	0.2250	8.195E+11
Co-60	3.4842E-04	126.700	126.700	0.00E+00	4.41E-02	4.41E-02	0.3750	3.536E+11
Cs-134	1.0795E-03	126.700	126.700	0.00E+00	1.37E-01	1.37E-01	0.5750	7.554E+12
Cs-135	1.0066E-05	126.700	126.700	0.00E+00	1.28E-03	1.28E-03	0.8500	1.036E+11
Cs-137	1.6092E-02	126.700	126.700	0.00E+00	2.04E+02	2.04E+02	1.2500	6.919E+10
Eu-154	1.8822E-02	126.700	126.700	0.00E+00	2.38E+00	2.38E+00	1.7500	2.864E+09
Eu-155	1.7672E-03	126.700	126.700	0.00E+00	2.24E-01	2.24E-01	2.2500	2.189E+05
Fe-55	9.0172E-05	126.700	126.700	0.00E+00	1.14E-02	1.14E-02	2.7500	7.870E+03
H-3	4.3506E-03	126.700	126.700	0.00E+00	5.51E-01	5.51E-01	3.5000	3.692E+03
I-129	8.6006E-07	126.700	126.700	0.00E+00	1.09E-04	1.09E-04	5.0000	1.326E+03
Kr-85	6.1652E-02	126.700	126.700	0.00E+00	7.81E+00	7.81E+00	7.0000	1.510E+02
Np-237	7.7672E-06	126.700	126.700	0.00E+00	9.84E-04	9.84E-04	11.0000	1.724E+01
Pa-231	0.0000E+00	126.700	126.700	0.00E+00	0.00E+00	0.00E+00		
Pb-210	0.0000E+00	126.700	126.700	0.00E+00	0.00E+00	0.00E+00		
Pm-147	1.8175E-02	126.700	126.700	0.00E+00	2.30E+00	2.30E+00		
Pu-238	2.2170E-02	126.700	126.700	0.00E+00	2.81E+00	2.81E+00		
Pu-239	2.8836E-02	126.700	126.700	0.00E+00	3.65E+00	3.65E+00		
Pu-240	2.2830E-02	126.700	126.700	0.00E+00	2.89E+00	2.89E+00		
Pu-241	1.1362E+00	126.700	126.700	0.00E+00	1.44E+02	1.44E+02		
Pu-242	1.4526E-05	126.700	126.700	0.00E+00	1.84E-03	1.84E-03		
Ra-226	0.0000E+00	126.700	126.700	0.00E+00	0.00E+00	0.00E+00		
Ra-228	0.0000E+00	126.700	126.700	0.00E+00	0.00E+00	0.00E+00		
Ru-106	4.2672E-06	126.700	126.700	0.00E+00	5.41E-04	5.41E-04		
Se-79	1.0901E-05	126.700	126.700	0.00E+00	1.38E-03	1.38E-03		
Sn-126	0.0000E+00	126.700	126.700	0.00E+00	0.00E+00	0.00E+00		
Sr-90	1.1546E+00	126.700	126.700	0.00E+00	1.46E+02	1.46E+02		
Tc-99	3.6494E-04	126.700	126.700	0.00E+00	4.62E-02	4.62E-02		
Th-229	0.0000E+00	126.700	126.700	0.00E+00	0.00E+00	0.00E+00		
Th-230	0.0000E+00	126.700	126.700	0.00E+00	0.00E+00	0.00E+00		
Th-232	0.0000E+00	126.700	126.700	0.00E+00	0.00E+00	0.00E+00		
Ti-208	0.0000E+00	126.700	126.700	0.00E+00	0.00E+00	0.00E+00		
U-232	0.0000E+00	126.700	126.700	0.00E+00	0.00E+00	0.00E+00		
U-233	0.0000E+00	126.700	126.700	0.00E+00	0.00E+00	0.00E+00		
U-234	6.3994E-05	126.700	126.700	0.00E+00	8.11E-03	8.11E-03		
U-235	-1.2944E-06	126.700	0.000	4.92E-06	0.00E+00	4.92E-06		
U-236	1.1932E-05	126.700	126.700	0.00E+00	1.51E-03	1.51E-03		
U-238	-3.0619E-07	126.700	0.000	7.99E-05	4.11E-05	7.99E-05		
Y-90	1.1550E+00	126.700	126.700	0.00E+00	1.46E+02	1.46E+02		
Other Radionuclides					1.95E+02	1.95E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.61E+00	2.61E+00
Total	Total

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).
	From SFD	Used	
Reactor Moderator:	GRAPHITE	GRAPHITE	
Fuel Cladding:	UNKNOWN	ZIRC	
BOL HM Constituents:	U METAL	U	
BOL Enrichment %:		0 to 5	

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:		126.700	
Bounding:		126.700	

Checks			Estimated EOL HM/Given EOL HM 1.84
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	87.91		
Bounding:	87.91		

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: MIT
 SNF ID #: 136
 Fuel Units & Descr: 120 - 15 FLAT PLATES
 Heavy Metal Mass: BOL=65.46kg ; EOL=43.03kg
 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"
 4.00

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	4.5861E-10	21,239.751	42,479.502	0.00E+00	9.74E-06	1.95E-05	0.0150	5.067E+15
Am-241	1.7832E-03	21,239.751	42,479.502	0.00E+00	3.79E+01	7.58E+01	0.0250	1.057E+15
Am-242m	4.3410E-07	21,239.751	42,479.502	0.00E+00	9.22E-03	1.84E-02	0.0375	9.228E+14
Am-243	1.4907E-06	21,239.751	42,479.502	0.00E+00	3.17E-02	6.33E-02	0.0575	9.840E+14
C-14	5.7162E-09	21,239.751	42,479.502	0.00E+00	1.21E-04	2.43E-04	0.0850	5.960E+14
Cl-36	1.3124E-32	21,239.751	42,479.502	0.00E+00	2.79E-28	5.57E-28	0.1250	4.086E+14
Cm-243	1.8568E-07	21,239.751	42,479.502	0.00E+00	3.94E-03	7.89E-03	0.2250	5.135E+14
Cm-244	3.5512E-05	21,239.751	42,479.502	0.00E+00	7.54E-01	1.51E+00	0.3750	2.249E+14
Co-60	1.0261E-05	21,239.751	42,479.502	0.00E+00	2.18E-01	4.36E-01	0.5750	3.651E+15
Cs-134	1.6931E-02	21,239.751	42,479.502	0.00E+00	3.60E+02	7.19E+02	0.8500	8.673E+13
Cs-135	3.4477E-06	21,239.751	42,479.502	0.00E+00	7.32E-02	1.46E-01	1.2500	4.381E+13
Cs-137	2.2800E-03	21,239.751	42,479.502	0.00E+00	4.84E+04	9.69E+04	1.7500	1.836E+12
Eu-154	3.6656E-02	21,239.751	42,479.502	0.00E+00	7.79E+02	1.56E+03	2.2500	2.297E+09
Eu-155	9.6841E-03	21,239.751	42,479.502	0.00E+00	2.06E+02	4.11E+02	2.7500	1.380E+08
Fe-55	4.6977E-04	21,239.751	42,479.502	0.00E+00	9.98E+00	2.00E+01	3.5000	8.775E+06
H-3	6.0485E-03	21,239.751	42,479.502	0.00E+00	1.28E+02	2.57E+02	5.0000	2.029E+04
I-129	7.5300E-07	21,239.751	42,479.502	0.00E+00	1.60E-02	3.20E-02	7.0000	2.247E+03
Kr-85	1.4989E-01	21,239.751	42,479.502	0.00E+00	3.18E+03	6.37E+03	11.0000	2.523E+02
Np-237	9.5534E-06	21,239.751	42,479.502	0.00E+00	2.03E-01	4.06E-01		
Pa-231	1.6550E-09	21,239.751	42,479.502	0.00E+00	3.52E-05	7.03E-05		
Pb-210	2.6631E-11	21,239.751	42,479.502	0.00E+00	5.66E-07	1.13E-06		
Pm-147	1.8156E-01	21,239.751	42,479.502	0.00E+00	3.86E+03	7.71E+03		
Pu-238	1.8990E-02	21,239.751	42,479.502	0.00E+00	4.03E+02	8.07E+02		
Pu-239	4.2838E-04	21,239.751	42,479.502	0.00E+00	9.10E+00	1.82E+01		
Pu-240	2.4379E-04	21,239.751	42,479.502	0.00E+00	5.18E+00	1.04E+01		
Pu-241	4.2511E-02	21,239.751	42,479.502	0.00E+00	9.03E+02	1.81E+03		
Pu-242	3.6329E-07	21,239.751	42,479.502	0.00E+00	7.72E-03	1.54E-02		
Ra-226	1.4725E-10	21,239.751	42,479.502	0.00E+00	3.13E-06	6.26E-06		
Ra-228	8.9760E-15	21,239.751	42,479.502	0.00E+00	1.91E-10	3.81E-10		
Ru-106	1.9752E-04	21,239.751	42,479.502	0.00E+00	4.20E+00	8.39E+00		
Se-79	1.2933E-05	21,239.751	42,479.502	0.00E+00	2.75E-01	5.49E-01		
Sn-126	1.1574E-05	21,239.751	42,479.502	0.00E+00	2.46E-01	4.92E-01		
Sr-90	2.1680E+00	21,239.751	42,479.502	0.00E+00	4.60E+04	9.21E+04		
Tc-99	4.2239E-04	21,239.751	42,479.502	0.00E+00	8.97E+00	1.79E+01		
Th-229	3.9270E-12	21,239.751	42,479.502	0.00E+00	8.34E-08	1.67E-07		
Th-230	3.3578E-08	21,239.751	42,479.502	0.00E+00	7.13E-04	1.43E-03		
Th-232	1.5452E-14	21,239.751	42,479.502	0.00E+00	3.28E-10	6.56E-10		
Tl-208	4.6705E-08	21,239.751	42,479.502	0.00E+00	9.92E-04	1.98E-03		
U-232	1.3045E-07	21,239.751	42,479.502	0.00E+00	2.77E-03	5.54E-03		
U-233	2.3739E-09	21,239.751	42,479.502	0.00E+00	5.04E-05	1.01E-04		
U-234	1.8423E-04	21,239.751	42,479.502	0.00E+00	3.91E+00	7.83E+00		
U-235	-2.7235E-06	21,239.751	0.000	1.32E-01	7.39E-02	1.32E-01		
U-236	1.5493E-05	21,239.751	42,479.502	0.00E+00	3.29E-01	6.58E-01		
U-238	-4.2851E-09	21,239.751	0.000	1.51E-03	1.42E-03	1.51E-03		
Y-90	2.1686E+00	21,239.751	42,479.502	0.00E+00	4.61E+04	9.21E+04		
Other Radionuclides					4.62E+04	9.24E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.75E+02	1.15E+03
Total	Total

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 (6061)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	93.145832	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		21,239.751	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		42,479.502	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	1.03		
Bounding:	2.06		

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: MIT
 SNF ID #: 135
 Fuel Units & Descr: 451 - 15 FLAT PLATES
 Heavy Metal Mass: BOL=245.70kg ; EOL=187.53kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2035
 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"
 15.03

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	82,311.108	164,622.216	0.00E+00	1.20E-05	2.39E-05	Avg. MeV	
Am-241	1.1190E-03	82,311.108	164,622.216	0.00E+00	9.21E+01	1.84E+02	0.0150	3.176E+16
Am-242m	4.5425E-07	82,311.108	164,622.216	0.00E+00	3.74E-02	7.48E-02	0.0250	6.842E+15
Am-243	1.4921E-06	82,311.108	164,622.216	0.00E+00	1.23E-01	2.46E-01	0.0375	6.314E+15
C-14	5.7244E-09	82,311.108	164,622.216	0.00E+00	4.71E-04	9.42E-04	0.0575	6.209E+15
Cl-36	1.3124E-32	82,311.108	164,622.216	0.00E+00	1.08E-27	2.16E-27	0.0850	3.958E+15
Cm-243	2.3676E-07	82,311.108	164,622.216	0.00E+00	1.95E-02	3.90E-02	0.1250	3.427E+15
Cm-244	5.2042E-05	82,311.108	164,622.216	0.00E+00	4.28E+00	8.57E+00	0.2250	3.355E+15
Co-60	3.8208E-05	82,311.108	164,622.216	0.00E+00	3.14E+00	6.29E+00	0.3750	1.624E+15
Cs-134	4.8693E-01	82,311.108	164,622.216	0.00E+00	4.01E+04	8.02E+04	0.5750	2.230E+16
Cs-135	3.4477E-06	82,311.108	164,622.216	0.00E+00	2.84E-01	5.68E-01	0.8500	3.123E+15
Cs-137	2.8731E+00	82,311.108	164,622.216	0.00E+00	2.36E+05	4.73E+05	1.2500	5.811E+14
Eu-154	8.2053E-02	82,311.108	164,622.216	0.00E+00	6.75E+03	1.35E+04	1.7500	2.437E+13
Eu-155	3.9134E-02	82,311.108	164,622.216	0.00E+00	3.22E+03	6.44E+03	2.2500	5.112E+13
Fe-55	6.7429E-03	82,311.108	164,622.216	0.00E+00	5.55E+02	1.11E+03	2.7500	2.941E+11
H-3	1.0599E-02	82,311.108	164,622.216	0.00E+00	8.72E+02	1.74E+03	3.5000	3.262E+10
I-129	7.5300E-07	82,311.108	164,622.216	0.00E+00	6.20E-02	1.24E-01	5.0000	9.751E+04
Kr-85	2.8595E-01	82,311.108	164,622.216	0.00E+00	2.35E+04	4.71E+04	7.0000	1.087E+03
Np-237	9.5479E-06	82,311.108	164,622.216	0.00E+00	7.86E-01	1.57E+00	11.0000	1.225E+04
Pa-231	8.9297E-10	82,311.108	164,622.216	0.00E+00	7.35E-05	1.47E-04		
Pb-210	3.7609E-12	82,311.108	164,622.216	0.00E+00	3.10E-07	6.19E-07		
Pm-147	2.5452E+00	82,311.108	164,622.216	0.00E+00	2.09E+05	4.19E+05		
Pu-238	2.0550E-02	82,311.108	164,622.216	0.00E+00	1.69E+03	3.38E+03		
Pu-239	4.2838E-04	82,311.108	164,622.216	0.00E+00	3.53E+01	7.05E+01		
Pu-240	2.4401E-04	82,311.108	164,622.216	0.00E+00	2.01E+01	4.02E+01		
Pu-241	6.8764E-02	82,311.108	164,622.216	0.00E+00	5.66E+03	1.13E+04		
Pu-242	3.6329E-07	82,311.108	164,622.216	0.00E+00	2.99E-02	5.98E-02		
Ra-226	3.8045E-11	82,311.108	164,622.216	0.00E+00	3.13E-06	6.26E-06		
Ra-228	2.9902E-15	82,311.108	164,622.216	0.00E+00	2.46E-10	4.92E-10		
Ru-106	1.9055E-01	82,311.108	164,622.216	0.00E+00	1.57E+04	3.14E+04		
Se-79	1.2936E-05	82,311.108	164,622.216	0.00E+00	1.06E+00	2.13E+00		
Sn-126	1.1574E-05	82,311.108	164,622.216	0.00E+00	9.53E-01	1.91E+00		
Sr-90	2.7505E+00	82,311.108	164,622.216	0.00E+00	2.26E+05	4.53E+05		
Tc-99	4.2239E-04	82,311.108	164,622.216	0.00E+00	3.48E+01	6.95E+01		
Th-229	1.8848E-12	82,311.108	164,622.216	0.00E+00	1.55E-07	3.10E-07		
Th-230	1.7042E-08	82,311.108	164,622.216	0.00E+00	1.40E-03	2.81E-03		
Th-232	7.8132E-15	82,311.108	164,622.216	0.00E+00	6.43E-10	1.29E-09		
Ti-208	4.4063E-08	82,311.108	164,622.216	0.00E+00	3.63E-03	7.25E-03		
U-232	1.3151E-07	82,311.108	164,622.216	0.00E+00	1.08E-02	2.16E-02		
U-233	1.9564E-09	82,311.108	164,622.216	0.00E+00	1.61E-04	3.22E-04		
U-234	1.8371E-04	82,311.108	164,622.216	0.00E+00	1.51E+01	3.02E+01		
U-235	-2.7235E-06	82,311.108	0.000	4.94E-01	2.70E-01	4.94E-01		
U-236	1.5493E-05	82,311.108	164,622.216	0.00E+00	1.28E+00	2.55E+00		
U-238	-4.2851E-09	82,311.108	0.000	5.68E-03	5.32E-03	5.68E-03		
Y-90	2.7505E+00	82,311.108	164,622.216	0.00E+00	2.26E+05	4.53E+05		
Other Radionuclides					4.23E+05	8.47E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.17E+03	8.35E+03
Total	Total

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 (6061)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	93.1245618	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	82,311.108	55,096.642	
Bounding:		164,622.216	

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:	1.06	0.67
Bounding:	2.13	

Estimated EOL HM/ Given EOL HM: 0.87

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: ML-1 (GCRC) ¹Fuel decay start date: 1965 Estimated Canister usage: 18"x10"
 SNF ID #: 137 Estimates as of: 2010 3.72
 Fuel Units & Descr: 67 - 19 ROD ASSEMBLY Template: Pathfinder (Light Water, SST, 60 to 100%, U)
 Heavy Metal Mass: BOL=58.63kg ; EOL=58.29kg ²Template Burnup(MWd): 6.01
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 35 years

II. Estimates	m	x _n	x _b	b	y _n	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	2.3344E-08	316.457	632.914	0.00E+00	7.39E-06	1.48E-05	0.0150	4.724E+13
Am-241	1.1135E-04	316.457	632.914	0.00E+00	3.52E-02	7.05E-02	0.0250	9.817E+12
Am-242m	8.5075E-09	316.457	632.914	0.00E+00	2.69E-06	5.38E-06	0.0375	8.491E+12
Am-243	9.8519E-10	316.457	632.914	0.00E+00	3.12E-07	6.24E-07	0.0575	9.152E+12
C-14	2.3012E-04	316.457	632.914	0.00E+00	7.28E-02	1.46E-01	0.0850	5.530E+12
Cl-36	1.2261E-06	316.457	632.914	0.00E+00	3.88E-04	7.76E-04	0.1250	3.591E+12
Cm-243	2.4875E-10	316.457	632.914	0.00E+00	7.87E-08	1.57E-07	0.2250	4.762E+12
Cm-244	2.3178E-09	316.457	632.914	0.00E+00	7.33E-07	1.47E-06	0.3750	2.076E+12
Co-60	7.0849E-02	316.457	632.914	0.00E+00	2.24E+01	4.48E+01	0.5750	3.420E+13
Cs-134	3.0266E-06	316.457	632.914	0.00E+00	9.58E-04	1.92E-03	0.8500	3.462E+11
Cs-135	3.0316E-05	316.457	632.914	0.00E+00	9.59E-03	1.92E-02	1.2500	3.441E+12
Cs-137	1.4511E+00	316.457	632.914	0.00E+00	4.59E+02	9.18E+02	1.7500	8.932E+09
Eu-154	6.6955E-04	316.457	632.914	0.00E+00	2.12E-01	4.24E-01	2.2500	1.854E+07
Eu-155	6.9850E-04	316.457	632.914	0.00E+00	2.21E-01	4.42E-01	2.7500	5.359E+05
Fe-55	1.2318E-03	316.457	632.914	0.00E+00	3.90E-01	7.80E-01	3.5000	4.872E+01
H-3	2.5141E-03	316.457	632.914	0.00E+00	7.96E-01	1.59E+00	5.0000	2.014E+01
I-129	7.3195E-07	316.457	632.914	0.00E+00	2.32E-04	4.63E-04	7.0000	2.234E+00
Kr-85	4.1281E-02	316.457	632.914	0.00E+00	1.31E+01	2.61E+01	11.0000	2.514E-01
Np-237	1.1489E-06	316.457	632.914	0.00E+00	3.64E-04	7.27E-04		
Pa-231	4.5241E-08	316.457	632.914	0.00E+00	1.43E-05	2.86E-05		
Pb-210	6.4476E-13	316.457	632.914	0.00E+00	2.04E-10	4.08E-10		
Pm-147	1.1651E-03	316.457	632.914	0.00E+00	3.69E-01	7.37E-01		
Pu-238	2.9517E-04	316.457	632.914	0.00E+00	9.34E-02	1.87E-01		
Pu-239	6.6772E-04	316.457	632.914	0.00E+00	2.11E-01	4.23E-01		
Pu-240	8.6839E-05	316.457	632.914	0.00E+00	2.75E-02	5.50E-02		
Pu-241	7.1514E-04	316.457	632.914	0.00E+00	2.26E-01	4.53E-01		
Pu-242	1.9717E-09	316.457	632.914	0.00E+00	6.24E-07	1.25E-06		
Ra-226	1.7654E-12	316.457	632.914	0.00E+00	5.59E-10	1.12E-09		
Ra-228	8.2928E-12	316.457	632.914	0.00E+00	2.62E-09	5.25E-09		
Ru-106	1.8419E-10	316.457	632.914	0.00E+00	5.83E-08	1.17E-07		
Se-79	1.3223E-05	316.457	632.914	0.00E+00	4.18E-03	8.37E-03		
Sn-126	1.1493E-05	316.457	632.914	0.00E+00	3.64E-03	7.27E-03		
Sr-90	1.3649E+00	316.457	632.914	0.00E+00	4.32E+02	8.64E+02		
Tc-99	4.6656E-04	316.457	632.914	0.00E+00	1.48E-01	2.95E-01		
Th-229	1.4547E-11	316.457	632.914	0.00E+00	4.60E-09	9.21E-09		
Th-230	1.6617E-10	316.457	632.914	0.00E+00	5.26E-08	1.05E-07		
Th-232	8.3361E-12	316.457	632.914	0.00E+00	2.64E-09	5.28E-09		
Tl-208	2.1664E-08	316.457	632.914	0.00E+00	6.86E-06	1.37E-05		
U-232	5.8669E-08	316.457	632.914	0.00E+00	1.86E-05	3.71E-05		
U-233	3.1847E-09	316.457	632.914	0.00E+00	1.01E-06	2.02E-06		
U-234	3.8769E-07	316.457	632.914	0.00E+00	1.23E-04	2.45E-04		
U-235	-2.7761E-06	316.457	0.000	1.18E-01	1.17E-01	1.18E-01		
U-236	1.6190E-05	316.457	632.914	0.00E+00	5.12E-03	1.02E-02		
U-238	-2.8547E-09	316.457	0.000	1.35E-03	1.35E-03	1.35E-03		
Y-90	1.3652E+00	316.457	632.914	0.00E+00	4.32E+02	8.64E+02		
Other Radionuclides					5.22E+02	1.04E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.53E+00	1.11E+01
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	This Template was used for the following reasons: This fuel matches on all parameters except cladding (SST is conservative).
Fuel Cladding:	HASTELLOY-X	SST	
BOL HM Constituents:	UO2-BoO2	U	
BOL Enrichment %:	93.14285714	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
		316.457	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		632.914	

Checks			
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
	0.12		
Bounding:	0.23		

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: MNR (CANADA) 1 Fuel decay start date: 2006
 SNF ID #: 1064 Estimates as of: 2010
 Fuel Units & Descr: 11 - 18 CURVED PLATES Template: ATR (Light Water, Alum., 60 to 100%, U)
 Heavy Metal Mass: BOL=1.96kg ; EOL=1.38kg 2 Template Burnup(MWd): 367.2
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.31

Radionuclide	II. Estimates		Gamma Sources					
	m	x _n	x _b	b	y _n	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	1.4545E-10	545.862	1,091.724	0.00E+00	7.94E-08	1.59E-07	0.0150	2.106E+14
Am-241	1.1190E-03	545.862	1,091.724	0.00E+00	6.11E-01	1.22E+00	0.0250	4.538E+13
Am-242m	4.5425E-07	545.862	1,091.724	0.00E+00	2.48E-04	4.96E-04	0.0375	4.187E+13
Am-243	1.4921E-06	545.862	1,091.724	0.00E+00	8.14E-04	1.63E-03	0.0575	4.117E+13
C-14	5.7244E-09	545.862	1,091.724	0.00E+00	3.12E-06	6.25E-06	0.0850	2.625E+13
Cl-36	1.3124E-32	545.862	1,091.724	0.00E+00	7.16E-30	1.43E-29	0.1250	2.273E+13
Cm-243	2.3676E-07	545.862	1,091.724	0.00E+00	1.29E-04	2.58E-04	0.2250	2.225E+13
Cm-244	5.2042E-05	545.862	1,091.724	0.00E+00	2.84E-02	5.68E-02	0.3750	1.077E+13
Co-60	3.8208E-05	545.862	1,091.724	0.00E+00	2.09E-02	4.17E-02	0.5750	1.479E+14
Cs-134	4.8693E-01	545.862	1,091.724	0.00E+00	2.66E+02	5.32E+02	0.8500	2.071E+13
Cs-135	3.4477E-06	545.862	1,091.724	0.00E+00	1.88E-03	3.76E-03	1.2500	3.854E+12
Cs-137	2.8731E+00	545.862	1,091.724	0.00E+00	1.57E+03	3.14E+03	1.7500	1.616E+11
Eu-154	8.2053E-02	545.862	1,091.724	0.00E+00	4.48E+01	8.96E+01	2.2500	3.390E+11
Eu-155	3.9134E-02	545.862	1,091.724	0.00E+00	2.14E+01	4.27E+01	2.7500	1.950E+09
Fe-55	6.7429E-03	545.862	1,091.724	0.00E+00	3.68E+00	7.36E+00	3.5000	2.164E+08
H-3	1.0599E-02	545.862	1,091.724	0.00E+00	5.79E+00	1.16E+01	5.0000	6.467E+02
I-129	7.5300E-07	545.862	1,091.724	0.00E+00	4.11E-04	8.22E-04	7.0000	7.210E+01
Kr-85	2.8595E-01	545.862	1,091.724	0.00E+00	1.56E+02	3.12E+02	11.0000	8.126E+00
Np-237	9.5479E-06	545.862	1,091.724	0.00E+00	5.21E-03	1.04E-02		
Pa-231	8.9297E-10	545.862	1,091.724	0.00E+00	4.87E-07	9.75E-07		
Pb-210	3.7609E-12	545.862	1,091.724	0.00E+00	2.05E-09	4.11E-09		
Pm-147	2.5452E+00	545.862	1,091.724	0.00E+00	1.39E+03	2.78E+03		
Pu-238	2.0550E-02	545.862	1,091.724	0.00E+00	1.12E+01	2.24E+01		
Pu-239	4.2838E-04	545.862	1,091.724	0.00E+00	2.34E-01	4.68E-01		
Pu-240	2.4401E-04	545.862	1,091.724	0.00E+00	1.33E-01	2.66E-01		
Pu-241	6.8764E-02	545.862	1,091.724	0.00E+00	3.75E+01	7.51E+01		
Pu-242	3.6329E-07	545.862	1,091.724	0.00E+00	1.98E-04	3.97E-04		
Ra-226	3.8045E-11	545.862	1,091.724	0.00E+00	2.08E-08	4.15E-08		
Ra-228	2.9902E-15	545.862	1,091.724	0.00E+00	1.63E-12	3.26E-12		
Ru-106	1.9055E-01	545.862	1,091.724	0.00E+00	1.04E+02	2.08E+02		
Sa-79	1.2936E-05	545.862	1,091.724	0.00E+00	7.06E-03	1.41E-02		
Sn-126	1.1574E-05	545.862	1,091.724	0.00E+00	6.32E-03	1.26E-02		
Sr-90	2.7505E+00	545.862	1,091.724	0.00E+00	1.50E+03	3.00E+03		
Tc-99	4.2239E-04	545.862	1,091.724	0.00E+00	2.31E-01	4.61E-01		
Th-229	1.8848E-12	545.862	1,091.724	0.00E+00	1.03E-09	2.06E-09		
Th-230	1.7042E-08	545.862	1,091.724	0.00E+00	9.30E-06	1.86E-05		
Th-232	7.8132E-15	545.862	1,091.724	0.00E+00	4.26E-12	8.53E-12		
Ti-208	4.4063E-08	545.862	1,091.724	0.00E+00	2.41E-05	4.81E-05		
U-232	1.3151E-07	545.862	1,091.724	0.00E+00	7.18E-05	1.44E-04		
U-233	1.9564E-09	545.862	1,091.724	0.00E+00	1.07E-06	2.14E-06		
U-234	1.8371E-04	545.862	1,091.724	0.00E+00	1.00E-01	2.01E-01		
U-235	-2.7235E-06	545.862	0.000	3.94E-03	2.46E-03	3.94E-03		
U-236	1.5493E-05	545.862	1,091.724	0.00E+00	8.46E-03	1.69E-02		
U-238	-4.2851E-09	545.862	0.000	4.53E-05	4.30E-05	4.53E-05		
Y-90	2.7505E+00	545.862	1,091.724	0.00E+00	1.50E+03	3.00E+03		
Other Radionuclides					2.81E+03	5.61E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.77E+01	5.54E+01
Total	Total

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-ALX	U	
BOL Enrichment %:	93.11672336	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		545.862	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		1,091.724	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.89		1.02
Bounding:	1.77		

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: MOX SCRAP SNF
 SNF ID #: 368
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL= ; EOL=106.34kg
 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:
 HIC
 1.00

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3735E-12	106,140.239	106,140.239	0.00E+00	1.46E-07	1.46E-07	Avg. MeV	
Am-241	7.9527E-02	106,140.239	106,140.239	4.10E+02	8.85E+03	8.85E+03	0.0150	5.280E+15
Am-242m	2.1053E-03	106,140.239	106,140.239	0.00E+00	2.23E+02	2.23E+02	0.0250	1.150E+15
Am-243	1.0760E-04	106,140.239	106,140.239	0.00E+00	1.14E+01	1.14E+01	0.0375	1.316E+15
C-14	2.6141E-05	106,140.239	106,140.239	0.00E+00	2.77E+00	2.77E+00	0.0575	1.105E+15
Cl-36	3.4243E-10	106,140.239	106,140.239	0.00E+00	3.63E-05	3.63E-05	0.0850	6.557E+14
Cm-243	6.6092E-04	106,140.239	106,140.239	0.00E+00	7.02E+01	7.02E+01	0.1250	4.897E+14
Cm-244	2.9933E-03	106,140.239	106,140.239	0.00E+00	3.18E+02	3.18E+02	0.2250	4.966E+14
Co-60	1.5934E-02	106,140.239	106,140.239	0.00E+00	1.69E+03	1.69E+03	0.3750	2.553E+14
Cs-134	4.6356E-02	106,140.239	106,140.239	0.00E+00	4.92E+03	4.92E+03	0.5750	8.534E+15
Cs-135	4.7693E-05	106,140.239	106,140.239	0.00E+00	5.06E+00	5.06E+00	0.8500	2.855E+14
Cs-137	2.1113E+00	106,140.239	106,140.239	0.00E+00	2.24E+05	2.24E+05	1.2500	2.486E+14
Eu-154	4.8092E-02	106,140.239	106,140.239	0.00E+00	5.10E+03	5.10E+03	1.7500	4.084E+12
Eu-155	6.8447E-02	106,140.239	106,140.239	0.00E+00	7.26E+03	7.26E+03	2.2500	1.374E+11
Fe-55	5.8489E-03	106,140.239	106,140.239	0.00E+00	6.21E+02	6.21E+02	2.7500	1.433E+10
H-3	8.9300E-03	106,140.239	106,140.239	0.00E+00	9.48E+02	9.48E+02	3.5000	1.617E+09
I-129	1.2891E-06	106,140.239	106,140.239	0.00E+00	1.37E-01	1.37E-01	5.0000	2.967E+06
Kr-85	7.0941E-02	106,140.239	106,140.239	0.00E+00	7.53E+03	7.53E+03	7.0000	3.401E+05
Np-237	2.6541E-06	106,140.239	106,140.239	0.00E+00	2.82E-01	2.82E-01	11.0000	3.898E+04
Pa-231	4.8970E-12	106,140.239	106,140.239	0.00E+00	5.20E-07	5.20E-07		
Pb-210	2.2170E-13	106,140.239	106,140.239	0.00E+00	2.35E-08	2.35E-08		
Pm-147	2.3627E-01	106,140.239	106,140.239	0.00E+00	2.51E+04	2.51E+04		
Pu-238	2.8636E-02	106,140.239	106,140.239	0.00E+00	3.04E+03	3.04E+03		
Pu-239	-3.5520E-02	106,140.239	0.000	3.37E+03	0.00E+00	3.37E+03		
Pu-240	2.0790E-02	106,140.239	106,140.239	1.71E+03	3.92E+03	3.92E+03		
Pu-241	-4.8316E-01	106,140.239	0.000	7.68E+04	2.55E+04	7.68E+04		
Pu-242	1.1052E-05	106,140.239	106,140.239	4.56E-01	1.63E+00	1.63E+00		
Ra-226	5.7471E-13	106,140.239	106,140.239	0.00E+00	6.10E-08	6.10E-08		
Ra-228	5.4957E-17	106,140.239	106,140.239	0.00E+00	5.83E-12	5.83E-12		
Ru-106	1.4583E-02	106,140.239	106,140.239	0.00E+00	1.55E+03	1.55E+03		
Se-79	1.0137E-05	106,140.239	106,140.239	0.00E+00	1.08E+00	1.08E+00		
Sn-126	4.3922E-05	106,140.239	106,140.239	0.00E+00	4.66E+00	4.66E+00		
Sr-90	7.6329E-01	106,140.239	106,140.239	0.00E+00	8.10E+04	8.10E+04		
Tc-99	3.9412E-04	106,140.239	106,140.239	0.00E+00	4.18E+01	4.18E+01		
Th-229	1.6457E-12	106,140.239	106,140.239	0.00E+00	1.75E-07	1.75E-07		
Th-230	1.8822E-10	106,140.239	106,140.239	0.00E+00	2.00E-05	2.00E-05		
Th-232	9.7601E-17	106,140.239	106,140.239	0.00E+00	1.04E-11	1.04E-11		
Ti-208	5.2722E-07	106,140.239	106,140.239	0.00E+00	5.60E-02	5.60E-02		
U-232	1.4925E-06	106,140.239	106,140.239	0.00E+00	1.58E-01	1.58E-01		
U-233	2.1113E-10	106,140.239	106,140.239	0.00E+00	2.24E-05	2.24E-05		
U-234	1.9528E-06	106,140.239	106,140.239	0.00E+00	2.07E-01	2.07E-01		
U-235	-9.7920E-09	106,140.239	0.000	6.91E-04	0.00E+00	6.91E-04		
U-236	1.1570E-07	106,140.239	106,140.239	0.00E+00	1.23E-02	1.23E-02		
U-238	-1.7914E-07	106,140.239	0.000	5.03E-02	3.13E-02	5.03E-02		
Y-90	7.6329E-01	106,140.239	106,140.239	0.00E+00	8.10E+04	8.10E+04		
Other Radionuclides					2.30E+05	2.30E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.34E+03	2.44E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Reactor Moderator:	FAST	FAST	This Template was used for the following reasons: This fuel matches on all parameters except cladding (SST is conservative) and enrichment (unknown).
Fuel Cladding:	UNKNOWN	SST	
BOL HM Constituents:	PuO2-UO2	Pu and U	
BOL Enrichment %:		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Nominal:	106,140.239	106,140.239	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:	106,140.239	106,140.239	

Checks		
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	3.28	
Bounding:	3.28	
		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: MTR CANAL SCRAP
 SNF ID #: 1062
 Fuel Units & Descr: 105 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL= ; EOL=265.98kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1979
 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:
 HIC
 105.00

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	6.6376E-10	266.255	532.511	0.00E+00	1.77E-07	3.53E-07	0.0150	3.621E+13
Am-241	1.3144E-01	266.255	532.511	0.00E+00	3.50E+01	7.00E+01	0.0250	7.334E+12
Am-242m	3.0039E-04	266.255	532.511	0.00E+00	8.00E-02	1.60E-01	0.0375	7.098E+12
Am-243	6.2629E-04	266.255	532.511	0.00E+00	1.67E-01	3.34E-01	0.0575	7.743E+12
C-14	4.7965E-05	266.255	532.511	0.00E+00	1.28E-02	2.55E-02	0.0850	4.103E+12
Cl-36	8.0297E-07	266.255	532.511	0.00E+00	2.14E-04	4.28E-04	0.1250	2.997E+12
Cm-243	3.1993E-04	266.255	532.511	0.00E+00	8.52E-02	1.70E-01	0.2250	3.523E+12
Cm-244	7.1851E-02	266.255	532.511	0.00E+00	1.91E+01	3.83E+01	0.3750	1.511E+12
Co-60	9.5220E-03	266.255	532.511	0.00E+00	2.54E+00	5.07E+00	0.5750	3.473E+13
Cs-134	1.1662E-03	266.255	532.511	0.00E+00	3.11E-01	6.21E-01	0.8500	6.854E+11
Cs-135	1.4433E-05	266.255	532.511	0.00E+00	3.84E-03	7.69E-03	1.2500	9.260E+11
Cs-137	1.7603E-00	266.255	532.511	0.00E+00	4.69E+02	9.37E+02	1.7500	2.029E+10
Eu-154	4.5203E-02	266.255	532.511	0.00E+00	1.20E+01	2.41E+01	2.2500	3.748E+06
Eu-155	7.1479E-03	266.255	532.511	0.00E+00	1.90E+00	3.81E+00	2.7500	4.212E+06
Fe-55	6.1919E-04	266.255	532.511	0.00E+00	1.65E-01	3.30E-01	3.5000	5.524E+05
H-3	3.6386E-02	266.255	532.511	0.00E+00	9.69E+00	1.94E+01	5.0000	2.361E+05
I-129	9.8288E-07	266.255	532.511	0.00E+00	2.62E-04	5.23E-04	7.0000	2.721E+04
Kr-85	5.3844E-02	266.255	532.511	0.00E+00	1.43E+01	2.87E+01	11.0000	3.126E+03
Np-237	1.0546E-05	266.255	532.511	0.00E+00	2.81E-03	5.62E-03		
Pa-231	1.1370E-09	266.255	532.511	0.00E+00	3.03E-07	6.05E-07		
Pb-210	3.3624E-11	266.255	532.511	0.00E+00	8.95E-09	1.79E-08		
Pm-147	5.1211E-03	266.255	532.511	0.00E+00	1.36E+00	2.73E+00		
Pu-238	8.0669E-02	266.255	532.511	0.00E+00	2.15E+01	4.30E+01		
Pu-239	1.1626E-02	266.255	532.511	0.00E+00	3.10E+00	6.19E+00		
Pu-240	1.5097E-02	266.255	532.511	0.00E+00	4.02E+00	8.04E+00		
Pu-241	1.4567E+00	266.255	532.511	0.00E+00	3.88E+02	7.76E+02		
Pu-242	6.4260E-05	266.255	532.511	0.00E+00	1.71E-02	3.42E-02		
Ra-226	1.1392E-10	266.255	532.511	0.00E+00	3.03E-08	6.07E-08		
Ra-228	5.1841E-12	266.255	532.511	0.00E+00	1.38E-09	2.76E-09		
Ru-106	5.9012E-07	266.255	532.511	0.00E+00	1.57E-04	3.14E-04		
Se-79	1.2379E-05	266.255	532.511	0.00E+00	3.30E-03	6.59E-03		
Sn-126	2.5210E-05	266.255	532.511	0.00E+00	6.71E-03	1.34E-02		
Sr-90	1.1630E+00	266.255	532.511	0.00E+00	3.10E+02	6.19E+02		
Tc-99	3.9357E-04	266.255	532.511	0.00E+00	1.05E-01	2.10E-01		
Th-229	8.5691E-11	266.255	532.511	0.00E+00	2.28E-08	4.56E-08		
Th-230	1.4493E-08	266.255	532.511	0.00E+00	3.86E-06	7.72E-06		
Th-232	5.2923E-12	266.255	532.511	0.00E+00	1.41E-09	2.82E-09		
Tl-208	1.9202E-07	266.255	532.511	0.00E+00	5.11E-05	1.02E-04		
U-232	5.2083E-07	266.255	532.511	0.00E+00	1.39E-04	2.77E-04		
U-233	2.4386E-08	266.255	532.511	0.00E+00	6.49E-06	1.30E-05		
U-234	4.7012E-05	266.255	532.511	0.00E+00	1.25E-02	2.50E-02		
U-235	-1.4492E-06	266.255	0.000	1.84E-02	1.80E-02	1.84E-02		
U-236	7.5759E-06	266.255	532.511	0.00E+00	2.02E-03	4.03E-03		
U-238	-2.6129E-07	266.255	0.000	8.66E-02	8.65E-02	8.66E-02		
Y-90	1.1631E+00	266.255	532.511	0.00E+00	3.10E+02	6.19E+02		
Other Radionuclides					4.50E+02	9.00E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.30E+00	1.46E+01
Total	Total

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 (unknown).
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nomina:		266.255	Nominal burnup taken from SFD and converted to MWd using BOL=266.255kg Bounding burnup assumed to be twice nominal burnup.
Bounding:		532.511	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nomina:	0.03		1.00
Bounding:	0.06		

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: MURR (COLUMBIA) 1Fuel decay start date: 2035
 SNF ID #: 144 Estimates as of: 2010
 Fuel Units & Descr: 953 - 24 CURVED PLATES Template: ATR (Light Water, Alum., 60 to 100%, U)
 Heavy Metal Mass: BOL=791.94kg ; EOL=689.69kg 2Template Burnup(MWd): 367.2
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 26.47

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	1.4545E-10	96,839.268	193,678.536	0.00E+00	1.41E-05	2.82E-05	0.0150	3.737E+16
Am-241	1.1190E-03	96,839.268	193,678.536	0.00E+00	1.08E+02	2.17E+02	0.0250	8.050E+15
Am-242m	4.5425E-07	96,839.268	193,678.536	0.00E+00	4.40E-02	8.80E-02	0.0375	7.429E+15
Am-243	1.4921E-06	96,839.268	193,678.536	0.00E+00	1.44E-01	2.89E-01	0.0575	7.304E+15
C-14	5.7244E-09	96,839.268	193,678.536	0.00E+00	5.54E-04	1.11E-03	0.0850	4.656E+15
Cl-36	1.3124E-32	96,839.268	193,678.536	0.00E+00	1.27E-27	2.54E-27	0.1250	4.032E+15
Cm-243	2.3676E-07	96,839.268	193,678.536	0.00E+00	2.29E-02	4.59E-02	0.2250	3.947E+15
Cm-244	5.2042E-05	96,839.268	193,678.536	0.00E+00	5.04E+00	1.01E+01	0.3750	1.910E+15
Co-60	3.8208E-05	96,839.268	193,678.536	0.00E+00	3.70E+00	7.40E+00	0.5750	2.624E+16
Cs-134	4.8693E-01	96,839.268	193,678.536	0.00E+00	4.72E+04	9.43E+04	0.8500	3.674E+15
Cs-135	3.4477E-06	96,839.268	193,678.536	0.00E+00	3.34E-01	6.68E-01	1.2500	6.837E+14
Cs-137	2.8731E+00	96,839.268	193,678.536	0.00E+00	2.78E+05	5.56E+05	1.7500	2.867E+13
Eu-154	8.2053E-02	96,839.268	193,678.536	0.00E+00	7.95E+03	1.59E+04	2.2500	6.014E+13
Eu-155	3.9134E-02	96,839.268	193,678.536	0.00E+00	3.79E+03	7.58E+03	2.7500	3.460E+11
Fe-55	6.7429E-03	96,839.268	193,678.536	0.00E+00	6.53E+02	1.31E+03	3.5000	3.838E+10
H-3	1.0599E-02	96,839.268	193,678.536	0.00E+00	1.03E+03	2.05E+03	5.0000	1.148E+05
I-129	7.5300E-07	96,839.268	193,678.536	0.00E+00	7.29E-02	1.46E-01	7.0000	1.279E+04
Kr-85	2.8595E-01	96,839.268	193,678.536	0.00E+00	2.77E+04	5.54E+04	11.0000	1.442E+03
Np-237	9.5479E-06	96,839.268	193,678.536	0.00E+00	9.25E-01	1.85E+00		
Pa-231	8.9297E-10	96,839.268	193,678.536	0.00E+00	8.65E-05	1.73E-04		
Pb-210	3.7609E-12	96,839.268	193,678.536	0.00E+00	3.64E-07	7.28E-07		
Pm-147	2.5452E+00	96,839.268	193,678.536	0.00E+00	2.46E+05	4.93E+05		
Pu-238	2.0550E-02	96,839.268	193,678.536	0.00E+00	1.99E+03	3.98E+03		
Pu-239	4.2838E-04	96,839.268	193,678.536	0.00E+00	4.15E+01	8.30E+01		
Pu-240	2.4401E-04	96,839.268	193,678.536	0.00E+00	2.36E+01	4.73E+01		
Pu-241	6.8764E-02	96,839.268	193,678.536	0.00E+00	6.66E+03	1.33E+04		
Pu-242	3.6329E-07	96,839.268	193,678.536	0.00E+00	3.52E-02	7.04E-02		
Ra-226	3.8045E-11	96,839.268	193,678.536	0.00E+00	3.68E-06	7.37E-06		
Ra-228	2.9902E-15	96,839.268	193,678.536	0.00E+00	2.90E-10	5.79E-10		
Ru-106	1.9055E-01	96,839.268	193,678.536	0.00E+00	1.85E+04	3.69E+04		
Se-79	1.2936E-05	96,839.268	193,678.536	0.00E+00	1.25E+00	2.51E+00		
Sn-126	1.1574E-05	96,839.268	193,678.536	0.00E+00	1.12E+00	2.24E+00		
Sr-90	2.7505E+00	96,839.268	193,678.536	0.00E+00	2.66E+05	5.33E+05		
Tc-99	4.2239E-04	96,839.268	193,678.536	0.00E+00	4.09E+01	8.18E+01		
Th-229	1.8848E-12	96,839.268	193,678.536	0.00E+00	1.83E-07	3.65E-07		
Th-230	1.7042E-08	96,839.268	193,678.536	0.00E+00	1.65E-03	3.30E-03		
Th-232	7.8132E-15	96,839.268	193,678.536	0.00E+00	7.57E-10	1.51E-09		
Ti-208	4.4063E-08	96,839.268	193,678.536	0.00E+00	4.27E-03	8.53E-03		
U-232	1.3151E-07	96,839.268	193,678.536	0.00E+00	1.27E-02	2.55E-02		
U-233	1.9564E-09	96,839.268	193,678.536	0.00E+00	1.89E-04	3.79E-04		
U-234	1.8371E-04	96,839.268	193,678.536	0.00E+00	1.78E+01	3.58E+01		
U-235	2.7235E-06	96,839.268	0.000	1.60E+00	1.33E+00	1.60E+00		
U-236	1.5493E-05	96,839.268	193,678.536	0.00E+00	1.50E+00	3.00E+00		
U-238	4.2851E-09	96,839.268	0.000	1.79E-02	1.75E-02	1.79E-02		
Y-90	2.7505E+00	96,839.268	193,678.536	0.00E+00	2.66E+05	5.33E+05		
Other Radionuclides					4.98E+05	9.96E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.91E+03	9.82E+03
Total	Total

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 (6061)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	93.26113117	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		96,839.268	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		193,678.536	Bounding burnup assumed to be twice nominal burnup.

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.39	
Bounding:	0.78	
		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: MURR (COLUMBIA)
 SNF ID #: 962
 Fuel Units & Descr: 24 - 24 CURVED PLATES
 Heavy Metal Mass: BOL=18.84kg ; EOL=16.29kg
 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"
 0.67

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	1.1465E-09	3,391.200	6,782.400	0.00E+00	3.89E-06	7.78E-06	Avg. MeV	
Am-241	2.3056E-03	3,391.200	6,782.400	0.00E+00	7.82E+00	1.56E+01	0.0150	6.346E+14
Am-242m	4.1476E-07	3,391.200	6,782.400	0.00E+00	1.41E-03	2.81E-03	0.0250	1.318E+14
Am-243	1.4894E-06	3,391.200	6,782.400	0.00E+00	5.05E-03	1.01E-02	0.0375	1.148E+14
C-14	5.7108E-09	3,391.200	6,782.400	0.00E+00	1.94E-05	3.87E-05	0.0575	1.233E+14
Cl-36	1.3124E-32	3,391.200	6,782.400	0.00E+00	4.45E-29	8.90E-29	0.0850	7.440E+13
Cm-243	1.4562E-07	3,391.200	6,782.400	0.00E+00	4.94E-04	9.88E-04	0.1250	4.983E+13
Cm-244	2.4221E-05	3,391.200	6,782.400	0.00E+00	8.21E-02	1.64E-01	0.2250	6.423E+13
Co-60	2.7560E-06	3,391.200	6,782.400	0.00E+00	9.35E-03	1.87E-02	0.3750	2.792E+13
Cs-134	5.8851E-04	3,391.200	6,782.400	0.00E+00	2.00E+00	3.99E+00	0.5750	4.578E+14
Cs-135	3.4477E-06	3,391.200	6,782.400	0.00E+00	1.17E-02	2.34E-02	0.8500	6.596E+12
Cs-137	1.8099E+00	3,391.200	6,782.400	0.00E+00	6.14E+03	1.23E+04	1.2500	3.683E+12
Eu-154	1.6386E-02	3,391.200	6,782.400	0.00E+00	5.56E+01	1.11E+02	1.7500	1.813E+11
Eu-155	2.3957E-03	3,391.200	6,782.400	0.00E+00	8.12E+00	1.62E+01	2.2500	1.292E+07
Fe-55	3.2707E-05	3,391.200	6,782.400	0.00E+00	1.11E-01	2.22E-01	2.7500	1.058E+07
H-3	3.4504E-03	3,391.200	6,782.400	0.00E+00	1.17E+01	2.34E+01	3.5000	7.984E+03
I-129	7.5300E-07	3,391.200	6,782.400	0.00E+00	2.55E-03	5.11E-03	5.0000	2.685E+03
Kr-85	7.8540E-02	3,391.200	6,782.400	0.00E+00	2.66E+02	5.33E+02	7.0000	2.955E+02
Np-237	9.5615E-06	3,391.200	6,782.400	0.00E+00	3.24E-02	6.49E-02	11.0000	3.305E+01
Pa-231	2.7968E-09	3,391.200	6,782.400	0.00E+00	9.48E-06	1.90E-05		
Pb-210	1.2612E-10	3,391.200	6,782.400	0.00E+00	4.28E-07	8.55E-07		
Pm-147	1.2952E-02	3,391.200	6,782.400	0.00E+00	4.39E+01	8.78E+01		
Pu-238	1.7549E-02	3,391.200	6,782.400	0.00E+00	5.95E+01	1.19E+02		
Pu-239	4.2810E-04	3,391.200	6,782.400	0.00E+00	1.45E+00	2.90E+00		
Pu-240	2.4357E-04	3,391.200	6,782.400	0.00E+00	8.26E-01	1.65E+00		
Pu-241	2.6277E-02	3,391.200	6,782.400	0.00E+00	8.91E+01	1.78E+02		
Pu-242	3.6329E-07	3,391.200	6,782.400	0.00E+00	1.23E-03	2.46E-03		
Ra-226	4.4444E-10	3,391.200	6,782.400	0.00E+00	1.51E-06	3.01E-06		
Ra-228	1.9714E-14	3,391.200	6,782.400	0.00E+00	6.69E-11	1.34E-10		
Ru-106	2.0477E-07	3,391.200	6,782.400	0.00E+00	6.94E-04	1.39E-03		
Se-79	1.2933E-05	3,391.200	6,782.400	0.00E+00	4.39E-02	8.77E-02		
Sn-126	1.1574E-05	3,391.200	6,782.400	0.00E+00	3.93E-02	7.85E-02		
Sr-90	1.7092E+00	3,391.200	6,782.400	0.00E+00	5.80E+03	1.16E+04		
Tc-99	4.2239E-04	3,391.200	6,782.400	0.00E+00	1.43E+00	2.86E+00		
Th-229	7.7260E-12	3,391.200	6,782.400	0.00E+00	2.62E-08	5.24E-08		
Th-230	5.8497E-08	3,391.200	6,782.400	0.00E+00	1.98E-04	3.97E-04		
Th-232	2.6906E-14	3,391.200	6,782.400	0.00E+00	9.12E-11	1.82E-10		
Tl-208	4.4336E-08	3,391.200	6,782.400	0.00E+00	1.50E-04	3.01E-04		
U-232	1.2037E-07	3,391.200	6,782.400	0.00E+00	4.08E-04	8.16E-04		
U-233	3.0011E-09	3,391.200	6,782.400	0.00E+00	1.02E-05	2.04E-05		
U-234	1.8497E-04	3,391.200	6,782.400	0.00E+00	6.27E-01	1.25E+00		
U-235	-2.7235E-06	3,391.200	0.000	3.81E-02	2.88E-02	3.81E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.5493E-05	3,391.200	6,782.400	0.00E+00	5.25E-02	1.05E-01	7.17E+01	1.43E+02
U-238	-4.2851E-09	3,391.200	0.000	4.12E-04	3.97E-04	4.12E-04	Total	Total
Y-90	1.7094E+00	3,391.200	6,782.400	0.00E+00	5.80E+03	1.16E+04		
Other Radionuclides					5.84E+03	1.17E+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 (6061)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	93.5	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	3,391.200	2,411.490	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.
Bounding:		6,782.400	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.57	0.71	0.95
Bounding:	1.14		

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: MURR (COLUMBIA)	¹ Fuel decay start date: 1990
SNF ID #: 143	Estimates as of: 2010
Fuel Units & Descr: 312 - 24 CURVED PLATES	Template: ATR (Light Water, Alum., 60 to 100%, U)
Heavy Metal Mass: BOL=259.02kg ; EOL=213.06kg	² Template Burnup(MWd): 367.2
ROD Storage Site: SRS	Template BOL Heavy Metal Mass (MT): 0.00116689
	Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
13.00

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
Ac-227	6.6313E-10	43,522.739	87,045.478	0.00E+00	2.89E-05	5.77E-05	Avg. MeV	
Am-241	2.0060E-03	43,522.739	87,045.478	0.00E+00	8.73E+01	1.75E+02	0.0150	9.188E+15
Am-242m	4.2429E-07	43,522.739	87,045.478	0.00E+00	1.85E-02	3.69E-02	0.0250	1.911E+15
Am-243	1.4899E-06	43,522.739	87,045.478	0.00E+00	6.48E-02	1.30E-01	0.0375	1.667E+15
C-14	5.7135E-09	43,522.739	87,045.478	0.00E+00	2.49E-04	4.97E-04	0.0575	1.785E+15
Cl-36	1.3124E-32	43,522.739	87,045.478	0.00E+00	5.71E-28	1.14E-27	0.0850	1.079E+15
Cm-243	1.6443E-07	43,522.739	87,045.478	0.00E+00	7.16E-03	1.43E-02	0.1250	7.299E+14
Cm-244	2.9330E-05	43,522.739	87,045.478	0.00E+00	1.28E+00	2.55E+00	0.2250	9.307E+14
Co-60	5.3186E-06	43,522.739	87,045.478	0.00E+00	2.31E-01	4.63E-01	0.3750	4.051E+14
Cs-134	3.1563E-03	43,522.739	87,045.478	0.00E+00	1.37E+02	2.75E+02	0.5750	6.609E+15
Cs-135	3.4477E-06	43,522.739	87,045.478	0.00E+00	1.50E-01	3.00E-01	0.8500	1.117E+14
Cs-137	2.0313E+00	43,522.739	87,045.478	0.00E+00	8.84E+04	1.77E+05	1.2500	6.380E+13
Eu-154	2.4513E-02	43,522.739	87,045.478	0.00E+00	1.07E+03	2.13E+03	1.7500	2.929E+12
Eu-155	4.8175E-03	43,522.739	87,045.478	0.00E+00	2.10E+02	4.19E+02	2.2500	2.569E+08
Fe-55	1.2397E-04	43,522.739	87,045.478	0.00E+00	5.40E+00	1.08E+01	2.7500	1.452E+08
H-3	4.5697E-03	43,522.739	87,045.478	0.00E+00	1.99E+02	3.98E+02	3.5000	6.673E+05
I-129	7.5300E-07	43,522.739	87,045.478	0.00E+00	3.28E-02	6.55E-02	5.0000	3.772E+04
Kr-85	1.0850E-01	43,522.739	87,045.478	0.00E+00	4.72E+03	9.44E+03	7.0000	4.165E+03
Np-237	9.5616E-06	43,522.739	87,045.478	0.00E+00	4.16E-01	8.32E-01	11.0000	4.668E+02
Pa-231	2.0359E-09	43,522.739	87,045.478	0.00E+00	8.86E-05	1.77E-04		
Pb-210	4.9728E-11	43,522.739	87,045.478	0.00E+00	2.16E-06	4.33E-06		
Pm-147	4.8502E-02	43,522.739	87,045.478	0.00E+00	2.11E+03	4.22E+03		
Pu-238	1.8254E-02	43,522.739	87,045.478	0.00E+00	7.94E+02	1.59E+03		
Pu-239	4.2810E-04	43,522.739	87,045.478	0.00E+00	1.86E+01	3.73E+01		
Pu-240	2.4368E-04	43,522.739	87,045.478	0.00E+00	1.06E+01	2.12E+01		
Pu-241	3.3415E-02	43,522.739	87,045.478	0.00E+00	1.45E+03	2.91E+03		
Pu-242	3.6329E-07	43,522.739	87,045.478	0.00E+00	1.58E-02	3.16E-02		
Ra-226	2.2854E-10	43,522.739	87,045.478	0.00E+00	9.95E-06	1.99E-05		
Ra-228	1.2426E-14	43,522.739	87,045.478	0.00E+00	5.41E-10	1.08E-09		
Ru-106	6.3589E-06	43,522.739	87,045.478	0.00E+00	2.77E-01	5.54E-01		
Se-79	1.2933E-05	43,522.739	87,045.478	0.00E+00	5.63E-01	1.13E+00		
Sn-126	1.1574E-05	43,522.739	87,045.478	0.00E+00	5.04E-01	1.01E+00		
Sr-90	1.9248E+00	43,522.739	87,045.478	0.00E+00	8.38E+04	1.68E+05		
Tc-99	4.2239E-04	43,522.739	87,045.478	0.00E+00	1.84E+01	3.68E+01		
Th-229	5.0953E-12	43,522.739	87,045.478	0.00E+00	2.22E-07	4.44E-07		
Th-230	4.1885E-08	43,522.739	87,045.478	0.00E+00	1.82E-03	3.65E-03		
Th-232	1.9270E-14	43,522.739	87,045.478	0.00E+00	8.39E-10	1.68E-09		
Tl-208	4.6024E-08	43,522.739	87,045.478	0.00E+00	2.00E-03	4.01E-03		
U-232	1.2582E-07	43,522.739	87,045.478	0.00E+00	5.48E-03	1.10E-02		
U-233	2.5825E-09	43,522.739	87,045.478	0.00E+00	1.12E-04	2.25E-04		
U-234	1.8450E-04	43,522.739	87,045.478	0.00E+00	8.03E+00	1.61E+01		
U-235	-2.7235E-06	43,522.739	0.000	5.21E-01	4.03E-01	5.21E-01		
U-236	1.5493E-05	43,522.739	87,045.478	0.00E+00	6.74E-01	1.35E+00		
U-238	-4.2851E-09	43,522.739	0.000	5.97E-03	5.79E-03	5.97E-03		
Y-90	1.9254E+00	43,522.739	87,045.478	0.00E+00	8.38E+04	1.68E+05		
Other Radionuclides					8.42E+04	1.68E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.04E+03	2.08E+03
Total	Total

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-ALX	U	
BOL Enrichment %:	93.13704494	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		43,522.739	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		87,045.478	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.53		
Bounding:	1.07		

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: MURR (COLUMBIA)
 SNF ID #: 142
 Fuel Units & Descr: 32 - 24 CURVED PLATES
 Heavy Metal Mass: BOL=25.12kg ; EOL=21.72kg
 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"
 0.89

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)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-09	4,521.600	9,043.200	0.00E+00	5.18E-06	1.04E-05	Avg. MeV	
Am-241	2.3056E-03	4,521.600	9,043.200	0.00E+00	1.04E+01	2.08E+01	0.0150	8.462E+14
Am-242m	4.1476E-07	4,521.600	9,043.200	0.00E+00	1.88E-03	3.75E-03	0.0250	1.758E+14
Am-243	1.4894E-06	4,521.600	9,043.200	0.00E+00	6.73E-03	1.35E-02	0.0375	1.531E+14
C-14	5.7108E-09	4,521.600	9,043.200	0.00E+00	2.58E-05	5.16E-05	0.0575	1.644E+14
Cl-36	1.3124E-32	4,521.600	9,043.200	0.00E+00	5.93E-29	1.19E-28	0.0850	9.920E+13
Cm-243	1.4562E-07	4,521.600	9,043.200	0.00E+00	6.58E-04	1.32E-03	0.1250	6.644E+13
Cm-244	2.4221E-05	4,521.600	9,043.200	0.00E+00	1.10E-01	2.19E-01	0.2250	8.564E+13
Co-60	2.7560E-06	4,521.600	9,043.200	0.00E+00	1.25E-02	2.49E-02	0.3750	3.723E+13
Cs-134	5.8851E-04	4,521.600	9,043.200	0.00E+00	2.66E+00	5.32E+00	0.5750	6.104E+13
Cs-135	3.4477E-06	4,521.600	9,043.200	0.00E+00	1.56E-02	3.12E-02	0.8500	8.795E+12
Cs-137	1.8099E+00	4,521.600	9,043.200	0.00E+00	8.18E+03	1.64E+04	1.2500	4.892E+12
Eu-154	1.6386E-02	4,521.600	9,043.200	0.00E+00	7.41E+01	1.48E+02	1.7500	2.417E+11
Eu-155	2.3957E-03	4,521.600	9,043.200	0.00E+00	1.08E+01	2.17E+01	2.2500	1.723E+07
Fe-55	3.2707E-05	4,521.600	9,043.200	0.00E+00	1.48E-01	2.96E-01	2.7500	1.410E+07
H-3	3.4504E-03	4,521.600	9,043.200	0.00E+00	1.56E+01	3.12E+01	3.5000	1.065E+04
I-129	7.5300E-07	4,521.600	9,043.200	0.00E+00	3.40E-03	6.81E-03	5.0000	3.580E+03
Kr-85	7.8540E-02	4,521.600	9,043.200	0.00E+00	3.55E+02	7.10E+02	7.0000	3.940E+02
Np-237	9.5615E-06	4,521.600	9,043.200	0.00E+00	4.32E-02	8.65E-02	11.0000	4.407E+01
Pa-231	2.7968E-09	4,521.600	9,043.200	0.00E+00	1.26E-05	2.53E-05		
Pb-210	1.2612E-10	4,521.600	9,043.200	0.00E+00	5.70E-07	1.14E-06		
Pm-147	1.2952E-02	4,521.600	9,043.200	0.00E+00	5.86E+01	1.17E+02		
Pu-238	1.7549E-02	4,521.600	9,043.200	0.00E+00	7.93E+01	1.59E+02		
Pu-239	4.2810E-04	4,521.600	9,043.200	0.00E+00	1.94E+00	3.87E+00		
Pu-240	2.4357E-04	4,521.600	9,043.200	0.00E+00	1.10E+00	2.20E+00		
Pu-241	2.6277E-02	4,521.600	9,043.200	0.00E+00	1.19E+02	2.38E+02		
Pu-242	3.6329E-07	4,521.600	9,043.200	0.00E+00	1.64E-03	3.29E-03		
Ra-226	4.4444E-10	4,521.600	9,043.200	0.00E+00	2.01E-06	4.02E-06		
Ra-228	1.9714E-14	4,521.600	9,043.200	0.00E+00	8.91E-11	1.78E-10		
Ru-106	2.0477E-07	4,521.600	9,043.200	0.00E+00	9.26E-04	1.85E-03		
Se-79	1.2933E-05	4,521.600	9,043.200	0.00E+00	5.85E-02	1.17E-01		
Sn-126	1.1574E-05	4,521.600	9,043.200	0.00E+00	5.23E-02	1.05E-01		
Sr-90	1.7092E+00	4,521.600	9,043.200	0.00E+00	7.73E+03	1.55E+04		
Tc-99	4.2239E-04	4,521.600	9,043.200	0.00E+00	1.91E+00	3.82E+00		
Th-229	7.7260E-12	4,521.600	9,043.200	0.00E+00	3.49E-08	6.99E-08		
Th-230	5.8497E-08	4,521.600	9,043.200	0.00E+00	2.64E-04	5.29E-04		
Th-232	2.6906E-14	4,521.600	9,043.200	0.00E+00	1.22E-10	2.43E-10		
Th-208	4.4336E-08	4,521.600	9,043.200	0.00E+00	2.00E-04	4.01E-04		
U-232	1.2037E-07	4,521.600	9,043.200	0.00E+00	5.44E-04	1.09E-03		
U-233	3.0011E-09	4,521.600	9,043.200	0.00E+00	1.36E-05	2.71E-05		
U-234	1.8497E-04	4,521.600	9,043.200	0.00E+00	8.36E-01	1.67E+00		
U-235	-2.7235E-06	4,521.600	0.000	5.08E-02	3.84E-02	5.08E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.5493E-05	4,521.600	9,043.200	0.00E+00	7.01E-02	1.40E-01	9.56E+01	1.91E+02
U-238	-4.2851E-09	4,521.600	0.000	5.49E-04	5.29E-04	5.49E-04	Total	Total
Y-90	1.7094E+00	4,521.600	9,043.200	0.00E+00	7.73E+03	1.55E+04		
Other Radionuclides					7.79E+03	1.56E+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 (6061)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	93.5	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	4,521.600	3,215.320	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.
Bounding:		9,043.200	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.57	0.71	0.95
Bounding:	1.14		

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: N REACTOR 1st Fuel decay start date: 1971
 SNF ID #: 991 Estimates as of: 2010
 Fuel Units & Descr: 103680 - 2 CONCENTRIC TUBES Template: N-Reactor (Graphite, Zirc. 0 to 5%, U)
 Heavy Metal Mass: BOL=2103003.65kg ; EOL=2096202.24kg 2nd Template Burnup(MWd): 69600
 ROD Storage Site: HANFORD Template BOL Heavy Metal Mass (MT): 11.6
Template Decay Time: 35 years

Estimated
Canister usage:
MCO
400.00

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)		
Ac-227	4.2184E-10	7,175,192.979	14,350,385.959	0.00E+00	3.03E-03	6.05E-03	Avg. MeV	
Am-241	9.6379E-02	7,175,192.979	14,350,385.959	0.00E+00	6.92E+05	1.38E+06	0.0150	6.973E+17
Am-242m	5.8463E-05	7,175,192.979	14,350,385.959	0.00E+00	4.19E+02	8.39E+02	0.0250	1.425E+17
Am-243	4.6279E-05	7,175,192.979	14,350,385.959	0.00E+00	3.32E+02	6.64E+02	0.0375	1.318E+17
C-14	9.2026E-05	7,175,192.979	14,350,385.959	0.00E+00	6.60E+02	1.32E+03	0.0575	1.505E+17
Cl-36	0.0000E+00	7,175,192.979	14,350,385.959	0.00E+00	0.00E+00	0.00E+00	0.0850	7.912E+16
Cm-243	0.0000E+00	7,175,192.979	14,350,385.959	0.00E+00	0.00E+00	0.00E+00	0.1250	5.255E+16
Cm-244	4.5445E-04	7,175,192.979	14,350,385.959	0.00E+00	3.26E+03	6.52E+03	0.2250	6.788E+16
Co-60	6.3707E-05	7,175,192.979	14,350,385.959	0.00E+00	4.57E+02	9.14E+02	0.3750	2.937E+16
Cs-134	1.4042E-05	7,175,192.979	14,350,385.959	0.00E+00	1.01E+02	2.02E+02	0.5750	6.337E+15
Cs-135	1.0066E-05	7,175,192.979	14,350,385.959	0.00E+00	7.22E+01	1.44E+02	0.8500	6.438E+15
Cs-137	1.1945E+00	7,175,192.979	14,350,385.959	0.00E+00	8.57E+06	1.71E+07	1.2500	3.512E+15
Eu-154	6.6451E-03	7,175,192.979	14,350,385.959	0.00E+00	4.77E+04	9.54E+04	1.7500	1.781E+14
Eu-155	2.9052E-04	7,175,192.979	14,350,385.959	0.00E+00	2.08E+03	4.17E+03	2.2500	1.439E+10
Fe-55	2.8807E-06	7,175,192.979	14,350,385.959	0.00E+00	2.07E+01	4.13E+01	2.7500	3.399E+08
H-3	2.1063E-03	7,175,192.979	14,350,385.959	0.00E+00	1.51E+04	3.02E+04	3.5000	3.006E+08
I-129	8.6006E-07	7,175,192.979	14,350,385.959	0.00E+00	6.17E+00	1.23E+01	5.0000	1.269E+08
Kr-85	2.6739E-02	7,175,192.979	14,350,385.959	0.00E+00	1.92E+05	3.84E+05	7.0000	1.438E+07
Np-237	8.5589E-06	7,175,192.979	14,350,385.959	0.00E+00	6.14E+01	1.23E+02	11.0000	1.638E+06
Pa-231	1.2500E-09	7,175,192.979	14,350,385.959	0.00E+00	8.97E-03	1.79E-02		
Pb-210	2.3017E-11	7,175,192.979	14,350,385.959	0.00E+00	1.65E-04	3.30E-04		
Pm-147	5.9856E-04	7,175,192.979	14,350,385.959	0.00E+00	4.29E+03	8.59E+03		
Pu-238	2.0029E-02	7,175,192.979	14,350,385.959	0.00E+00	1.44E+05	2.87E+05		
Pu-239	2.8836E-02	7,175,192.979	14,350,385.959	0.00E+00	2.07E+05	4.14E+05		
Pu-240	2.2802E-02	7,175,192.979	14,350,385.959	0.00E+00	1.64E+05	3.27E+05		
Pu-241	6.1020E-01	7,175,192.979	14,350,385.959	0.00E+00	4.38E+06	8.76E+06		
Pu-242	1.4526E-05	7,175,192.979	14,350,385.959	0.00E+00	1.04E+02	2.08E+02		
Ra-226	9.7701E-11	7,175,192.979	14,350,385.959	0.00E+00	7.01E-04	1.40E-03		
Ra-228	1.1068E-14	7,175,192.979	14,350,385.959	0.00E+00	7.94E-08	1.59E-07		
Ru-106	5.9224E-10	7,175,192.979	14,350,385.959	0.00E+00	4.25E-03	8.50E-03		
Se-79	1.0899E-05	7,175,192.979	14,350,385.959	0.00E+00	7.82E+01	1.56E+02		
Sn-126	0.0000E+00	7,175,192.979	14,350,385.959	0.00E+00	0.00E+00	0.00E+00		
Sr-90	8.4899E-01	7,175,192.979	14,350,385.959	0.00E+00	6.09E+06	1.22E+07		
Tc-99	3.6494E-04	7,175,192.979	14,350,385.959	0.00E+00	2.62E+03	5.24E+03		
Th-229	1.2928E-12	7,175,192.979	14,350,385.959	0.00E+00	9.28E-06	1.86E-05		
Th-230	1.6293E-08	7,175,192.979	14,350,385.959	0.00E+00	1.17E-01	2.34E-01		
Th-232	1.6451E-14	7,175,192.979	14,350,385.959	0.00E+00	1.18E-07	2.36E-07		
Tl-208	3.4382E-15	7,175,192.979	14,350,385.959	0.00E+00	2.47E-08	4.93E-08		
U-232	0.0000E+00	7,175,192.979	14,350,385.959	0.00E+00	0.00E+00	0.00E+00		
U-233	9.9425E-10	7,175,192.979	14,350,385.959	0.00E+00	7.13E-03	1.43E-02		
U-234	6.5575E-05	7,175,192.979	14,350,385.959	0.00E+00	4.71E+02	9.41E+02		
U-235	-1.2944E-06	7,175,192.979	0.000	5.68E+01	4.75E+01	5.68E+01		
U-236	1.1951E-05	7,175,192.979	14,350,385.959	0.00E+00	8.58E+01	1.72E+02		
U-238	-3.0619E-07	7,175,192.979	0.000	6.98E+02	6.96E+02	6.98E+02		
Y-90	8.4928E-01	7,175,192.979	14,350,385.959	0.00E+00	6.09E+06	1.22E+07		
Other Radionuclides					8.23E+06	1.65E+07		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	GRAPHITE	GRAPHITE	
Fuel Cladding:	ZIRC-2	ZIRC	
BOL HM Constituents:	U METAL	U	
BOL Enrichment %:	1.250000197	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	5,061,929.781	7,175,192.979	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	12,618,021.888	14,350,385.959	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.57	1.42	1.00
Bounding:	1.14	1.14	

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: N.S. SAVANNAH
 SNF ID #: 854
 Fuel Units & Descr: 12 - UNKNOWN
 Heavy Metal Mass: BOL = ; EOL=21.09kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1963
 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"
 12.00

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	8.7758E-10	31.685	31.685	0.00E+00	2.78E-08	2.78E-08		
Am-241	1.4352E-01	31.685	31.685	0.00E+00	4.55E+00	4.55E+00	0.0150	1.705E+12
Am-242m	2.8698E-04	31.685	31.685	0.00E+00	9.09E-03	9.09E-03	0.0250	3.438E+11
Am-243	6.2565E-04	31.685	31.685	0.00E+00	1.98E-02	1.98E-02	0.0375	3.279E+11
C-14	4.7901E-05	31.685	31.685	0.00E+00	1.52E-03	1.52E-03	0.0575	3.788E+11
Cl-36	8.0297E-07	31.685	31.685	0.00E+00	2.54E-05	2.54E-05	0.0850	1.908E+11
Cm-243	2.5081E-04	31.685	31.685	0.00E+00	7.95E-03	7.95E-03	0.1250	1.324E+11
Cm-244	4.9015E-02	31.685	31.685	0.00E+00	1.55E+00	1.55E+00	0.2250	1.636E+11
Co-60	2.5581E-03	31.685	31.685	0.00E+00	8.11E-02	8.11E-02	0.3750	7.034E+10
Cs-134	4.0536E-05	31.685	31.685	0.00E+00	1.28E-03	1.28E-03	0.5750	1.636E+12
Cs-135	1.4433E-05	31.685	31.685	0.00E+00	4.57E-04	4.57E-04	0.8500	2.263E+10
Cs-137	1.3979E+00	31.685	31.685	0.00E+00	4.43E+01	4.43E+01	1.2500	2.223E+10
Eu-154	2.0203E-02	31.685	31.685	0.00E+00	6.40E-01	6.40E-01	1.7500	6.658E+08
Eu-155	1.7684E-03	31.685	31.685	0.00E+00	5.60E-02	5.60E-02	2.2500	1.073E+05
Fe-55	4.3136E-05	31.685	31.685	0.00E+00	1.37E-03	1.37E-03	2.7500	2.197E+05
H-3	2.0769E-02	31.685	31.685	0.00E+00	6.58E-01	6.58E-01	3.5000	2.265E+04
I-129	9.8288E-07	31.685	31.685	0.00E+00	3.11E-05	3.11E-05	5.0000	9.684E+03
Kr-85	2.8214E-02	31.685	31.685	0.00E+00	8.94E-01	8.94E-01	7.0000	1.116E+03
Np-237	1.1218E-05	31.685	31.685	0.00E+00	3.55E-04	3.55E-04	11.0000	1.282E+02
Pa-231	1.3036E-09	31.685	31.685	0.00E+00	4.13E-08	4.13E-08		
Pb-210	8.5078E-11	31.685	31.685	0.00E+00	2.70E-09	2.70E-09		
Pm-147	3.6531E-04	31.685	31.685	0.00E+00	1.16E-02	1.16E-02		
Pu-238	7.4564E-02	31.685	31.685	0.00E+00	2.36E+00	2.36E+00		
Pu-239	1.1623E-02	31.685	31.685	0.00E+00	3.68E-01	3.68E-01		
Pu-240	1.5132E-02	31.685	31.685	0.00E+00	4.79E-01	4.79E-01		
Pu-241	9.0036E-01	31.685	31.685	0.00E+00	2.85E+01	2.85E+01		
Pu-242	6.4260E-05	31.685	31.685	0.00E+00	2.04E-03	2.04E-03		
Ra-226	2.2804E-10	31.685	31.685	0.00E+00	7.23E-09	7.23E-09		
Ra-228	5.2713E-12	31.685	31.685	0.00E+00	1.67E-10	1.67E-10		
Ru-106	6.1160E-10	31.685	31.685	0.00E+00	1.94E-08	1.94E-08		
Se-79	1.2377E-05	31.685	31.685	0.00E+00	3.92E-04	3.92E-04		
Sn-126	2.5210E-05	31.685	31.685	0.00E+00	7.99E-04	7.99E-04		
Sr-90	9.1667E-01	31.685	31.685	0.00E+00	2.90E+01	2.90E+01		
Tc-99	3.9357E-04	31.685	31.685	0.00E+00	1.25E-02	1.25E-02		
Th-229	1.2057E-10	31.685	31.685	0.00E+00	3.82E-09	3.82E-09		
Th-230	2.1043E-08	31.685	31.685	0.00E+00	6.67E-07	6.67E-07		
Th-232	5.2972E-12	31.685	31.685	0.00E+00	1.68E-10	1.68E-10		
Th-232	1.7474E-07	31.685	31.685	0.00E+00	5.54E-06	5.54E-06		
U-232	4.7368E-07	31.685	31.685	0.00E+00	1.50E-05	1.50E-05		
U-233	2.5097E-08	31.685	31.685	0.00E+00	7.95E-07	7.95E-07		
U-234	5.0000E-05	31.685	31.685	0.00E+00	1.58E-03	1.58E-03		
U-235	-1.4489E-06	31.685	0.000	1.46E-03	1.41E-03	1.46E-03		
U-236	7.5824E-06	31.685	31.685	0.00E+00	2.40E-04	2.40E-04		
U-238	-2.6129E-07	31.685	0.000	6.87E-03	6.86E-03	6.87E-03		
Y-90	9.1699E-01	31.685	31.685	0.00E+00	2.91E+01	2.91E+01		
Other Radionuclides					4.25E+01	4.25E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.29E-01	7.29E-01
Total	Total

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 (unknown).
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		31.685	Nominal burnup set equal to bounding burnup. Bounding burnup taken from SFD and converted to MWd using BOL=21.123kg
Bounding:		31.685	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.04		1.00
Bounding:	0.04		

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: NEREIDE (FRANCE)
 SNF ID #: 751
 Fuel Units & Descr: 46 - 12 CURVED PLATES
 Heavy Metal Mass: BOL = : EOL=35.42kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1982
 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"
 1.92

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	1.1465E-09	21.265	42.531	0.00E+00	2.44E-08	4.88E-08		0.0150
Am-241	2.3056E-03	21.265	42.531	0.00E+00	4.90E-02	9.81E-02		3.981E+12
Am-242m	4.1476E-07	21.265	42.531	0.00E+00	8.82E-06	1.76E-05		0.0250
Am-243	1.4894E-06	21.265	42.531	0.00E+00	3.17E-05	6.33E-05		0.0375
C-14	5.7108E-09	21.265	42.531	0.00E+00	1.21E-07	2.43E-07		0.0575
Cl-36	1.3124E-32	21.265	42.531	0.00E+00	2.79E-31	5.58E-31		0.0850
Cm-243	1.4562E-07	21.265	42.531	0.00E+00	3.10E-06	6.19E-06		0.1250
Cm-244	2.4221E-05	21.265	42.531	0.00E+00	5.15E-04	1.03E-03		0.2250
Co-60	2.7560E-06	21.265	42.531	0.00E+00	5.86E-05	1.17E-04		0.3750
Cs-134	5.8851E-04	21.265	42.531	0.00E+00	1.25E-02	2.50E-02		0.5750
Cs-135	3.4477E-06	21.265	42.531	0.00E+00	7.33E-05	1.47E-04		0.8500
Cs-137	1.8099E+00	21.265	42.531	0.00E+00	3.85E+01	7.70E+01		1.2500
Eu-154	1.6386E-02	21.265	42.531	0.00E+00	3.48E-01	6.97E-01		1.7500
Eu-155	2.3957E-05	21.265	42.531	0.00E+00	5.09E-02	1.02E-01		2.2500
Fe-55	3.2707E-05	21.265	42.531	0.00E+00	6.96E-04	1.39E-03		2.7500
H-3	3.4504E-03	21.265	42.531	0.00E+00	7.34E-02	1.47E-01		3.5000
I-129	7.5300E-07	21.265	42.531	0.00E+00	1.60E-05	3.20E-05		5.0000
Kr-85	7.8540E-02	21.265	42.531	0.00E+00	1.67E+00	3.34E+00		7.0000
Np-237	9.5615E-06	21.265	42.531	0.00E+00	2.03E-04	4.07E-04		11.0000
Pa-231	2.7968E-09	21.265	42.531	0.00E+00	5.95E-08	1.19E-07		
Pb-210	1.2612E-10	21.265	42.531	0.00E+00	2.68E-09	5.36E-09		
Pm-147	1.2952E-02	21.265	42.531	0.00E+00	2.75E-01	5.51E-01		
Pu-238	1.7549E-02	21.265	42.531	0.00E+00	3.73E-01	7.46E-01		
Pu-239	4.2810E-04	21.265	42.531	0.00E+00	9.10E-03	1.82E-02		
Pu-240	2.4357E-04	21.265	42.531	0.00E+00	5.18E-03	1.04E-02		
Pu-241	2.6277E-02	21.265	42.531	0.00E+00	5.59E-01	1.12E+00		
Pu-242	3.6329E-07	21.265	42.531	0.00E+00	7.73E-06	1.55E-05		
Ra-226	4.4444E-10	21.265	42.531	0.00E+00	9.45E-09	1.89E-08		
Ra-228	1.9714E-14	21.265	42.531	0.00E+00	4.19E-13	8.38E-13		
Ru-106	2.0477E-07	21.265	42.531	0.00E+00	4.35E-06	8.71E-06		
Se-79	1.2933E-05	21.265	42.531	0.00E+00	2.75E-04	5.50E-04		
Sn-126	1.1574E-05	21.265	42.531	0.00E+00	2.46E-04	4.92E-04		
Sr-90	1.7092E+00	21.265	42.531	0.00E+00	3.63E+01	7.27E+01		
Tc-99	4.2239E-04	21.265	42.531	0.00E+00	8.98E-03	1.80E-02		
Th-229	7.7260E-12	21.265	42.531	0.00E+00	1.64E-10	3.29E-10		
Th-230	5.8497E-08	21.265	42.531	0.00E+00	1.24E-06	2.49E-06		
Th-232	2.6906E-14	21.265	42.531	0.00E+00	5.72E-13	1.14E-12		
Th-208	4.4336E-08	21.265	42.531	0.00E+00	9.43E-07	1.89E-06		
U-232	1.2037E-07	21.265	42.531	0.00E+00	2.56E-06	5.12E-06		
U-233	3.0011E-09	21.265	42.531	0.00E+00	6.38E-08	1.28E-07		
U-234	1.8497E-04	21.265	42.531	0.00E+00	3.93E-03	7.87E-03		
U-235	-2.7235E-06	21.265	0.000	7.06E-02	7.05E-02	7.06E-02		
U-236	1.5493E-05	21.265	42.531	0.00E+00	3.29E-04	6.59E-04		
U-238	-4.2851E-09	21.265	0.000	7.14E-04	7.14E-04	7.14E-04		
Y-90	1.7094E+00	21.265	42.531	0.00E+00	3.64E+01	7.27E+01		
Other Radionuclides					3.66E+01	7.33E+01		

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 (unknown).
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U3Si2	U	
BOL Enrichment %:		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		21.265	Nominal burnup taken from SFD and converted to MWd using BOL=35.442kg Bounding burnup assumed to be twice nominal burnup.
Bounding:		42.531	

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	
Bounding:	0.00	
		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: NIST
 SNF ID #: 752
 Fuel Units & Descr: 420 - 17 CURVED PLATES
 Heavy Metal Mass: BOL=72.16kg ; EOL=33.89kg
 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"
 11.67

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	1.3262E-10	36,405.155	66,463.108	0.00E+00	4.83E-06	8.81E-06	Avg. MeV	
Am-241	5.9611E-03	36,405.155	66,463.108	0.00E+00	2.17E+02	3.96E+02	0.0150	9.084E+15
Am-242m	1.4332E-06	36,405.155	66,463.108	0.00E+00	5.22E-02	9.53E-02	0.0250	1.893E+15
Am-243	3.7132E-05	36,405.155	66,463.108	0.00E+00	1.35E+00	2.47E+00	0.0375	1.713E+15
C-14	2.6501E-08	36,405.155	66,463.108	0.00E+00	9.65E-04	1.76E-04	0.0575	1.763E+15
Cl-36	4.4441E-31	36,405.155	66,463.108	0.00E+00	1.62E-26	2.95E-26	0.0850	1.092E+15
Cm-243	7.2722E-06	36,405.155	66,463.108	0.00E+00	2.65E-01	4.83E-01	0.1250	8.198E+14
Cm-244	6.8226E-03	36,405.155	66,463.108	0.00E+00	2.48E+02	4.53E+02	0.2250	9.219E+14
Co-60	1.8117E-04	36,405.155	66,463.108	0.00E+00	6.60E+00	1.20E+01	0.3750	4.072E+14
Cs-134	3.0595E-01	36,405.155	66,463.108	0.00E+00	1.11E+04	2.03E+04	0.5750	7.358E+15
Cs-135	4.2564E-06	36,405.155	66,463.108	0.00E+00	1.55E-01	2.83E-01	0.8500	8.628E+14
Cs-137	2.5650E+00	36,405.155	66,463.108	0.00E+00	9.34E+04	1.70E+05	1.2500	2.169E+14
Eu-154	1.1628E-01	36,405.155	66,463.108	0.00E+00	4.23E+03	7.73E+03	1.7500	6.246E+12
Eu-155	5.7776E-02	36,405.155	66,463.108	0.00E+00	2.10E+03	3.84E+03	2.2500	2.734E+11
Fe-55	1.9465E-02	36,405.155	66,463.108	0.00E+00	7.09E+02	1.29E+03	2.7500	4.085E+09
H-3	8.1045E-03	36,405.155	66,463.108	0.00E+00	2.95E+02	5.39E+02	3.5000	4.960E+08
I-129	6.6403E-07	36,405.155	66,463.108	0.00E+00	2.42E-02	4.41E-02	5.0000	2.877E+06
Kr-85	2.0620E-01	36,405.155	66,463.108	0.00E+00	7.51E+03	1.37E+04	7.0000	3.306E+05
Np-237	3.1513E-05	36,405.155	66,463.108	0.00E+00	1.15E+00	2.09E+00	11.0000	3.791E+04
Pa-231	6.0304E-10	36,405.155	66,463.108	0.00E+00	2.20E-05	4.01E-05		
Pb-210	2.7017E-12	36,405.155	66,463.108	0.00E+00	9.84E-08	1.80E-07		
Pm-147	3.4210E-01	36,405.155	66,463.108	0.00E+00	1.25E+04	2.27E+04		
Pu-238	1.6622E-01	36,405.155	66,463.108	0.00E+00	6.05E+03	1.10E+04		
Pu-239	6.9563E-04	36,405.155	66,463.108	0.00E+00	2.53E+01	4.62E+01		
Pu-240	3.7169E-04	36,405.155	66,463.108	0.00E+00	1.35E+01	2.47E+01		
Pu-241	2.1731E-01	36,405.155	66,463.108	0.00E+00	7.91E+03	1.44E+04		
Pu-242	3.0911E-06	36,405.155	66,463.108	0.00E+00	1.13E-01	2.05E-01		
Ra-226	1.9435E-11	36,405.155	66,463.108	0.00E+00	7.08E-07	1.29E-06		
Ra-228	6.1725E-15	36,405.155	66,463.108	0.00E+00	2.25E-10	4.10E-10		
Ru-106	7.0778E-03	36,405.155	66,463.108	0.00E+00	2.58E+02	4.70E+02		
Se-79	1.2339E-05	36,405.155	66,463.108	0.00E+00	4.49E-01	8.20E-01		
Sn-126	1.0194E-05	36,405.155	66,463.108	0.00E+00	3.71E-01	6.78E-01		
Sr-90	2.4186E+00	36,405.155	66,463.108	0.00E+00	8.80E+04	1.61E+05		
Tc-99	3.8056E-04	36,405.155	66,463.108	0.00E+00	1.39E+01	2.53E+01		
Th-229	2.0097E-12	36,405.155	66,463.108	0.00E+00	7.32E-08	1.34E-07		
Th-230	6.0577E-09	36,405.155	66,463.108	0.00E+00	2.21E-04	4.03E-04		
Th-232	1.2473E-14	36,405.155	66,463.108	0.00E+00	4.54E-10	8.29E-10		
Ti-208	4.8791E-08	36,405.155	66,463.108	0.00E+00	1.78E-03	3.24E-03		
U-232	1.3821E-07	36,405.155	66,463.108	0.00E+00	5.03E-03	9.19E-03		
U-233	2.3906E-09	36,405.155	66,463.108	0.00E+00	8.70E-05	1.59E-04		
U-234	4.7697E-05	36,405.155	66,463.108	0.00E+00	1.74E+00	3.17E+00		
U-235	-2.8661E-06	36,405.155	0.000	1.45E-01	4.09E-02	1.45E-01		
U-236	1.6701E-05	36,405.155	66,463.108	0.00E+00	6.08E-01	1.11E+00		
U-238	-9.4194E-09	36,405.155	0.000	1.66E-03	1.31E-03	1.66E-03		
Y-90	2.4192E+00	36,405.155	66,463.108	0.00E+00	8.81E+04	1.61E+05		
Other Radionuclides					9.11E+04	1.66E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.44E+03	2.62E+03
Total	Total

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:	U3O8	U	
BOL Enrichment %:	93.17430199	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	36,405.155	35,243.243	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	39,175.874	66,463.108	Bounding burnup calculated assuming all BOL heavy metal burned.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	1.16	0.97	0.99
Bounding:	2.11	1.70	

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: NIST
 SNF ID #: 154
 Fuel Units & Descr: 980 - 17 CURVED PLATES
 Heavy Metal Mass: BOL=367.50kg ; EOL=159.74kg
 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"
 27.22

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	1.3262E-10	191,368.359	338,505.353	0.00E+00	2.54E-05	4.49E-05		0.0150
Am-241	5.9611E-03	191,368.359	338,505.353	0.00E+00	1.14E+03	2.02E+03		4.627E+16
Am-242m	1.4332E-06	191,368.359	338,505.353	0.00E+00	2.74E-01	4.85E-01		0.0250
Am-243	3.7132E-05	191,368.359	338,505.353	0.00E+00	7.11E+00	1.26E+01		0.0375
C-14	2.6501E-08	191,368.359	338,505.353	0.00E+00	5.07E-03	8.97E-03		0.0575
Cl-36	4.4441E-31	191,368.359	338,505.353	0.00E+00	8.50E-26	1.50E-25		0.0850
Cm-243	7.2722E-06	191,368.359	338,505.353	0.00E+00	1.39E+00	2.46E+00		0.1250
Cm-244	6.8226E-03	191,368.359	338,505.353	0.00E+00	1.31E+03	2.31E+03		0.2250
Co-60	1.8117E-04	191,368.359	338,505.353	0.00E+00	3.47E+01	6.13E+01		0.3750
Cs-134	3.0595E-01	191,368.359	338,505.353	0.00E+00	5.85E+04	1.04E+05		0.5750
Cs-135	4.2564E-06	191,368.359	338,505.353	0.00E+00	8.15E-01	1.44E+00		0.8500
Cs-137	2.5650E+00	191,368.359	338,505.353	0.00E+00	4.91E+05	8.68E+05		1.2500
Eu-154	1.1628E-01	191,368.359	338,505.353	0.00E+00	2.23E+04	3.94E+04		1.7500
Eu-155	5.7776E-02	191,368.359	338,505.353	0.00E+00	1.11E+04	1.96E+04		2.2500
Fe-55	1.9465E-02	191,368.359	338,505.353	0.00E+00	3.73E+03	6.59E+03		2.7500
H-3	8.1045E-03	191,368.359	338,505.353	0.00E+00	1.55E+03	2.74E+03		3.5000
I-129	6.6403E-07	191,368.359	338,505.353	0.00E+00	1.27E-01	2.25E-01		5.0000
Kr-85	2.0620E-01	191,368.359	338,505.353	0.00E+00	3.95E+04	6.98E+04		7.0000
Np-237	3.1513E-05	191,368.359	338,505.353	0.00E+00	6.03E+00	1.07E+01		11.0000
Pa-231	6.0304E-10	191,368.359	338,505.353	0.00E+00	1.15E-04	2.04E-04		
Pb-210	2.7017E-12	191,368.359	338,505.353	0.00E+00	5.17E-07	9.15E-07		
Pm-147	3.4210E-01	191,368.359	338,505.353	0.00E+00	6.55E+04	1.16E+05		
Pu-238	1.6622E-01	191,368.359	338,505.353	0.00E+00	3.18E+04	5.63E+04		
Pu-239	6.9563E-04	191,368.359	338,505.353	0.00E+00	1.33E+02	2.35E+02		
Pu-240	3.7169E-04	191,368.359	338,505.353	0.00E+00	7.11E+01	1.26E+02		
Pu-241	2.1731E-01	191,368.359	338,505.353	0.00E+00	4.16E+04	7.36E+04		
Pu-242	3.0911E-06	191,368.359	338,505.353	0.00E+00	5.92E-01	1.05E+00		
Ra-226	1.9435E-11	191,368.359	338,505.353	0.00E+00	3.72E-06	6.58E-06		
Ra-228	6.1725E-15	191,368.359	338,505.353	0.00E+00	1.18E-09	2.09E-09		
Ru-106	7.0778E-03	191,368.359	338,505.353	0.00E+00	1.35E+03	2.40E+03		
Se-79	1.2339E-05	191,368.359	338,505.353	0.00E+00	2.36E+00	4.18E+00		
Sn-126	1.0194E-05	191,368.359	338,505.353	0.00E+00	1.95E+00	3.45E+00		
Sr-90	2.4186E+00	191,368.359	338,505.353	0.00E+00	4.63E+05	8.19E+05		
Tc-99	3.8056E-04	191,368.359	338,505.353	0.00E+00	7.28E+01	1.29E+02		
Th-229	2.0097E-12	191,368.359	338,505.353	0.00E+00	3.85E-07	6.80E-07		
Th-230	6.0577E-09	191,368.359	338,505.353	0.00E+00	1.16E-03	2.05E-03		
Th-232	1.2473E-14	191,368.359	338,505.353	0.00E+00	2.39E-09	4.22E-09		
Tl-208	4.8791E-08	191,368.359	338,505.353	0.00E+00	9.34E-03	1.65E-02		
U-232	1.3821E-07	191,368.359	338,505.353	0.00E+00	2.64E-02	4.68E-02		
U-233	2.3906E-09	191,368.359	338,505.353	0.00E+00	4.57E-04	8.09E-04		
U-234	4.7697E-05	191,368.359	338,505.353	0.00E+00	9.13E+00	1.61E+01		
U-235	-2.8661E-06	191,368.359	0.000	7.41E-01	1.93E-01	7.41E-01		
U-236	1.6701E-05	191,368.359	338,505.353	0.00E+00	3.20E+00	5.65E+00		
U-238	-9.4194E-09	191,368.359	0.000	8.23E-03	6.43E-03	8.23E-03		
Y-90	2.4192E+00	191,368.359	338,505.353	0.00E+00	4.63E+05	8.19E+05		
Other Radionuclides					4.79E+05	8.47E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.55E+03	1.34E+04
Total	Total

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 (6061)	ALUM	
BOL HM Constituents:	U3O8	U	
BOL Enrichment %:	93.33333333	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	185,416.245	191,368.359	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	199,527.878	338,505.353	Bounding burnup calculated assuming all BOL heavy metal burned.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.19	1.03	1.03
Bounding:	2.11	1.70	

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: OCONEE
 SNF ID #: 156
 Fuel Units & Descr: 14 - ROD
 Heavy Metal Mass: BOL=39.20kg ; EOL=31.98kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1986
 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: 20 years

Estimated
 Canister usage:
 18"x10"
 0.78

Radionuclide	m		x _n		x _b		b		y _n		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)	Avg. MeV					
Ac-227	5.0630E-10	6,863.026	13,726.051	0.00E+00	3.47E-06	6.95E-06								
Am-241	1.1489E-01	6,863.026	13,726.051	0.00E+00	7.88E+02	1.58E+03								
Am-242m	3.0733E-04	6,863.026	13,726.051	0.00E+00	2.11E+00	4.22E+00								
Am-243	6.2661E-04	6,863.026	13,726.051	0.00E+00	4.30E+00	8.60E+00								
C-14	4.7997E-05	6,863.026	13,726.051	0.00E+00	3.29E-01	6.59E-01								
Cl-36	8.0313E-07	6,863.026	13,726.051	0.00E+00	5.51E-03	1.10E-02								
Cm-243	3.6127E-04	6,863.026	13,726.051	0.00E+00	2.48E+02	4.96E+02								
Cm-244	8.6999E-02	6,863.026	13,726.051	0.00E+00	5.97E+02	1.19E+03								
Co-60	1.8379E-02	6,863.026	13,726.051	0.00E+00	1.26E+02	2.52E+02								
Cs-134	6.2548E-03	6,863.026	13,726.051	0.00E+00	4.29E+01	8.59E+01								
Cs-135	1.4433E-05	6,863.026	13,726.051	0.00E+00	9.91E-02	1.98E-01								
Cs-137	1.9767E-00	6,863.026	13,726.051	0.00E+00	1.36E+04	2.71E+04								
Eu-154	6.7603E-02	6,863.026	13,726.051	0.00E+00	4.64E+02	9.28E+02								
Eu-155	1.4373E-02	6,863.026	13,726.051	0.00E+00	9.86E+01	1.97E+02								
Fe-55	2.3466E-03	6,863.026	13,726.051	0.00E+00	1.61E+01	3.22E+01								
H-3	4.8143E-02	6,863.026	13,726.051	0.00E+00	3.30E+02	6.61E+02								
I-129	9.8288E-07	6,863.026	13,726.051	0.00E+00	6.75E-03	1.35E-02								
Kr-85	7.4386E-02	6,863.026	13,726.051	0.00E+00	5.11E+02	1.02E+03								
Np-237	1.0145E-05	6,863.026	13,726.051	0.00E+00	6.96E-02	1.39E-01								
Pa-231	1.0258E-09	6,863.026	13,726.051	0.00E+00	7.04E-06	1.41E-05								
Pb-210	1.4163E-11	6,863.026	13,726.051	0.00E+00	9.72E-08	1.94E-07								
Pm-147	1.9170E-02	6,863.026	13,726.051	0.00E+00	1.32E+02	2.63E+02								
Pu-238	8.3915E-02	6,863.026	13,726.051	0.00E+00	5.76E+02	1.15E+03								
Pu-239	1.1628E-02	6,863.026	13,726.051	0.00E+00	7.98E+01	1.60E+02								
Pu-240	1.5050E-02	6,863.026	13,726.051	0.00E+00	1.03E+02	2.07E+02								
Pu-241	1.8524E+00	6,863.026	13,726.051	0.00E+00	1.27E+04	2.54E+04								
Pu-242	6.4260E-05	6,863.026	13,726.051	0.00E+00	4.41E-01	8.82E-01								
Ra-226	6.0562E-11	6,863.026	13,726.051	0.00E+00	4.16E-07	8.31E-07								
Ra-228	4.9919E-12	6,863.026	13,726.051	0.00E+00	3.43E-08	6.85E-08								
Ru-106	1.8330E-05	6,863.026	13,726.051	0.00E+00	1.26E-01	2.52E-01								
Se-79	1.2379E-05	6,863.026	13,726.051	0.00E+00	8.50E-02	1.70E-01								
Sn-126	2.5210E-05	6,863.026	13,726.051	0.00E+00	1.73E-01	3.46E-01								
Sr-90	1.3098E+00	6,863.026	13,726.051	0.00E+00	8.99E+03	1.80E+04								
Tc-99	3.9357E-04	6,863.026	13,726.051	0.00E+00	2.70E+00	5.40E+00								
Th-229	6.2968E-11	6,863.026	13,726.051	0.00E+00	4.32E-07	8.64E-07								
Th-230	1.0362E-08	6,863.026	13,726.051	0.00E+00	7.11E-05	1.42E-04								
Th-232	5.2891E-12	6,863.026	13,726.051	0.00E+00	3.63E-08	7.26E-08								
Ti-208	1.9977E-07	6,863.026	13,726.051	0.00E+00	1.37E-03	2.74E-03								
U-232	5.4490E-07	6,863.026	13,726.051	0.00E+00	3.74E-03	7.48E-03								
U-233	2.3934E-08	6,863.026	13,726.051	0.00E+00	1.64E-04	3.29E-04								
U-234	4.4816E-05	6,863.026	13,726.051	0.00E+00	3.08E-01	6.15E-01								
U-235	-1.4492E-06	6,863.026	0.00	1.75E-03	0.00E+00	1.75E-03								
U-236	7.5711E-06	6,863.026	13,726.051	0.00E+00	5.20E-02	1.04E-01								
U-238	-2.6129E-07	6,863.026	0.00	1.29E-02	1.11E-02	1.29E-02								
Y-90	1.3101E+00	6,863.026	13,726.051	0.00E+00	8.99E+03	1.80E+04								
Other Radionuclides					1.30E+04	2.60E+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:	ZIRC-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	2.0625	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	1,326.332	6,863.026	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	1,960.000	13,726.051	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	5.00	5.17	1.12
Bounding:	10.00	7.00	

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: OHIO STATE
 SNF ID #: 158
 Fuel Units & Descr: 30 - 18 FLAT PLATES
 Heavy Metal Mass: BOL=26.15kg : EOL=26.15kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2035
 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							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	495.310	990.620	0.00E+00	7.20E-08	1.44E-07	Avg. MeV	
Am-241	1.1190E-03	495.310	990.620	0.00E+00	5.54E-01	1.11E+00	0.0150	1.911E+14
Am-242m	4.5425E-07	495.310	990.620	0.00E+00	2.25E-04	4.50E-04	0.0250	4.117E+13
Am-243	1.4921E-06	495.310	990.620	0.00E+00	7.39E-04	1.48E-03	0.0375	3.800E+13
C-14	5.7244E-09	495.310	990.620	0.00E+00	2.84E-06	5.67E-06	0.0575	3.736E+13
Cf-252	1.3124E-32	495.310	990.620	0.00E+00	6.50E-30	1.30E-29	0.0850	2.382E+13
Cm-243	2.3676E-07	495.310	990.620	0.00E+00	1.17E-04	2.35E-04	0.1250	2.063E+13
Cm-244	5.2042E-05	495.310	990.620	0.00E+00	2.58E-02	5.16E-02	0.2250	2.019E+13
Co-60	3.8208E-05	495.310	990.620	0.00E+00	1.89E-02	3.78E-02	0.3750	9.771E+12
Cs-134	4.8693E-01	495.310	990.620	0.00E+00	2.41E+02	4.82E+02	0.5750	1.342E+14
Cs-135	3.4477E-06	495.310	990.620	0.00E+00	1.71E-03	3.42E-03	0.8500	1.879E+13
Cs-137	2.8731E+00	495.310	990.620	0.00E+00	1.42E+03	2.85E+03	1.2500	3.497E+12
Eu-154	8.2053E-02	495.310	990.620	0.00E+00	4.06E+01	8.13E+01	1.7500	1.467E+11
Eu-155	3.9134E-02	495.310	990.620	0.00E+00	1.94E+01	3.88E+01	2.2500	3.076E+11
Fe-55	6.7429E-03	495.310	990.620	0.00E+00	3.34E+00	6.68E+00	2.7500	1.770E+09
H-3	1.0599E-02	495.310	990.620	0.00E+00	5.25E+00	1.05E+01	3.5000	1.963E+08
I-129	7.5300E-07	495.310	990.620	0.00E+00	3.73E-04	7.46E-04	5.0000	6.029E+02
Kr-85	2.8595E-01	495.310	990.620	0.00E+00	1.42E+02	2.83E+02	7.0000	6.728E+01
Np-237	9.5479E-06	495.310	990.620	0.00E+00	4.73E-03	9.46E-03	11.0000	7.588E+00
Pa-231	8.9297E-10	495.310	990.620	0.00E+00	4.42E-07	8.85E-07		
Pb-210	3.7609E-12	495.310	990.620	0.00E+00	1.86E-09	3.73E-09		
Pm-147	2.5452E+00	495.310	990.620	0.00E+00	1.26E+03	2.52E+03		
Pu-238	2.0550E-02	495.310	990.620	0.00E+00	1.02E+01	2.04E+01		
Pu-239	4.2838E-04	495.310	990.620	0.00E+00	2.12E-01	4.24E-01		
Pu-240	2.4401E-04	495.310	990.620	0.00E+00	1.21E-01	2.42E-01		
Pu-241	6.8764E-02	495.310	990.620	0.00E+00	3.41E+01	6.81E+01		
Pu-242	3.6329E-07	495.310	990.620	0.00E+00	1.80E-04	3.60E-04		
Ra-226	3.8045E-11	495.310	990.620	0.00E+00	1.88E-08	3.77E-08		
Ra-228	2.9902E-15	495.310	990.620	0.00E+00	1.48E-12	2.96E-12		
Ru-106	1.9055E-01	495.310	990.620	0.00E+00	9.44E+01	1.89E+02		
Se-79	1.2936E-05	495.310	990.620	0.00E+00	6.41E-03	1.28E-02		
Sn-126	1.1574E-05	495.310	990.620	0.00E+00	5.73E-03	1.15E-02		
Sr-90	2.7505E+00	495.310	990.620	0.00E+00	1.36E+03	2.72E+03		
Tc-99	4.2239E-04	495.310	990.620	0.00E+00	2.09E-01	4.18E-01		
Th-229	1.8848E-12	495.310	990.620	0.00E+00	9.34E-10	1.87E-09		
Th-230	1.7042E-08	495.310	990.620	0.00E+00	8.44E-06	1.69E-05		
Th-232	7.8132E-15	495.310	990.620	0.00E+00	3.87E-12	7.74E-12		
Tl-208	4.4063E-08	495.310	990.620	0.00E+00	2.18E-05	4.36E-05		
U-232	1.3151E-07	495.310	990.620	0.00E+00	6.51E-05	1.30E-04		
U-233	1.9564E-09	495.310	990.620	0.00E+00	9.69E-07	1.94E-06		
U-234	1.8371E-04	495.310	990.620	0.00E+00	9.10E-02	1.82E-01		
U-235	-2.7235E-06	495.310	0.000	1.12E-02	9.82E-03	1.12E-02		
U-236	1.5493E-05	495.310	990.620	0.00E+00	7.67E-03	1.53E-02		
U-238	-4.2851E-09	495.310	0.000	7.05E-03	7.05E-03	7.05E-03		
Y-90	2.7505E+00	495.310	990.620	0.00E+00	1.36E+03	2.72E+03		
Other Radionuclides					2.55E+03	5.09E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.51E+01	5.02E+01
Total	Total

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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	ALUM (8061)	ALUM	
BOL HM Constituents:	U3Si2	U	
BOL Enrichment %:	19.76578383	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		495.310	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup assumed to be twice nominal burnup.
Bounding:		990.620	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.06		
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: OHIO STATE
 SNF ID #: 157
 Fuel Units & Descr: 24 - 18 FLAT PLATES
 Heavy Metal Mass: BOL=3.41kg ; EOL=3.41kg
 ROD Storage Sits: 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"
 0.67

Radionuclide	II. Estimates		x _b	b	y _n	y _b	Gamma Sources	
	m	x _n					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	4.5861E-10	64.594	129.189	0.00E+00	2.96E-08	5.92E-08	0.0150	1.541E+13
Am-241	1.7832E-03	64.594	129.189	0.00E+00	1.15E-01	2.30E-01	0.0250	3.214E+12
Am-242m	4.3410E-07	64.594	129.189	0.00E+00	2.80E-05	5.61E-05	0.0375	2.807E+12
Am-243	1.4907E-06	64.594	129.189	0.00E+00	9.63E-05	1.93E-04	0.0575	2.993E+12
C-14	5.7162E-09	64.594	129.189	0.00E+00	3.69E-07	7.38E-07	0.0850	1.813E+12
Cl-36	1.3124E-32	64.594	129.189	0.00E+00	8.48E-31	1.70E-30	0.1250	1.243E+12
Cm-243	1.8568E-07	64.594	129.189	0.00E+00	1.20E-05	2.40E-05	0.2250	1.562E+12
Cm-244	3.5512E-05	64.594	129.189	0.00E+00	2.29E-03	4.59E-03	0.3750	6.841E+11
Co-60	1.0261E-05	64.594	129.189	0.00E+00	6.63E-04	1.33E-03	0.5750	1.110E+13
Cs-134	1.6931E-02	64.594	129.189	0.00E+00	1.09E+00	2.19E+00	0.8500	2.638E+11
Cs-135	3.4477E-06	64.594	129.189	0.00E+00	2.23E-04	4.45E-04	1.2500	1.332E+11
Cs-137	2.2800E+00	64.594	129.189	0.00E+00	1.47E+02	2.95E+02	1.7500	5.584E+09
Eu-154	3.6656E-02	64.594	129.189	0.00E+00	2.37E+00	4.74E+00	2.2500	6.985E+06
Eu-155	9.6841E-03	64.594	129.189	0.00E+00	6.26E-01	1.25E+00	2.7500	4.197E+05
Fe-55	4.6977E-04	64.594	129.189	0.00E+00	3.03E-02	6.07E-02	3.5000	2.669E+04
H-3	6.0485E-03	64.594	129.189	0.00E+00	3.91E-01	7.81E-01	5.0000	6.196E+01
I-129	7.5300E-07	64.594	129.189	0.00E+00	4.86E-05	9.73E-05	7.0000	6.863E+09
Kr-85	1.4989E-01	64.594	129.189	0.00E+00	9.68E+00	1.94E+01	11.0000	7.706E-01
Np-237	9.5534E-06	64.594	129.189	0.00E+00	6.17E-04	1.23E-03		
Pa-231	1.6550E-09	64.594	129.189	0.00E+00	1.07E-07	2.14E-07		
Pb-210	2.6631E-11	64.594	129.189	0.00E+00	1.72E-09	3.44E-09		
Pm-147	1.8156E-01	64.594	129.189	0.00E+00	1.17E+01	2.35E+01		
Pu-238	1.8990E-02	64.594	129.189	0.00E+00	1.23E+00	2.45E+00		
Pu-239	4.2838E-04	64.594	129.189	0.00E+00	2.77E-02	5.53E-02		
Pu-240	2.4379E-04	64.594	129.189	0.00E+00	1.57E-02	3.15E-02		
Pu-241	4.2511E-02	64.594	129.189	0.00E+00	2.75E+00	5.49E+00		
Pu-242	3.6329E-07	64.594	129.189	0.00E+00	2.35E-05	4.69E-05		
Ra-226	1.4725E-10	64.594	129.189	0.00E+00	9.51E-09	1.90E-08		
Ra-228	8.9760E-15	64.594	129.189	0.00E+00	5.80E-13	1.16E-12		
Ru-106	1.9752E-04	64.594	129.189	0.00E+00	1.28E-02	2.55E-02		
Se-79	1.2933E-05	64.594	129.189	0.00E+00	8.35E-04	1.67E-03		
Sn-126	1.1574E-05	64.594	129.189	0.00E+00	7.48E-04	1.50E-03		
Sr-90	2.1680E+00	64.594	129.189	0.00E+00	1.40E+02	2.80E+02		
Tc-99	4.2239E-04	64.594	129.189	0.00E+00	2.73E-02	5.46E-02		
Th-229	3.9270E-12	64.594	129.189	0.00E+00	2.54E-10	5.07E-10		
Th-230	3.3578E-08	64.594	129.189	0.00E+00	2.17E-06	4.34E-06		
Th-232	1.5452E-14	64.594	129.189	0.00E+00	9.98E-13	2.00E-12		
Tl-208	4.6705E-08	64.594	129.189	0.00E+00	3.02E-06	6.03E-06		
U-232	1.3045E-07	64.594	129.189	0.00E+00	8.43E-06	1.69E-05		
U-233	2.3739E-09	64.594	129.189	0.00E+00	1.53E-07	3.07E-07		
U-234	1.8423E-04	64.594	129.189	0.00E+00	1.19E-02	2.38E-02		
U-235	-2.7235E-06	64.594	0.000	6.87E-03	6.70E-03	6.87E-03		
U-236	1.5493E-05	64.594	129.189	0.00E+00	1.00E-03	2.00E-03		
U-238	-4.2851E-09	64.594	0.000	7.73E-05	7.70E-05	7.73E-05		
Y-90	2.1686E+00	64.594	129.189	0.00E+00	1.40E+02	2.80E+02		
Other Radionuclides					1.40E+02	2.81E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.75E+00	3.50E+00
Total	Total

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 (6061)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	93.25425219	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		64.594	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup assumed to be twice nominal burnup.
Bounding:		129.189	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.06		0.98
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: OMEGA WEST (204)
 SNF ID #: 406
 Fuel Units & Descr: 16 - 18 OR 19 FLAT PLATES
 Heavy Metal Mass: BOL=3.26kg : EOL=2.52kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1992
 Estimates as of: 2010
 Template: ATR (Light Water, Atom., 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"
 0.67

II. Estimates

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
								Avg. MeV
Ac-227	4.5861E-10	871.974	1,743.949	0.00E+00	4.00E-07	8.00E-07		
Am-241	1.7832E-03	871.974	1,743.949	0.00E+00	1.55E+00	3.11E+00	0.0150	2.080E+14
Am-242m	4.3410E-07	871.974	1,743.949	0.00E+00	3.79E-04	7.57E-04	0.0250	4.339E+13
Am-243	1.4907E-06	871.974	1,743.949	0.00E+00	1.30E-03	2.60E-03	0.0375	3.789E+13
C-14	5.7162E-09	871.974	1,743.949	0.00E+00	4.98E-06	9.97E-06	0.0575	4.040E+13
Cl-36	1.3124E-32	871.974	1,743.949	0.00E+00	1.14E-29	2.29E-29	0.0850	2.447E+13
Cm-243	1.8568E-07	871.974	1,743.949	0.00E+00	1.62E-04	3.24E-04	0.1250	1.678E+13
Cm-244	3.5512E-05	871.974	1,743.949	0.00E+00	3.10E-02	6.19E-02	0.2250	2.108E+13
Co-60	1.0261E-05	871.974	1,743.949	0.00E+00	8.95E-03	1.79E-02	0.3750	9.235E+12
Cs-134	1.6931E-02	871.974	1,743.949	0.00E+00	1.48E+01	2.95E+01	0.5750	1.499E+14
Cs-135	3.4477E-06	871.974	1,743.949	0.00E+00	3.01E-03	6.01E-03	0.8500	3.561E+12
Cs-137	2.2800E+00	871.974	1,743.949	0.00E+00	1.99E+03	3.98E+03	1.2500	1.799E+12
Eu-154	3.6656E-02	871.974	1,743.949	0.00E+00	3.20E+01	6.39E+01	1.7500	7.538E+10
Eu-155	9.6841E-03	871.974	1,743.949	0.00E+00	8.44E+00	1.69E+01	2.2500	9.430E+07
Fe-55	4.6977E-04	871.974	1,743.949	0.00E+00	4.10E-01	8.19E-01	2.7500	5.666E+06
H-3	6.0485E-03	871.974	1,743.949	0.00E+00	5.27E+00	1.05E+01	3.5000	3.603E+05
I-129	7.5300E-07	871.974	1,743.949	0.00E+00	6.57E-04	1.31E-03	5.0000	8.330E+02
Kr-85	1.4989E-01	871.974	1,743.949	0.00E+00	1.31E+02	2.61E+02	7.0000	9.226E+01
Np-237	9.5534E-06	871.974	1,743.949	0.00E+00	8.33E-03	1.67E-02	11.0000	1.036E+01
Pa-231	1.6550E-09	871.974	1,743.949	0.00E+00	1.44E-06	2.89E-06		
Pb-210	2.6631E-11	871.974	1,743.949	0.00E+00	2.32E-08	4.64E-08		
Pm-147	1.8156E-01	871.974	1,743.949	0.00E+00	1.58E+02	3.17E+02		
Pu-238	1.8990E-02	871.974	1,743.949	0.00E+00	1.66E+01	3.31E+01		
Pu-239	4.2838E-04	871.974	1,743.949	0.00E+00	3.74E-01	7.47E-01		
Pu-240	2.4379E-04	871.974	1,743.949	0.00E+00	2.13E-01	4.25E-01		
Pu-241	4.2511E-02	871.974	1,743.949	0.00E+00	3.71E+01	7.41E+01		
Pu-242	3.6329E-07	871.974	1,743.949	0.00E+00	3.17E-04	6.34E-04		
Ra-226	1.4725E-10	871.974	1,743.949	0.00E+00	1.28E-07	2.57E-07		
Ra-228	8.9760E-15	871.974	1,743.949	0.00E+00	7.83E-12	1.57E-11		
Ru-106	1.9752E-04	871.974	1,743.949	0.00E+00	1.72E-01	3.44E-01		
Se-79	1.2933E-05	871.974	1,743.949	0.00E+00	1.13E-02	2.26E-02		
Sn-126	1.1574E-05	871.974	1,743.949	0.00E+00	1.01E-02	2.02E-02		
Sr-90	2.1680E+00	871.974	1,743.949	0.00E+00	1.89E+03	3.78E+03		
Tc-99	4.2239E-04	871.974	1,743.949	0.00E+00	3.68E-01	7.37E-01		
Th-229	3.9270E-12	871.974	1,743.949	0.00E+00	3.42E-09	6.85E-09		
Th-230	3.3578E-08	871.974	1,743.949	0.00E+00	2.93E-05	5.86E-05		
Th-232	1.5452E-14	871.974	1,743.949	0.00E+00	1.35E-11	2.69E-11		
Tl-208	4.6705E-08	871.974	1,743.949	0.00E+00	4.07E-05	8.15E-05		
U-232	1.3045E-07	871.974	1,743.949	0.00E+00	1.14E-04	2.27E-04		
U-233	2.3739E-09	871.974	1,743.949	0.00E+00	2.07E-06	4.14E-06		
U-234	1.8423E-04	871.974	1,743.949	0.00E+00	1.61E-01	3.21E-01		
U-235	-2.7235E-06	871.974	0.000	6.57E-03	4.19E-03	6.57E-03		
U-236	1.5493E-05	871.974	1,743.949	0.00E+00	1.35E-02	2.70E-02		
U-238	-4.2851E-09	871.974	0.000	7.53E-05	7.16E-05	7.53E-05		
Y-90	2.1686E+00	871.974	1,743.949	0.00E+00	1.89E+03	3.78E+03		
Other Radionuclides					1.90E+03	3.79E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.36E+01	4.72E+01
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:	U3O8	U	
BOL Enrichment %:	93.1372549	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	871.974	700.037	
Bounding:		1,743.949	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.85	0.80	0.95
Bounding:	1.70		

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: OMEGA WEST (236)
 SNF ID #: 407
 Fuel Units & Descr: 44 - 18 OR 19 FLAT PLATES
 Heavy Metal Mass: BOL=10.38kg ; EOL=7.26kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1992
 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"
 1.83

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	4.5861E-10	3,788.935	7,577.869	0.00E+00	1.74E-06	3.48E-06		
Am-241	1.7832E-03	3,788.935	7,577.869	0.00E+00	6.76E+00	1.35E+01	0.0150	9.040E+14
Am-242m	4.3410E-07	3,788.935	7,577.869	0.00E+00	1.64E-03	3.29E-03	0.0250	1.885E+14
Am-243	1.4907E-06	3,788.935	7,577.869	0.00E+00	5.65E-03	1.13E-02	0.0375	1.646E+14
C-14	5.7162E-09	3,788.935	7,577.869	0.00E+00	2.17E-05	4.33E-05	0.0575	1.755E+14
Cl-36	1.3124E-32	3,788.935	7,577.869	0.00E+00	4.97E-29	9.94E-29	0.0850	1.063E+14
Cm-243	1.8568E-07	3,788.935	7,577.869	0.00E+00	7.04E-04	1.41E-03	0.1250	7.289E+13
Cm-244	3.5512E-05	3,788.935	7,577.869	0.00E+00	1.35E-01	2.69E-01	0.2250	9.160E+13
Co-60	1.0261E-05	3,788.935	7,577.869	0.00E+00	3.89E-02	7.78E-02	0.3750	4.013E+13
Cs-134	1.6931E-02	3,788.935	7,577.869	0.00E+00	6.41E+01	1.28E+02	0.5750	6.514E+14
Cs-135	3.4477E-06	3,788.935	7,577.869	0.00E+00	1.31E-02	2.61E-02	0.8500	1.547E+13
Cs-137	2.2800E+00	3,788.935	7,577.869	0.00E+00	8.64E+03	1.73E+04	1.2500	7.816E+12
Eu-154	3.6656E-02	3,788.935	7,577.869	0.00E+00	1.39E+02	2.78E+02	1.7500	3.275E+11
Eu-155	9.6841E-03	3,788.935	7,577.869	0.00E+00	3.67E+01	7.34E+01	2.2500	4.097E+08
Fe-55	4.6977E-04	3,788.935	7,577.869	0.00E+00	1.78E+00	3.56E+00	2.7500	2.462E+07
H-3	6.0485E-03	3,788.935	7,577.869	0.00E+00	2.29E+01	4.58E+01	3.5000	1.565E+06
I-129	7.5300E-07	3,788.935	7,577.869	0.00E+00	2.85E-03	5.71E-03	5.0000	3.619E+03
Kr-85	1.4989E-01	3,788.935	7,577.869	0.00E+00	5.68E+02	1.14E+03	7.0000	4.009E+02
Np-237	9.5534E-06	3,788.935	7,577.869	0.00E+00	3.62E-02	7.24E-02	11.0000	4.501E+01
Pa-231	1.6550E-09	3,788.935	7,577.869	0.00E+00	6.27E-06	1.25E-05		
Pb-210	2.6631E-11	3,788.935	7,577.869	0.00E+00	1.01E-07	2.02E-07		
Pm-147	1.8156E-01	3,788.935	7,577.869	0.00E+00	6.88E+02	1.38E+03		
Pu-238	1.8990E-02	3,788.935	7,577.869	0.00E+00	7.20E+01	1.44E+02		
Pu-239	4.2838E-04	3,788.935	7,577.869	0.00E+00	1.62E+00	3.25E+00		
Pu-240	2.4379E-04	3,788.935	7,577.869	0.00E+00	9.24E-01	1.85E+00		
Pu-241	4.2511E-02	3,788.935	7,577.869	0.00E+00	1.61E+02	3.22E+02		
Pu-242	3.6329E-07	3,788.935	7,577.869	0.00E+00	1.38E-03	2.75E-03		
Ra-226	1.4725E-10	3,788.935	7,577.869	0.00E+00	5.58E-07	1.12E-06		
Ra-228	8.9760E-15	3,788.935	7,577.869	0.00E+00	3.40E-11	6.80E-11		
Ru-106	1.9752E-04	3,788.935	7,577.869	0.00E+00	7.48E-01	1.50E+00		
Se-79	1.2933E-05	3,788.935	7,577.869	0.00E+00	4.90E-02	9.80E-02		
Sn-126	1.1574E-05	3,788.935	7,577.869	0.00E+00	4.39E-02	8.77E-02		
Sr-90	2.1680E+00	3,788.935	7,577.869	0.00E+00	8.21E+03	1.64E+04		
Tc-99	4.2239E-04	3,788.935	7,577.869	0.00E+00	1.60E+00	3.20E+00		
Th-229	3.9270E-12	3,788.935	7,577.869	0.00E+00	1.49E-08	2.98E-08		
Th-230	3.3578E-08	3,788.935	7,577.869	0.00E+00	1.27E-04	2.54E-04		
Th-232	1.5452E-14	3,788.935	7,577.869	0.00E+00	5.85E-11	1.17E-10		
Tl-208	4.6705E-08	3,788.935	7,577.869	0.00E+00	1.77E-04	3.54E-04		
U-232	1.3045E-07	3,788.935	7,577.869	0.00E+00	4.94E-04	9.89E-04		
U-233	2.3739E-09	3,788.935	7,577.869	0.00E+00	8.99E-06	1.80E-05		
U-234	1.8423E-04	3,788.935	7,577.869	0.00E+00	6.98E-01	1.40E+00		
U-235	2.7235E-06	3,788.935	0.000	2.09E-02	1.06E-02	2.09E-02		
U-236	1.5493E-05	3,788.935	7,577.869	0.00E+00	5.87E-02	1.17E-01		
U-238	4.2851E-09	3,788.935	0.000	2.37E-04	2.20E-04	2.37E-04		
Y-90	2.1686E+00	3,788.935	7,577.869	0.00E+00	8.22E+03	1.64E+04		
Other Radionuclides					8.24E+03	1.65E+04		

Thermal Power		
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
1.03E+02	2.05E+02	
Total	Total	

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:	U3O8	U	
BOL Enrichment %:	93.22033898	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	3,788.935	2,954.322	
Bounding:		7,577.869	

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:	1.16	0.78	
Bounding:	2.32		

Estimated EOL HM/Given EOL HM: 0.91

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: OMEGA WEST (250)
 SNF ID #: 408
 Fuel Units & Descr: 27 - 18 OR 19 FLAT PLATES
 Heavy Metal Mass: BOL=6.75kg ; EOL=5.20kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1992
 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"
 1.13

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	4.5861E-10	1,594.343	3,188.687	0.00E+00	7.31E-07	1.46E-06		
Am-241	1.7832E-03	1,594.343	3,188.687	0.00E+00	2.84E+00	5.69E+00	0.0150	3.804E+14
Am-242m	4.3410E-07	1,594.343	3,188.687	0.00E+00	6.92E-04	1.38E-03	0.0250	7.933E+13
Am-243	1.4907E-06	1,594.343	3,188.687	0.00E+00	2.38E-03	4.75E-03	0.0375	6.927E+13
C-14	5.7162E-09	1,594.343	3,188.687	0.00E+00	9.11E-06	1.82E-05	0.0575	7.386E+13
Cl-36	1.3124E-32	1,594.343	3,188.687	0.00E+00	2.09E-29	4.18E-29	0.0850	4.474E+13
Cm-243	1.8568E-07	1,594.343	3,188.687	0.00E+00	2.96E-04	5.92E-04	0.1250	3.067E+13
Cm-244	3.5512E-05	1,594.343	3,188.687	0.00E+00	5.66E-02	1.13E-01	0.2250	3.855E+13
Co-60	1.0261E-05	1,594.343	3,188.687	0.00E+00	1.64E-02	3.27E-02	0.3750	1.688E+13
Cs-134	1.6931E-02	1,594.343	3,188.687	0.00E+00	2.70E+01	5.40E+01	0.5750	2.741E+14
Cs-135	3.4477E-06	1,594.343	3,188.687	0.00E+00	5.50E-03	1.10E-02	0.8500	6.510E+12
Cs-137	2.2800E+00	1,594.343	3,188.687	0.00E+00	3.64E+03	7.27E+03	1.2500	3.289E+12
Eu-154	3.6656E-02	1,594.343	3,188.687	0.00E+00	5.84E+01	1.17E+02	1.7500	1.378E+11
Eu-155	9.6841E-03	1,594.343	3,188.687	0.00E+00	1.54E+01	3.09E+01	2.2500	1.724E+08
Fe-55	4.6977E-04	1,594.343	3,188.687	0.00E+00	7.49E-01	1.50E+00	2.7500	1.036E+07
H-3	6.0485E-03	1,594.343	3,188.687	0.00E+00	9.64E+00	1.93E+01	3.5000	6.587E+05
I-129	7.5300E-07	1,594.343	3,188.687	0.00E+00	1.20E-03	2.40E-03	5.0000	1.523E+03
Kr-85	1.4989E-01	1,594.343	3,188.687	0.00E+00	2.39E+02	4.78E+02	7.0000	1.687E+02
Np-237	9.5534E-06	1,594.343	3,188.687	0.00E+00	1.52E-02	3.05E-02	11.0000	1.894E+01
Pa-231	1.6550E-09	1,594.343	3,188.687	0.00E+00	2.64E-06	5.28E-06		
Pb-210	2.6631E-11	1,594.343	3,188.687	0.00E+00	4.25E-08	8.49E-08		
Pm-147	1.8156E-01	1,594.343	3,188.687	0.00E+00	2.89E+02	5.79E+02		
Pu-238	1.8990E-02	1,594.343	3,188.687	0.00E+00	3.03E+01	6.06E+01		
Pu-239	4.2838E-04	1,594.343	3,188.687	0.00E+00	6.83E-01	1.37E+00		
Pu-240	2.4379E-04	1,594.343	3,188.687	0.00E+00	3.89E-01	7.77E-01		
Pu-241	4.2511E-02	1,594.343	3,188.687	0.00E+00	6.78E+01	1.36E+02		
Pu-242	3.6329E-07	1,594.343	3,188.687	0.00E+00	5.79E-04	1.16E-03		
Ra-226	1.4725E-10	1,594.343	3,188.687	0.00E+00	2.35E-07	4.70E-07		
Ra-228	8.9760E-15	1,594.343	3,188.687	0.00E+00	1.43E-11	2.86E-11		
Ru-106	1.9752E-04	1,594.343	3,188.687	0.00E+00	3.15E-01	6.30E-01		
Se-79	1.2933E-05	1,594.343	3,188.687	0.00E+00	2.06E-02	4.12E-02		
Sn-126	1.1574E-05	1,594.343	3,188.687	0.00E+00	1.85E-02	3.69E-02		
Sr-90	2.1680E+00	1,594.343	3,188.687	0.00E+00	3.46E+03	6.91E+03		
Tc-99	4.2239E-04	1,594.343	3,188.687	0.00E+00	6.73E-01	1.35E+00		
Th-229	3.9270E-12	1,594.343	3,188.687	0.00E+00	6.26E-09	1.25E-08		
Th-230	3.3578E-08	1,594.343	3,188.687	0.00E+00	5.35E-05	1.07E-04		
Th-232	1.5452E-14	1,594.343	3,188.687	0.00E+00	2.46E-11	4.93E-11		
Tl-208	4.6705E-08	1,594.343	3,188.687	0.00E+00	7.45E-05	1.49E-04		
U-232	1.3045E-07	1,594.343	3,188.687	0.00E+00	2.08E-04	4.16E-04		
U-233	2.3739E-09	1,594.343	3,188.687	0.00E+00	3.78E-06	7.57E-06		
U-234	1.8423E-04	1,594.343	3,188.687	0.00E+00	2.94E-01	5.87E-01		
U-235	-2.7235E-06	1,594.343	0.000	1.36E-02	9.23E-03	1.36E-02		
U-236	1.5493E-05	1,594.343	3,188.687	0.00E+00	2.47E-02	4.94E-02		
U-238	-4.2851E-09	1,594.343	0.000	1.58E-04	1.51E-04	1.58E-04		
Y-90	2.1686E+00	1,594.343	3,188.687	0.00E+00	3.46E+03	6.91E+03		
Other Radionuclides					3.47E+03	6.93E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.31E+01	8.63E+01
Total	Total

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:	U3O8	U	
BOL Enrichment %:	93.048	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	1,594.343	1,467.691	
Bounding:		3,188.687	

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:	0.75	0.92	
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: ORR
 SNF ID #: 753
 Fuel Units & Descr: 4 - 19 CURVED PLATES
 Heavy Metal Mass: BOL= 72kg ; EOL= 31kg
 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"
 0.11

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	2.0068E-09	386.763	678.066	0.00E+00	7.76E-07	1.36E-06	0.0150	4.994E+13
Am-241	2.5251E-03	386.763	678.066	0.00E+00	9.77E-01	1.71E+00	0.0250	1.037E+13
Am-242m	3.9624E-07	386.763	678.066	0.00E+00	1.53E-04	2.69E-04	0.0375	9.014E+12
Am-243	1.4880E-06	386.763	678.066	0.00E+00	5.76E-04	1.01E-03	0.0575	9.702E+12
C-14	5.7053E-09	386.763	678.066	0.00E+00	2.21E-06	3.87E-06	0.0850	5.846E+12
Cl-36	1.3124E-32	386.763	678.066	0.00E+00	5.08E-30	8.90E-30	0.1250	3.861E+12
Cm-243	1.1419E-07	386.763	678.066	0.00E+00	4.42E-05	7.74E-05	0.2250	5.047E+12
Cm-244	1.6522E-05	386.763	678.066	0.00E+00	6.39E-03	1.12E-02	0.3750	2.195E+12
Co-60	7.4047E-07	386.763	678.066	0.00E+00	2.86E-04	5.02E-04	0.5750	3.629E+13
Cs-134	2.0455E-05	386.763	678.066	0.00E+00	7.91E-03	1.39E-02	0.8500	4.432E+11
Cs-135	3.4477E-06	386.763	678.066	0.00E+00	1.33E-03	2.34E-03	1.2500	2.144E+11
Cs-137	1.4365E+00	386.763	678.066	0.00E+00	5.56E+02	9.74E+02	1.7500	1.207E+10
Eu-154	7.3229E-03	386.763	678.066	0.00E+00	2.83E+00	4.97E+00	2.2500	1.009E+06
Eu-155	5.9259E-04	386.763	678.066	0.00E+00	2.29E-01	4.02E-01	2.7500	9.628E+05
Fe-55	2.2791E-06	386.763	678.066	0.00E+00	8.81E-04	1.55E-03	3.5000	5.578E+02
H-3	1.9698E-03	386.763	678.066	0.00E+00	7.62E-01	1.34E+00	5.0000	2.279E+02
I-129	7.5300E-07	386.763	678.066	0.00E+00	2.91E-04	5.11E-04	7.0000	2.494E+01
Kr-85	4.1176E-02	386.763	678.066	0.00E+00	1.59E+01	2.79E+01	11.0000	2.781E+00
Np-237	9.5752E-06	386.763	678.066	0.00E+00	3.70E-03	6.49E-03		
Pa-231	3.9379E-09	386.763	678.066	0.00E+00	1.52E-06	2.67E-06		
Pb-210	3.3115E-10	386.763	678.066	0.00E+00	1.28E-07	2.25E-07		
Pm-147	9.2402E-04	386.763	678.066	0.00E+00	3.57E-01	6.27E-01		
Pu-238	1.6217E-02	386.763	678.066	0.00E+00	6.27E+00	1.10E+01		
Pu-239	4.2810E-04	386.763	678.066	0.00E+00	1.66E-01	2.90E-01		
Pu-240	2.4333E-04	386.763	678.066	0.00E+00	9.41E-02	1.65E-01		
Pu-241	1.6242E-02	386.763	678.066	0.00E+00	6.28E+00	1.10E+01		
Pu-242	3.6329E-07	386.763	678.066	0.00E+00	1.41E-04	2.46E-04		
Ra-226	9.0114E-10	386.763	678.066	0.00E+00	3.49E-07	6.11E-07		
Ra-228	3.1019E-14	386.763	678.066	0.00E+00	1.20E-11	2.10E-11		
Ru-106	2.1225E-10	386.763	678.066	0.00E+00	8.21E-08	1.44E-07		
Se-79	1.2930E-05	386.763	678.066	0.00E+00	5.00E-03	8.77E-03		
Sn-126	1.1571E-05	386.763	678.066	0.00E+00	4.48E-03	7.85E-03		
Sr-90	1.3472E+00	386.763	678.066	0.00E+00	5.21E+02	9.14E+02		
Tc-99	4.2239E-04	386.763	678.066	0.00E+00	1.63E-01	2.86E-01		
Th-229	1.2407E-11	386.763	678.066	0.00E+00	4.80E-09	8.41E-09		
Th-230	8.3497E-08	386.763	678.066	0.00E+00	3.23E-05	5.66E-05		
Th-232	3.8371E-14	386.763	678.066	0.00E+00	1.48E-11	2.60E-11		
Ti-208	4.0414E-08	386.763	678.066	0.00E+00	1.56E-05	2.74E-05		
U-232	1.0948E-07	386.763	678.066	0.00E+00	4.23E-05	7.42E-05		
U-233	3.6275E-09	386.763	678.066	0.00E+00	1.40E-06	2.46E-06		
U-234	1.8562E-04	386.763	678.066	0.00E+00	7.18E-02	1.26E-01		
U-235	-2.7235E-06	386.763	0.000	1.44E-03	3.90E-04	1.44E-03		
U-236	1.5493E-05	386.763	678.066	0.00E+00	5.99E-03	1.05E-02		
U-238	-4.2851E-09	386.763	0.000	1.61E-05	1.45E-05	1.61E-05		
Y-90	1.3475E+00	386.763	678.066	0.00E+00	5.21E+02	9.14E+02		
Other Radionuclides					5.29E+02	9.28E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.47E+00	1.13E+01
Total	Total

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:	U3O8	U	
BOL Enrichment %:	93.29608939	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		386.763	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		678.066	Bounding burnup calculated assuming all BOL heavy metal burned.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	1.72		1.08
Bounding:	3.01		

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: ORR
 SNF ID #: 903
 Fuel Units & Descr: 97 - 19 CURVED PLATES
 Heavy Metal Mass: BOL=29.64kg ; EOL=20.78kg
 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"
 2.69

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	2.0068E-09	8,396.085	16,792.169	0.00E+00	1.68E-05	3.37E-05	0.0150	1.237E+15
Am-241	2.5251E-03	8,396.085	16,792.169	0.00E+00	2.12E+01	4.24E+01	0.0250	2.568E+14
Am-242m	3.9624E-07	8,396.085	16,792.169	0.00E+00	3.33E-03	6.65E-03	0.0375	2.232E+14
Am-243	1.4880E-06	8,396.085	16,792.169	0.00E+00	1.25E-02	2.50E-02	0.0575	2.403E+14
C-14	5.7053E-09	8,396.085	16,792.169	0.00E+00	4.79E-05	9.58E-05	0.0850	1.448E+14
Cl-36	1.3124E-32	8,396.085	16,792.169	0.00E+00	1.10E-28	2.20E-28	0.1250	9.562E+13
Co-243	1.1419E-07	8,396.085	16,792.169	0.00E+00	9.59E-04	1.92E-03	0.2250	1.250E+14
Co-244	1.6522E-05	8,396.085	16,792.169	0.00E+00	1.39E-01	2.77E-01	0.3750	5.437E+13
Co-60	7.4047E-07	8,396.085	16,792.169	0.00E+00	6.22E-03	1.24E-02	0.5750	8.986E+14
Cs-134	2.0455E-05	8,396.085	16,792.169	0.00E+00	1.72E-01	3.43E-01	0.8500	1.098E+13
Cs-135	3.4477E-06	8,396.085	16,792.169	0.00E+00	2.89E-02	5.79E-02	1.2500	5.309E+12
Cs-137	1.4365E+00	8,396.085	16,792.169	0.00E+00	1.21E+04	2.41E+04	1.7500	2.989E+11
Eu-154	7.3230E-03	8,396.085	16,792.169	0.00E+00	6.15E+01	1.23E+02	2.2500	2.499E+07
Eu-155	5.9259E-04	8,396.085	16,792.169	0.00E+00	4.98E+00	9.95E+00	2.7500	2.394E+07
Fe-55	2.2791E-06	8,396.085	16,792.169	0.00E+00	1.91E-02	3.83E-02	3.5000	1.382E+04
H-3	1.9698E-03	8,396.085	16,792.169	0.00E+00	1.65E+01	3.31E+01	5.0000	5.644E+03
I-129	7.5300E-07	8,396.085	16,792.169	0.00E+00	6.32E-03	1.26E-02	7.0000	6.178E+02
Kr-85	4.1176E-02	8,396.085	16,792.169	0.00E+00	3.46E+02	6.91E+02	11.0000	6.888E+01
Np-237	9.5752E-06	8,396.085	16,792.169	0.00E+00	8.04E-02	1.61E-01		
Pa-231	3.9379E-09	8,396.085	16,792.169	0.00E+00	3.31E-05	6.61E-05		
Pb-210	3.3115E-10	8,396.085	16,792.169	0.00E+00	2.78E-06	5.56E-06		
Pm-147	9.2402E-04	8,396.085	16,792.169	0.00E+00	7.76E+00	1.55E+01		
Pu-238	1.6217E-02	8,396.085	16,792.169	0.00E+00	1.36E+02	2.72E+02		
Pu-239	4.2810E-04	8,396.085	16,792.169	0.00E+00	3.59E+00	7.19E+00		
Pu-240	2.4333E-04	8,396.085	16,792.169	0.00E+00	2.04E+00	4.09E+00		
Pu-241	1.6242E-02	8,396.085	16,792.169	0.00E+00	1.36E+02	2.73E+02		
Pu-242	3.6329E-07	8,396.085	16,792.169	0.00E+00	3.05E-03	6.10E-03		
Ra-226	9.0114E-10	8,396.085	16,792.169	0.00E+00	7.57E-06	1.51E-05		
Ra-228	3.1019E-14	8,396.085	16,792.169	0.00E+00	2.60E-10	5.21E-10		
Ru-106	2.1225E-10	8,396.085	16,792.169	0.00E+00	1.78E-06	3.56E-06		
Se-79	1.2930E-05	8,396.085	16,792.169	0.00E+00	1.09E-01	2.17E-01		
Sn-126	1.1571E-05	8,396.085	16,792.169	0.00E+00	9.72E-02	1.94E-01		
Sr-90	1.3472E+00	8,396.085	16,792.169	0.00E+00	1.13E+04	2.26E+04		
Tc-99	4.2239E-04	8,396.085	16,792.169	0.00E+00	3.55E+00	7.09E+00		
Th-229	1.2407E-11	8,396.085	16,792.169	0.00E+00	1.04E-07	2.08E-07		
Th-230	8.3497E-08	8,396.085	16,792.169	0.00E+00	7.01E-04	1.40E-03		
Th-232	3.8371E-14	8,396.085	16,792.169	0.00E+00	3.22E-10	6.44E-10		
Th-208	4.0414E-08	8,396.085	16,792.169	0.00E+00	3.39E-04	6.79E-04		
U-232	1.0948E-07	8,396.085	16,792.169	0.00E+00	9.19E-04	1.84E-03		
U-233	3.6275E-09	8,396.085	16,792.169	0.00E+00	3.05E-05	6.09E-05		
U-234	1.8562E-04	8,396.085	16,792.169	0.00E+00	1.56E+00	3.12E+00		
U-235	-2.7235E-06	8,396.085	0.000	5.97E-02	3.68E-02	5.97E-02		
U-236	1.5493E-05	8,396.085	16,792.169	0.00E+00	1.30E-01	2.60E-01		
U-238	-4.2851E-09	8,396.085	0.000	6.82E-04	6.46E-04	6.82E-04		
Y-90	1.3475E+00	8,396.085	16,792.169	0.00E+00	1.13E+04	2.26E+04		
Other Radionuclides					1.15E+04	2.30E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.41E+02	2.81E+02
Total	Total

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:	U3O8	U	
BOL Enrichment %:	93.15626243	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		8,396.085	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		16,792.169	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.90		1.02
Bounding:	1.80		

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: ORR
 SNF ID #: 944
 Fuel Units & Descr: 33 - 19 CURVED PLATES
 Heavy Metal Mass: BOL=56.54kg ; EOL=53.65kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1987
 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"
 1.38

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	6.6313E-10	2,731.393	5,462.787	0.00E+00	1.81E-06	3.62E-06	0.0150	5.766E+14
Am-241	2.0060E-03	2,731.393	5,462.787	0.00E+00	5.48E+00	1.10E+01	0.0250	1.199E+14
Am-242m	4.2429E-07	2,731.393	5,462.787	0.00E+00	1.16E-03	2.32E-03	0.0375	1.046E+14
Am-243	1.4899E-06	2,731.393	5,462.787	0.00E+00	4.07E-03	8.14E-03	0.0575	1.120E+14
C-14	5.7135E-09	2,731.393	5,462.787	0.00E+00	1.56E-05	3.12E-05	0.0850	6.769E+13
Cl-36	1.3124E-32	2,731.393	5,462.787	0.00E+00	3.58E-29	7.17E-29	0.1250	4.581E+13
Cm-243	1.6443E-07	2,731.393	5,462.787	0.00E+00	4.49E-04	8.98E-04	0.2250	5.841E+13
Cm-244	2.9330E-05	2,731.393	5,462.787	0.00E+00	8.01E-02	1.60E-01	0.3750	2.542E+13
Co-60	5.3186E-06	2,731.393	5,462.787	0.00E+00	1.45E-02	2.91E-02	0.5750	4.147E+14
Cs-134	3.1563E-03	2,731.393	5,462.787	0.00E+00	8.62E+00	1.72E+01	0.8500	7.012E+12
Cs-135	3.4477E-06	2,731.393	5,462.787	0.00E+00	9.42E-03	1.88E-02	1.2500	4.004E+12
Cs-137	2.0313E+00	2,731.393	5,462.787	0.00E+00	5.55E+03	1.11E+04	1.7500	1.838E+11
Eu-154	2.4513E-02	2,731.393	5,462.787	0.00E+00	6.70E+01	1.34E+02	2.2500	1.612E+07
Eu-155	4.8175E-03	2,731.393	5,462.787	0.00E+00	1.32E+01	2.63E+01	2.7500	9.113E+06
Fe-55	1.2397E-04	2,731.393	5,462.787	0.00E+00	3.39E-01	6.77E-01	3.5000	4.196E+04
H-3	4.5697E-03	2,731.393	5,462.787	0.00E+00	1.25E+01	2.50E+01	5.0000	2.401E+03
I-129	7.5300E-07	2,731.393	5,462.787	0.00E+00	2.06E-03	4.11E-03	7.0000	2.653E+02
Kr-85	1.0850E-01	2,731.393	5,462.787	0.00E+00	2.96E+02	5.93E+02	11.0000	2.974E+01
Np-237	9.5561E-06	2,731.393	5,462.787	0.00E+00	2.61E-02	5.22E-02		
Pa-231	2.0359E-09	2,731.393	5,462.787	0.00E+00	5.56E-06	1.11E-05		
Pb-210	4.9728E-11	2,731.393	5,462.787	0.00E+00	1.36E-07	2.72E-07		
Pm-147	4.8502E-02	2,731.393	5,462.787	0.00E+00	1.32E+02	2.65E+02		
Pu-238	1.8254E-02	2,731.393	5,462.787	0.00E+00	4.99E+01	9.97E+01		
Pu-239	4.2810E-04	2,731.393	5,462.787	0.00E+00	1.17E+00	2.34E+00		
Pu-240	2.4368E-04	2,731.393	5,462.787	0.00E+00	6.66E-01	1.33E+00		
Pu-241	3.3415E-02	2,731.393	5,462.787	0.00E+00	9.13E+01	1.83E+02		
Pu-242	3.6329E-07	2,731.393	5,462.787	0.00E+00	9.92E-04	1.98E-03		
Ra-226	2.2854E-10	2,731.393	5,462.787	0.00E+00	6.24E-07	1.25E-06		
Ra-228	1.2426E-14	2,731.393	5,462.787	0.00E+00	3.39E-11	6.79E-11		
Ru-106	6.3589E-06	2,731.393	5,462.787	0.00E+00	1.74E-02	3.47E-02		
Se-79	1.2933E-05	2,731.393	5,462.787	0.00E+00	3.53E-02	7.07E-02		
Sn-126	1.1574E-05	2,731.393	5,462.787	0.00E+00	3.16E-02	6.32E-02		
Sr-90	1.9248E+00	2,731.393	5,462.787	0.00E+00	5.26E+03	1.05E+04		
Tc-99	4.2239E-04	2,731.393	5,462.787	0.00E+00	1.15E+00	2.31E+00		
Th-229	5.0953E-12	2,731.393	5,462.787	0.00E+00	1.39E-08	2.78E-08		
Th-230	4.1885E-08	2,731.393	5,462.787	0.00E+00	1.14E-04	2.29E-04		
Th-232	1.9270E-14	2,731.393	5,462.787	0.00E+00	5.26E-11	1.05E-10		
Tl-208	4.6024E-08	2,731.393	5,462.787	0.00E+00	1.26E-04	2.51E-04		
U-232	1.2582E-07	2,731.393	5,462.787	0.00E+00	3.44E-04	6.87E-04		
U-233	2.5825E-09	2,731.393	5,462.787	0.00E+00	7.05E-06	1.41E-05		
U-234	1.8450E-04	2,731.393	5,462.787	0.00E+00	5.04E-01	1.01E+00		
U-235	-2.7235E-06	2,731.393	0.000	2.42E-02	1.68E-02	2.42E-02		
U-236	1.5493E-05	2,731.393	5,462.787	0.00E+00	4.23E-02	8.46E-02		
U-238	-4.2851E-09	2,731.393	0.000	1.52E-02	1.52E-02	1.52E-02		
Y-90	1.9254E+00	2,731.393	5,462.787	0.00E+00	5.26E+03	1.05E+04		
Other Radionuclides								

Thermal Power		
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
6.51E+01	1.30E+02	
Total	Total	

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:	ALUM	ALUM	
BOL HM Constituents:	U3Si2	U	
BOL Enrichment %:	19.8176038	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:		2,731.393	
Bounding:		5,462.787	

Checks			Estimated EOL HM/Given EOL HM 1.00
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.15		
Bounding:	0.31		

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: ORR
 SNF ID #: 165
 Fuel Units & Descr: 52 - 19 CURVED PLATES
 Heavy Metal Mass: BOL=87.95kg ; EOL=83.29kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1987
 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"
 1.44

Radionuclide	m		x _n		x _b		b		y _n		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)	Avg. MeV					
Ac-227	6.6313E-10	4,412.353	8,824.706	0.00E+00	2.93E-06	5.85E-06								
Am-241	2.0060E-03	4,412.353	8,824.706	0.00E+00	8.85E+00	1.77E+01								
Am-242m	4.2429E-07	4,412.353	8,824.706	0.00E+00	1.87E-03	3.74E-03								
Am-243	1.4899E-06	4,412.353	8,824.706	0.00E+00	6.57E-03	1.31E-02								
C-14	5.7135E-09	4,412.353	8,824.706	0.00E+00	5.29E-05	5.04E-05								
Cl-36	1.3124E-02	4,412.353	8,824.706	0.00E+00	5.79E-09	1.16E-08								
Cm-243	1.6443E-07	4,412.353	8,824.706	0.00E+00	7.26E-04	1.45E-03								
Cm-244	2.9330E-05	4,412.353	8,824.706	0.00E+00	1.29E-01	2.59E-01								
Co-60	5.3186E-06	4,412.353	8,824.706	0.00E+00	2.35E-02	4.69E-02								
Cs-134	3.1563E-03	4,412.353	8,824.706	0.00E+00	1.39E+01	2.79E+01								
Cs-135	3.4477E-06	4,412.353	8,824.706	0.00E+00	1.52E-02	3.04E-02								
Cs-137	2.0313E+00	4,412.353	8,824.706	0.00E+00	8.96E+03	1.79E+04								
Eu-154	2.4513E-02	4,412.353	8,824.706	0.00E+00	1.08E+02	2.16E+02								
Eu-155	4.8175E-03	4,412.353	8,824.706	0.00E+00	2.13E+01	4.25E+01								
Fe-55	1.2397E-04	4,412.353	8,824.706	0.00E+00	5.47E-01	1.09E+00								
H-3	4.5697E-03	4,412.353	8,824.706	0.00E+00	2.02E+01	4.03E+01								
I-129	7.5300E-07	4,412.353	8,824.706	0.00E+00	3.32E-03	6.64E-03								
Kr-85	1.0850E-01	4,412.353	8,824.706	0.00E+00	4.79E+02	9.57E+02								
Np-237	9.5561E-06	4,412.353	8,824.706	0.00E+00	4.22E-02	8.43E-02								
Pa-231	2.0359E-09	4,412.353	8,824.706	0.00E+00	8.98E-06	1.80E-05								
Pb-210	4.9728E-11	4,412.353	8,824.706	0.00E+00	2.19E-07	4.39E-07								
Pm-147	4.8502E-02	4,412.353	8,824.706	0.00E+00	2.14E+02	4.28E+02								
Pu-238	1.8254E-02	4,412.353	8,824.706	0.00E+00	8.05E+01	1.61E+02								
Pu-239	4.2810E-04	4,412.353	8,824.706	0.00E+00	1.89E+00	3.78E+00								
Pu-240	2.4368E-04	4,412.353	8,824.706	0.00E+00	1.08E+00	2.15E+00								
Pu-241	3.3415E-02	4,412.353	8,824.706	0.00E+00	1.47E+02	2.95E+02								
Pu-242	3.6329E-07	4,412.353	8,824.706	0.00E+00	1.60E-03	3.21E-03								
Ra-226	2.2854E-10	4,412.353	8,824.706	0.00E+00	1.01E-06	2.02E-06								
Ra-228	1.2426E-14	4,412.353	8,824.706	0.00E+00	5.48E-11	1.10E-10								
Ru-106	6.3589E-06	4,412.353	8,824.706	0.00E+00	2.81E-02	5.61E-02								
Se-79	1.2933E-05	4,412.353	8,824.706	0.00E+00	5.71E-02	1.14E-01								
Sn-126	1.1574E-05	4,412.353	8,824.706	0.00E+00	5.11E-02	1.02E-01								
Sr-90	1.9248E+00	4,412.353	8,824.706	0.00E+00	8.49E+03	1.70E+04								
Tc-99	4.2239E-04	4,412.353	8,824.706	0.00E+00	1.86E+00	3.73E+00								
Th-229	5.0953E-12	4,412.353	8,824.706	0.00E+00	2.25E-08	4.50E-08								
Th-230	4.1885E-08	4,412.353	8,824.706	0.00E+00	1.85E-04	3.70E-04								
Th-232	1.9270E-14	4,412.353	8,824.706	0.00E+00	8.50E-11	1.70E-10								
Ti-208	4.6024E-08	4,412.353	8,824.706	0.00E+00	2.03E-04	4.06E-04								
U-232	1.2582E-07	4,412.353	8,824.706	0.00E+00	5.55E-04	1.11E-03								
U-233	2.5825E-09	4,412.353	8,824.706	0.00E+00	1.14E-05	2.28E-05								
U-234	1.8450E-04	4,412.353	8,824.706	0.00E+00	8.14E-01	1.63E+00								
U-235	-2.7235E-06	4,412.353	0.000	3.81E-02	2.61E-02	3.81E-02								
U-236	1.5493E-05	4,412.353	8,824.706	0.00E+00	6.84E-02	1.37E-01								
U-238	-4.2851E-09	4,412.353	0.000	2.36E-02	2.36E-02	2.36E-02								
Y-90	1.9254E+00	4,412.353	8,824.706	0.00E+00	8.50E+03	1.70E+04								
Other Radionuclides					8.53E+03	1.71E+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	This Template was used for the following reasons: This fuel matches on all parameters except enrichment.
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U3Si2	U	
BOL Enrichment %:	20.03831236	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
		4,412.353	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		8,824.706	

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

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: ORR	¹ Fuel decay start date: 1985
SNF ID #: 461	Estimates as of: 2010
Fuel Units & Descr: 17 - 19 CURVED PLATES	Template: ATR (Light Water, Alum., 60 to 100%, U)
Heavy Metal Mass: BOL=4.98kg : EOL=3.25kg	² Template Burnup(MWd): 367.2
ROD Storage Site: SRS	Template BOL Heavy Metal Mass (MT): 0.00116689
	Template Decay Time: 25 years

Estimated
Canister usage:
18"x10"
0.47

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	1.1465E-09	1,637.302	3,274.604	0.00E+00	1.88E-06	3.75E-06	Avg. MeV	
Am-241	2.3056E-03	1,637.302	3,274.604	0.00E+00	3.77E+00	7.55E+00	0.0150	3.064E+14
Am-242m	4.1476E-07	1,637.302	3,274.604	0.00E+00	6.79E-04	1.36E-03	0.0250	6.366E+13
Am-243	1.4894E-06	1,637.302	3,274.604	0.00E+00	2.44E-03	4.88E-03	0.0375	5.544E+13
C-14	5.7108E-09	1,637.302	3,274.604	0.00E+00	9.35E-06	1.87E-05	0.0575	5.953E+13
Cl-36	1.3124E-32	1,637.302	3,274.604	0.00E+00	2.15E-29	4.30E-29	0.0850	3.592E+13
Cm-243	1.4562E-07	1,637.302	3,274.604	0.00E+00	2.38E-04	4.77E-04	0.1250	2.406E+13
Cm-244	2.4221E-05	1,637.302	3,274.604	0.00E+00	3.97E-02	7.93E-02	0.2250	3.101E+13
Co-60	2.7560E-06	1,637.302	3,274.604	0.00E+00	4.51E-03	9.02E-03	0.3750	1.348E+13
Cs-134	5.8851E-04	1,637.302	3,274.604	0.00E+00	9.64E-01	1.93E+00	0.5750	2.210E+14
Cs-135	3.4477E-06	1,637.302	3,274.604	0.00E+00	5.64E-03	1.13E-02	0.8500	3.185E+12
Cs-137	1.8099E+00	1,637.302	3,274.604	0.00E+00	2.96E+03	5.93E+03	1.2500	1.771E+12
Eu-154	1.6386E-02	1,637.302	3,274.604	0.00E+00	2.68E+01	5.37E+01	1.7500	8.752E+10
Eu-155	2.3957E-03	1,637.302	3,274.604	0.00E+00	3.92E+00	7.84E+00	2.2500	6.239E+06
Fe-55	3.2707E-05	1,637.302	3,274.604	0.00E+00	5.36E-02	1.07E-01	2.7500	5.106E+06
H-3	3.4504E-03	1,637.302	3,274.604	0.00E+00	5.65E+00	1.13E+01	3.5000	3.854E+03
I-129	7.5300E-07	1,637.302	3,274.604	0.00E+00	1.23E-03	2.47E-03	5.0000	1.296E+03
Kr-85	7.8540E-02	1,637.302	3,274.604	0.00E+00	1.29E+02	2.57E+02	7.0000	1.426E+02
Np-237	9.5615E-06	1,637.302	3,274.604	0.00E+00	1.57E-02	3.13E-02	11.0000	1.595E+01
Pa-231	2.7968E-09	1,637.302	3,274.604	0.00E+00	4.58E-06	9.16E-06		
Pb-210	1.2612E-10	1,637.302	3,274.604	0.00E+00	2.06E-07	4.13E-07		
Pm-147	1.2952E-02	1,637.302	3,274.604	0.00E+00	2.12E+01	4.24E+01		
Pu-238	1.7549E-02	1,637.302	3,274.604	0.00E+00	2.87E+01	5.75E+01		
Pu-239	4.2810E-04	1,637.302	3,274.604	0.00E+00	7.01E-01	1.40E+00		
Pu-240	2.4357E-04	1,637.302	3,274.604	0.00E+00	3.99E-01	7.98E-01		
Pu-241	2.6277E-02	1,637.302	3,274.604	0.00E+00	4.30E+01	8.60E+01		
Pu-242	3.6329E-07	1,637.302	3,274.604	0.00E+00	5.95E-04	1.19E-03		
Ra-226	4.4444E-10	1,637.302	3,274.604	0.00E+00	7.28E-07	1.46E-06		
Ra-228	1.9714E-14	1,637.302	3,274.604	0.00E+00	3.23E-11	6.46E-11		
Ru-106	2.0477E-07	1,637.302	3,274.604	0.00E+00	3.35E-04	6.71E-04		
Se-79	1.2933E-05	1,637.302	3,274.604	0.00E+00	2.12E-02	4.24E-02		
Sn-126	1.1574E-05	1,637.302	3,274.604	0.00E+00	1.90E-02	3.79E-02		
Sr-90	1.7092E+00	1,637.302	3,274.604	0.00E+00	2.80E+03	5.60E+03		
Tc-99	4.2239E-04	1,637.302	3,274.604	0.00E+00	6.92E-01	1.38E+00		
Th-229	7.7260E-12	1,637.302	3,274.604	0.00E+00	1.26E-08	2.53E-08		
Th-230	5.8497E-08	1,637.302	3,274.604	0.00E+00	9.58E-05	1.92E-04		
Th-232	2.6906E-14	1,637.302	3,274.604	0.00E+00	4.41E-11	8.81E-11		
Ti-208	4.4336E-08	1,637.302	3,274.604	0.00E+00	7.26E-05	1.45E-04		
U-232	1.2037E-07	1,637.302	3,274.604	0.00E+00	1.97E-04	3.94E-04		
U-233	3.0011E-09	1,637.302	3,274.604	0.00E+00	4.91E-06	9.83E-06		
U-234	1.8497E-04	1,637.302	3,274.604	0.00E+00	3.03E-01	6.06E-01		
U-235	-2.7235E-06	1,637.302	0.000	1.00E-02	5.57E-03	1.00E-02		
U-236	1.5493E-05	1,637.302	3,274.604	0.00E+00	2.54E-02	5.07E-02		
U-238	-4.2851E-09	1,637.302	0.000	1.14E-04	1.07E-04	1.14E-04		
Y-90	1.7094E+00	1,637.302	3,274.604	0.00E+00	2.80E+03	5.60E+03		
Other Radionuclides					2.82E+03	5.64E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.46E+01	6.93E+01
Total	Total

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 (6061)	ALUM	
BOL HM Constituents:	U3O8	U	
BOL Enrichment %:	93.19412969	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	0.473	1,637.302	
Bounding:		3,274.604	

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:	1.04	3,460.10	
Bounding:	2.09		

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: ORR
 SNF ID #: 850
 Fuel Units & Descr: 11 - ASSEMBLY
 Heavy Metal Mass: BOL=11.08kg ; EOL=9.91kg
 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"
 0.31

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	2.0068E-09	1,106.308	2,212.616	0.00E+00	2.22E-06	4.44E-06	0.0150	1.630E+14
Am-241	2.5251E-03	1,106.308	2,212.616	0.00E+00	2.79E+00	5.59E+00	0.0250	3.384E+13
Am-242m	3.9624E-07	1,106.308	2,212.616	0.00E+00	4.38E-04	8.77E-04	0.0375	2.941E+13
Am-243	1.4880E-06	1,106.308	2,212.616	0.00E+00	1.65E-03	3.29E-03	0.0575	3.166E+13
C-14	5.7053E-09	1,106.308	2,212.616	0.00E+00	6.31E-06	1.26E-05	0.0850	1.908E+13
Cl-36	1.3124E-32	1,106.308	2,212.616	0.00E+00	1.45E-29	2.90E-29	0.1250	1.260E+13
Cm-243	1.1419E-07	1,106.308	2,212.616	0.00E+00	1.26E-04	2.53E-04	0.2250	1.647E+13
Cm-244	1.6522E-05	1,106.308	2,212.616	0.00E+00	1.83E-02	3.66E-02	0.3750	7.164E+12
Co-60	7.4047E-07	1,106.308	2,212.616	0.00E+00	8.19E-04	1.64E-03	0.5750	1.184E+12
Cs-134	2.0455E-05	1,106.308	2,212.616	0.00E+00	2.26E-02	4.53E-02	0.8500	1.446E+12
Cs-135	3.4477E-06	1,106.308	2,212.616	0.00E+00	3.81E-03	7.63E-03	1.2500	6.996E+11
Cs-137	1.4365E+00	1,106.308	2,212.616	0.00E+00	1.59E+03	3.18E+03	1.7500	3.938E+10
Eu-154	7.3230E-03	1,106.308	2,212.616	0.00E+00	8.10E+00	1.62E+01	2.2500	3.293E+06
Eu-155	5.9259E-04	1,106.308	2,212.616	0.00E+00	6.56E-01	1.31E+00	2.7500	3.142E+06
Fe-55	2.2791E-06	1,106.308	2,212.616	0.00E+00	2.52E-03	5.04E-03	3.5000	1.836E+03
H-3	1.9698E-03	1,106.308	2,212.616	0.00E+00	2.18E+00	4.36E+00	5.0000	7.503E+02
I-129	7.5300E-07	1,106.308	2,212.616	0.00E+00	8.33E-04	1.67E-03	7.0000	8.216E+01
Kr-85	4.1176E-02	1,106.308	2,212.616	0.00E+00	4.56E+01	9.11E+01	11.0000	9.163E+00
Np-237	9.5752E-06	1,106.308	2,212.616	0.00E+00	1.06E-02	2.12E-02		
Pa-231	3.9379E-09	1,106.308	2,212.616	0.00E+00	4.36E-06	8.71E-06		
Pb-210	3.3115E-10	1,106.308	2,212.616	0.00E+00	3.66E-07	7.33E-07		
Pm-147	9.2402E-04	1,106.308	2,212.616	0.00E+00	1.02E+00	2.04E+00		
Pu-238	1.6217E-02	1,106.308	2,212.616	0.00E+00	1.79E+01	3.59E+01		
Pu-239	4.2810E-04	1,106.308	2,212.616	0.00E+00	4.74E-01	9.47E-01		
Pu-240	2.4333E-04	1,106.308	2,212.616	0.00E+00	2.69E-01	5.38E-01		
Pu-241	1.6242E-02	1,106.308	2,212.616	0.00E+00	1.80E+01	3.59E+01		
Pu-242	3.6329E-07	1,106.308	2,212.616	0.00E+00	4.02E-04	8.04E-04		
Ra-226	9.0114E-10	1,106.308	2,212.616	0.00E+00	9.97E-07	1.99E-06		
Ra-228	3.1019E-14	1,106.308	2,212.616	0.00E+00	3.43E-11	6.86E-11		
Ru-106	2.1225E-10	1,106.308	2,212.616	0.00E+00	2.35E-07	4.70E-07		
Se-79	1.2930E-05	1,106.308	2,212.616	0.00E+00	1.43E-02	2.86E-02		
Sn-126	1.1571E-05	1,106.308	2,212.616	0.00E+00	1.28E-02	2.56E-02		
Sr-90	1.3472E+00	1,106.308	2,212.616	0.00E+00	1.49E+03	2.98E+03		
Tc-99	4.2239E-04	1,106.308	2,212.616	0.00E+00	4.67E-01	9.35E-01		
Th-229	1.2407E-11	1,106.308	2,212.616	0.00E+00	1.37E-08	2.75E-08		
Th-230	8.3497E-08	1,106.308	2,212.616	0.00E+00	9.24E-05	1.85E-04		
Th-232	3.8371E-14	1,106.308	2,212.616	0.00E+00	4.25E-11	8.49E-11		
Ti-208	4.0414E-08	1,106.308	2,212.616	0.00E+00	4.47E-05	8.94E-05		
U-232	1.0948E-07	1,106.308	2,212.616	0.00E+00	1.21E-04	2.42E-04		
U-233	3.6275E-09	1,106.308	2,212.616	0.00E+00	4.01E-06	8.03E-06		
U-234	1.8562E-04	1,106.308	2,212.616	0.00E+00	2.05E-01	4.11E-01		
U-235	-2.7235E-06	1,106.308	0.000	4.74E-03	1.73E-03	4.74E-03		
U-236	1.5493E-05	1,106.308	2,212.616	0.00E+00	1.71E-02	3.43E-02		
U-238	-4.2851E-09	1,106.308	0.000	2.99E-03	2.98E-03	2.99E-03		
Y-90	1.3475E+00	1,106.308	2,212.616	0.00E+00	1.49E+03	2.98E+03		
Other Radionuclides					1.51E+03	3.03E+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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U3Si2	U	
BOL Enrichment %:	19.81328831	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		1,106.308	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		2,212.616	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.32		1.01
Bounding:	0.63		

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: ORR EXPERIMENTS
 SNF ID #: 1086
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL= ; EOL=1.05kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1987
 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: 20 years

Estimated
 Canister usage:
 HIC
 1.00

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	3.1309E-08	92.205	92.205	0.00E+00	2.89E-06	2.89E-06	0.0150	8.747E+12
Am-241	5.2273E-07	92.205	92.205	0.00E+00	4.82E-05	4.82E-05	0.0250	1.829E+12
Am-242m	0.0000E+00	92.205	92.205	0.00E+00	0.00E+00	0.00E+00	0.0375	1.602E+12
Am-243	8.3889E-15	92.205	92.205	0.00E+00	7.74E-13	7.74E-13	0.0575	1.694E+12
C-14	2.1748E-05	92.205	92.205	0.00E+00	2.01E-03	2.01E-03	0.0850	1.033E+12
Cl-36	5.5188E-08	92.205	92.205	0.00E+00	5.09E-06	5.09E-06	0.1250	6.685E+11
Cm-243	2.2310E-14	92.205	92.205	0.00E+00	2.06E-12	2.06E-12	0.2250	8.786E+11
Cm-244	9.2991E-16	92.205	92.205	0.00E+00	8.57E-14	8.57E-14	0.3750	3.887E+11
Co-60	1.5070E-02	92.205	92.205	0.00E+00	1.39E+00	1.39E+00	0.5750	6.685E+12
Cs-134	9.6689E-05	92.205	92.205	0.00E+00	8.92E-03	8.92E-03	0.8500	6.315E+10
Cs-135	4.4996E-05	92.205	92.205	0.00E+00	4.15E-03	4.15E-03	1.2500	1.244E+11
Cs-137	1.9481E+00	92.205	92.205	0.00E+00	1.80E+02	1.80E+02	1.7500	1.628E+09
Eu-154	6.2056E-04	92.205	92.205	0.00E+00	5.72E-02	5.72E-02	2.2500	7.971E+05
Eu-155	1.1527E-02	92.205	92.205	0.00E+00	1.06E+00	1.06E+00	2.7500	3.037E+04
Fe-55	7.7328E-04	92.205	92.205	0.00E+00	7.13E-02	7.13E-02	3.5000	9.126E+02
H-3	8.2100E-03	92.205	92.205	0.00E+00	7.57E-01	7.57E-01	5.0000	5.803E+00
I-129	1.1426E-06	92.205	92.205	0.00E+00	1.05E-04	1.05E-04	7.0000	4.899E-01
Kr-85	1.0182E-01	92.205	92.205	0.00E+00	9.39E+00	9.39E+00	11.0000	4.449E-02
Np-237	3.3099E-06	92.205	92.205	0.00E+00	3.05E-04	3.05E-04		
Pa-231	9.7115E-08	92.205	92.205	0.00E+00	8.95E-06	8.95E-06		
Pb-210	1.3729E-12	92.205	92.205	0.00E+00	1.27E-10	1.27E-10		
Pm-147	6.0983E-02	92.205	92.205	0.00E+00	5.62E+00	5.62E+00		
Pu-238	1.9311E-04	92.205	92.205	0.00E+00	1.78E-02	1.78E-02		
Pu-239	1.9481E-02	92.205	92.205	0.00E+00	1.80E+00	1.80E+00		
Pu-240	6.8022E-05	92.205	92.205	0.00E+00	6.27E-03	6.27E-03		
Pu-241	8.5986E-06	92.205	92.205	0.00E+00	7.93E-04	7.93E-04		
Pu-242	4.3751E-13	92.205	92.205	0.00E+00	4.03E-11	4.03E-11		
Ra-226	6.2329E-12	92.205	92.205	0.00E+00	5.75E-10	5.75E-10		
Ra-228	2.2106E-11	92.205	92.205	0.00E+00	2.04E-09	2.04E-09		
Ru-106	9.3383E-06	92.205	92.205	0.00E+00	8.61E-04	8.61E-04		
Se-79	1.6490E-05	92.205	92.205	0.00E+00	1.52E-03	1.52E-03		
Sn-126	3.7564E-05	92.205	92.205	0.00E+00	3.46E-03	3.46E-03		
Sr-90	1.7214E+00	92.205	92.205	0.00E+00	1.59E+02	1.59E+02		
Tc-99	4.4842E-04	92.205	92.205	0.00E+00	4.13E-02	4.13E-02		
Th-229	2.3111E-11	92.205	92.205	0.00E+00	2.13E-09	2.13E-09		
Th-230	1.1257E-09	92.205	92.205	0.00E+00	1.04E-07	1.04E-07		
Th-232	2.3674E-11	92.205	92.205	0.00E+00	2.18E-09	2.18E-09		
Ti-208	6.7289E-09	92.205	92.205	0.00E+00	6.20E-07	6.20E-07		
U-232	1.8203E-08	92.205	92.205	0.00E+00	1.68E-06	1.68E-06		
U-233	9.7490E-09	92.205	92.205	0.00E+00	8.99E-07	8.99E-07		
U-234	4.8830E-06	92.205	92.205	0.00E+00	4.50E-04	4.50E-04		
U-235	-2.3191E-06	92.205	0.000	6.38E-04	4.24E-04	6.38E-04		
U-236	1.2633E-05	92.205	92.205	0.00E+00	1.16E-03	1.16E-03		
U-238	-9.5407E-08	92.205	0.000	2.88E-04	2.79E-04	2.88E-04		
Y-90	1.7231E+00	92.205	92.205	0.00E+00	1.59E+02	1.59E+02		
Other Radionuclides					1.77E+02	1.77E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.03E+00	2.03E+00
Total	Total

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 and enrichment (unknown).
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	FAST	
Fuel Cladding:	ALUM	ZIRC	
BOL HM Constituents:	U3Si2	U	
BOL Enrichment %:		10 to 40	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup. Bounding burnup taken from SFD and converted to MWd using BOL=1.153kg
	From SFD	Estimated	
Nominal:		92.205	
Bounding:		92.205	

Checks			Estimated EOL HM/Given EOL HM 1.03
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	25.60		
Bounding:	25.60		

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: ORR SPECIAL
 SNF ID #: 163
 Fuel Units & Descr: 11 - 19 CURVED PLATES
 Heavy Metal Mass: BOL=22.05kg ; EOL=18.48kg
 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"
 0.31

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	2.0068E-09	3,376.219	6,752.438	0.00E+00	6.78E-06	1.36E-05	0.0150	4.973E+14
Am-241	2.5251E-03	3,376.219	6,752.438	0.00E+00	8.53E+00	1.71E+01	0.0250	1.033E+14
Am-242m	3.9624E-07	3,376.219	6,752.438	0.00E+00	1.34E-03	2.68E-03	0.0375	8.976E+13
Am-243	1.4880E-06	3,376.219	6,752.438	0.00E+00	5.02E-03	1.00E-02	0.0575	9.662E+13
C-14	5.7053E-09	3,376.219	6,752.438	0.00E+00	1.93E-05	3.85E-05	0.0850	5.821E+13
Cl-36	1.3124E-32	3,376.219	6,752.438	0.00E+00	4.43E-29	8.86E-29	0.1250	3.845E+13
Cm-243	1.1419E-07	3,376.219	6,752.438	0.00E+00	3.86E-04	7.71E-04	0.2250	5.026E+13
Cm-244	1.6522E-05	3,376.219	6,752.438	0.00E+00	5.58E-02	1.12E-01	0.3750	2.186E+13
Co-60	7.4047E-07	3,376.219	6,752.438	0.00E+00	2.50E-03	5.00E-03	0.5750	3.613E+14
Cs-134	2.0455E-05	3,376.219	6,752.438	0.00E+00	6.91E-02	1.38E-01	0.8500	4.414E+12
Cs-135	3.4477E-06	3,376.219	6,752.438	0.00E+00	1.16E-02	2.33E-02	1.2500	2.135E+12
Cs-137	1.4365E+00	3,376.219	6,752.438	0.00E+00	4.85E+03	9.70E+03	1.7500	1.202E+11
Eu-154	7.3230E-03	3,376.219	6,752.438	0.00E+00	2.47E+01	4.94E+01	2.2500	1.005E+07
Eu-155	5.9259E-04	3,376.219	6,752.438	0.00E+00	2.00E+00	4.00E+00	2.7500	9.588E+06
Fe-55	2.2791E-06	3,376.219	6,752.438	0.00E+00	7.69E-03	1.54E-02	3.5000	5.584E+03
H-3	1.9698E-03	3,376.219	6,752.438	0.00E+00	6.65E+00	1.33E+01	5.0000	2.282E+03
I-129	7.5300E-07	3,376.219	6,752.438	0.00E+00	2.54E-03	5.08E-03	7.0000	2.498E+02
Kr-85	4.1176E-02	3,376.219	6,752.438	0.00E+00	1.39E+02	2.78E+02	11.0000	2.786E+01
Np-237	9.5752E-06	3,376.219	6,752.438	0.00E+00	3.23E-02	6.47E-02		
Pa-231	3.9379E-09	3,376.219	6,752.438	0.00E+00	1.33E-05	2.66E-05		
Pb-210	3.3115E-10	3,376.219	6,752.438	0.00E+00	1.12E-06	2.24E-06		
Pm-147	9.2402E-04	3,376.219	6,752.438	0.00E+00	3.12E+00	6.24E+00		
Pu-238	1.6217E-02	3,376.219	6,752.438	0.00E+00	5.48E+01	1.10E+02		
Pu-239	4.2810E-04	3,376.219	6,752.438	0.00E+00	1.45E+00	2.89E+00		
Pu-240	2.4333E-04	3,376.219	6,752.438	0.00E+00	8.22E-01	1.64E+00		
Pu-241	1.6242E-02	3,376.219	6,752.438	0.00E+00	5.48E+01	1.10E+02		
Pu-242	3.6329E-07	3,376.219	6,752.438	0.00E+00	1.23E-03	2.45E-03		
Ra-226	9.0114E-10	3,376.219	6,752.438	0.00E+00	3.04E-06	6.08E-06		
Ra-228	3.1019E-14	3,376.219	6,752.438	0.00E+00	1.05E-10	2.09E-10		
Ru-106	2.1225E-10	3,376.219	6,752.438	0.00E+00	7.17E-07	1.43E-06		
Se-79	1.2930E-05	3,376.219	6,752.438	0.00E+00	4.37E-02	8.73E-02		
Sn-126	1.1571E-05	3,376.219	6,752.438	0.00E+00	3.91E-02	7.81E-02		
Sr-90	1.3472E+00	3,376.219	6,752.438	0.00E+00	4.55E+03	9.10E+03		
Tc-99	4.2239E-04	3,376.219	6,752.438	0.00E+00	1.43E+00	2.85E+00		
Th-229	1.2407E-11	3,376.219	6,752.438	0.00E+00	4.19E-08	8.38E-08		
Th-230	8.3497E-08	3,376.219	6,752.438	0.00E+00	2.82E-04	5.64E-04		
Th-232	3.8371E-14	3,376.219	6,752.438	0.00E+00	1.30E-10	2.59E-10		
Ti-208	4.0414E-08	3,376.219	6,752.438	0.00E+00	1.36E-04	2.73E-04		
U-232	1.0948E-07	3,376.219	6,752.438	0.00E+00	3.70E-04	7.39E-04		
U-233	3.6275E-09	3,376.219	6,752.438	0.00E+00	1.22E-05	2.45E-05		
U-234	1.8562E-04	3,376.219	6,752.438	0.00E+00	6.27E-01	1.25E+00		
U-235	-2.7235E-06	3,376.219	0.000	1.13E-02	2.07E-03	1.13E-02		
U-236	1.5493E-05	3,376.219	6,752.438	0.00E+00	5.23E-02	1.05E-01		
U-238	-4.2851E-09	3,376.219	0.000	5.66E-03	5.64E-03	5.66E-03		
Y-90	1.3475E+00	3,376.219	6,752.438	0.00E+00	4.55E+03	9.10E+03		
Other Radionuclides					4.62E+03	9.24E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.65E+01	1.13E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: LIGHT WATER	Used: 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:	UO8	U	
BOL Enrichment %:	23.64708607	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD: 3,376.219	Estimated: 3,376.219	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		6,752.438	

Checks		
Nominal:	Burnup Multiplier: 0.49	Estimated EOL HM/Given EOL HM: 1.01
Bounding:	0.97	

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: OFR-BW-1
 SNF ID #: 160
 Fuel Units & Descr: 1 - 19 CURVED PLATES
 Heavy Metal Mass: BOL= ; EOL=.07kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1966
 Estimates as of: 2010

Estimated
 Canister usage:
 18"x10"
 0.03

Template: (Worst Case)
²Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 35 years

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	2.3072E-06	66.525	66.525	0.00E+00	1.53E-04	1.53E-04	0.0150	8.152E+13
Am-241	8.4448E+00	66.525	66.525	0.00E+00	5.62E+02	5.62E+02	0.0250	1.622E+13
Am-242m	1.6848E-02	66.525	66.525	0.00E+00	1.12E+00	1.12E+00	0.0375	1.417E+13
Am-243	1.6320E-02	66.525	66.525	0.00E+00	1.09E+00	1.09E+00	0.0575	2.230E+13
C-14	1.2090E-01	66.525	66.525	0.00E+00	8.04E+00	8.04E+00	0.0850	8.703E+12
Cl-36	2.2849E-03	66.525	66.525	0.00E+00	1.52E-01	1.52E-01	0.1250	6.821E+12
Cr-243	8.6624E-04	66.525	66.525	0.00E+00	5.76E-02	5.76E-02	0.2250	7.539E+12
Cr-244	1.6848E-01	66.525	66.525	0.00E+00	1.12E+01	1.12E+01	0.3750	3.224E+12
Co-60	2.8086E+01	66.525	66.525	0.00E+00	1.87E+03	1.87E+03	0.5750	5.244E+13
Cs-134	3.4148E-04	66.525	66.525	0.00E+00	2.27E-02	2.27E-02	0.8500	2.004E+12
Cs-135	4.3976E-04	66.525	66.525	0.00E+00	2.93E-02	2.93E-02	1.2500	1.401E+14
Cs-137	2.1049E+01	66.525	66.525	0.00E+00	1.40E+03	1.40E+03	1.7500	6.197E+10
Eu-154	1.2500E+00	66.525	66.525	0.00E+00	8.32E+01	8.32E+01	2.2500	7.346E+08
Eu-155	6.8986E-02	66.525	66.525	0.00E+00	4.59E+00	4.59E+00	2.7500	2.070E+08
Fe-55	2.9308E-01	66.525	66.525	0.00E+00	1.95E+01	1.95E+01	3.5000	1.657E+05
H-3	2.4311E-01	66.525	66.525	0.00E+00	1.62E+01	1.62E+01	5.0000	7.036E+04
I-129	1.0618E-05	66.525	66.525	0.00E+00	7.06E-04	7.06E-04	7.0000	8.057E+03
Kr-85	5.9882E-01	66.525	66.525	0.00E+00	3.98E+01	3.98E+01	11.0000	9.219E-02
Np-237	1.5668E-04	66.525	66.525	0.00E+00	1.04E-02	1.04E-02		
Pa-231	2.8656E-06	66.525	66.525	0.00E+00	1.91E-04	1.91E-04		
Pb-210	2.3918E-08	66.525	66.525	0.00E+00	1.59E-06	1.59E-06		
Pm-147	1.6900E-02	66.525	66.525	0.00E+00	1.12E+00	1.12E+00		
Pu-238	-8.6123E-01	66.525	0.000	1.80E+01	0.00E+00	1.80E+01		
Pu-239	-4.8440E-02	66.525	0.000	2.18E+00	0.00E+00	2.18E+00		
Pu-240	-3.0095E-01	66.525	0.000	2.78E+00	0.00E+00	2.78E+00		
Pu-241	-1.0411E+02	66.525	0.000	7.16E+02	0.00E+00	7.16E+02		
Pu-242	-1.1381E-04	66.525	0.000	1.20E-02	4.46E-03	1.20E-02		
Ra-226	6.4400E-08	66.525	66.525	0.00E+00	4.28E-06	4.28E-06		
Ra-228	5.9952E-07	66.525	66.525	0.00E+00	3.99E-05	3.99E-05		
Ru-106	8.5526E-07	66.525	66.525	0.00E+00	5.69E-05	5.69E-05		
Se-79	1.9181E-04	66.525	66.525	0.00E+00	1.28E-02	1.28E-02		
Sn-126	1.6671E-04	66.525	66.525	0.00E+00	1.11E-02	1.11E-02		
Sr-90	1.9799E+01	66.525	66.525	0.00E+00	1.32E+03	1.32E+03		
Tc-99	6.7678E-03	66.525	66.525	0.00E+00	4.50E-01	4.50E-01		
Th-229	1.7488E-06	66.525	66.525	0.00E+00	1.16E-04	1.16E-04		
Th-230	5.8704E-06	66.525	66.525	0.00E+00	3.91E-04	3.91E-04		
Th-232	6.0208E-07	66.525	66.525	0.00E+00	4.01E-05	4.01E-05		
Ti-208	8.7573E-05	66.525	66.525	0.00E+00	5.83E-03	5.83E-03		
U-232	2.3706E-04	66.525	66.525	0.00E+00	1.58E-02	1.58E-02		
U-233	3.6128E-04	66.525	66.525	0.00E+00	2.40E-02	2.40E-02		
U-234	1.2788E-02	66.525	66.525	0.00E+00	8.51E-01	8.51E-01		
U-235	5.7486E-04	66.525	66.525	6.02E-05	3.83E-02	3.83E-02		
U-236	2.3485E-04	66.525	66.525	0.00E+00	1.56E-02	1.56E-02		
U-238	1.1581E-04	66.525	66.525	7.49E-06	7.71E-03	7.71E-03		
Y-90	1.9804E+01	66.525	66.525	0.00E+00	1.32E+03	1.32E+03		
Other Radionuclides					4.10E+03	4.10E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.56E+01	6.83E+01
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 Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
BOL HM Constituents:	SST	SST/Inconel	
BOL Enrichment %:	PuO2-UO2	U, Th, & Pu	
		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		66.525	Nominal burnup set equal to bounding burnup.
		66.525	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup	
Bounding:	14.21	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: PATHFINDER (SUPERHEATER)
 SNF ID #: 814
 Fuel Units & Descr: 6 - ROD
 Heavy Metal Mass: BOL=80kg ; EOL=80kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1967
 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"
 0.05

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	2.3344E-08	15.088	30.176	0.00E+00	3.52E-07	7.04E-07	0.0150	2.252E+12
Am-241	1.1135E-04	15.088	30.176	0.00E+00	1.68E-03	3.36E-03	0.0250	4.680E+11
Am-242m	8.5075E-09	15.088	30.176	0.00E+00	1.28E-07	2.57E-07	0.0375	4.048E+11
Am-243	9.8519E-10	15.088	30.176	0.00E+00	1.49E-08	2.97E-08	0.0575	4.364E+11
C-14	2.3012E-04	15.088	30.176	0.00E+00	3.47E-03	6.94E-03	0.0850	2.637E+11
Cl-36	1.2261E-06	15.088	30.176	0.00E+00	1.85E-05	3.70E-05	0.1250	1.712E+11
Cm-243	2.4875E-10	15.088	30.176	0.00E+00	3.75E-09	7.51E-09	0.2250	2.270E+11
Cm-244	2.3178E-09	15.088	30.176	0.00E+00	3.50E-08	6.99E-08	0.3750	9.898E+10
Co-60	7.0849E-02	15.088	30.176	0.00E+00	1.07E+00	2.14E+00	0.5750	1.631E+12
Cs-134	3.0266E-06	15.088	30.176	0.00E+00	4.57E-05	9.13E-05	0.8500	1.651E+10
Cs-135	3.0316E-05	15.088	30.176	0.00E+00	4.57E-04	9.15E-04	1.2500	1.641E+11
Cs-137	1.4511E+00	15.088	30.176	0.00E+00	2.19E+01	4.38E+01	1.7500	4.259E+08
Eu-154	6.6955E-04	15.088	30.176	0.00E+00	1.01E-02	2.02E-02	2.2500	8.839E+05
Eu-155	6.9850E-04	15.088	30.176	0.00E+00	1.05E-02	2.11E-02	2.7500	2.555E+04
Fe-55	1.2318E-03	15.088	30.176	0.00E+00	1.86E-02	3.72E-02	3.5000	1.942E+00
H-3	2.5141E-03	15.088	30.176	0.00E+00	3.79E-02	7.59E-02	5.0000	8.000E-01
I-129	7.3195E-07	15.088	30.176	0.00E+00	1.10E-05	2.21E-05	7.0000	8.847E-02
Kr-85	4.1281E-02	15.088	30.176	0.00E+00	6.23E-01	1.25E+00	11.0000	9.936E-03
Np-237	1.1489E-06	15.088	30.176	0.00E+00	1.73E-05	3.47E-05		
Pa-231	4.5241E-08	15.088	30.176	0.00E+00	6.83E-07	1.37E-06		
Pb-210	6.4476E-13	15.088	30.176	0.00E+00	9.73E-12	1.95E-11		
Pm-147	1.1651E-03	15.088	30.176	0.00E+00	1.76E-02	3.52E-02		
Pu-238	2.9517E-04	15.088	30.176	0.00E+00	4.45E-03	8.91E-03		
Pu-239	6.6772E-04	15.088	30.176	0.00E+00	1.01E-02	2.01E-02		
Pu-240	8.6839E-05	15.088	30.176	0.00E+00	1.31E-03	2.62E-03		
Pu-241	7.1514E-04	15.088	30.176	0.00E+00	1.08E-02	2.16E-02		
Pu-242	1.9717E-09	15.088	30.176	0.00E+00	2.97E-08	5.95E-08		
Ra-226	1.7654E-12	15.088	30.176	0.00E+00	2.66E-11	5.33E-11		
Ra-228	8.2928E-12	15.088	30.176	0.00E+00	1.25E-10	2.50E-10		
Ru-106	1.8419E-10	15.088	30.176	0.00E+00	2.78E-09	5.56E-09		
Se-79	1.3223E-05	15.088	30.176	0.00E+00	2.00E-04	3.99E-04		
Sn-126	1.1493E-05	15.088	30.176	0.00E+00	1.73E-04	3.47E-04		
Sr-90	1.3649E+00	15.088	30.176	0.00E+00	2.06E+01	4.12E+01		
Tc-99	4.6656E-04	15.088	30.176	0.00E+00	7.04E-03	1.41E-02		
Th-229	1.4547E-11	15.088	30.176	0.00E+00	2.19E-10	4.39E-10		
Th-230	1.6617E-10	15.088	30.176	0.00E+00	2.51E-09	5.01E-09		
Th-232	8.3361E-12	15.088	30.176	0.00E+00	1.26E-10	2.52E-10		
Tl-208	2.1664E-08	15.088	30.176	0.00E+00	3.27E-07	6.54E-07		
U-232	5.8669E-08	15.088	30.176	0.00E+00	8.85E-07	1.77E-06		
U-233	3.1847E-09	15.088	30.176	0.00E+00	4.81E-08	9.61E-08		
U-234	3.8769E-07	15.088	30.176	0.00E+00	5.85E-06	1.17E-05		
U-235	-2.7761E-06	15.088	0.000	1.61E-03	1.57E-03	1.61E-03		
U-236	1.6190E-05	15.088	30.176	0.00E+00	2.44E-04	4.89E-04		
U-238	-2.8547E-09	15.088	0.000	1.84E-05	1.83E-05	1.84E-05		
Y-90	1.3652E+00	15.088	30.176	0.00E+00	2.06E+01	4.12E+01		
Other Radionuclides					2.49E+01	4.98E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.63E-01	5.27E-01
Total	Total

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:	SST (316L)	SST	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	93.1500181	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		15.088	Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding:		30.176	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.40		0.98
Bounding:	0.81		

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: PATHFINDER (SUPERHEATER)
 SNF ID #: 166
 Fuel Units & Descr: 411 - ROD
 Heavy Metal Mass: BOL=54.70kg ; EOL=52.61kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1967
 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"
 3.57

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	2.3344E-08	1,980.076	3,960.152	0.00E+00	4.62E-05	9.24E-05		
Am-241	1.1135E-04	1,980.076	3,960.152	0.00E+00	2.20E-01	4.41E-01	0.0150	2.956E+14
Am-242m	8.5075E-09	1,980.076	3,960.152	0.00E+00	1.68E-05	3.37E-05	0.0250	6.142E+13
Am-243	9.8519E-10	1,980.076	3,960.152	0.00E+00	1.95E-06	3.90E-06	0.0375	5.313E+13
C-14	2.3012E-04	1,980.076	3,960.152	0.00E+00	4.56E-01	9.11E-01	0.0575	5.727E+13
Cl-36	1.2261E-06	1,980.076	3,960.152	0.00E+00	2.43E-03	4.86E-03	0.0850	3.460E+13
Cm-243	2.4875E-10	1,980.076	3,960.152	0.00E+00	4.93E-07	9.85E-07	0.1250	2.247E+13
Cm-244	2.3178E-09	1,980.076	3,960.152	0.00E+00	4.59E-06	9.18E-06	0.2250	2.979E+13
Co-60	7.0849E-02	1,980.076	3,960.152	0.00E+00	1.40E+02	2.81E+02	0.3750	1.299E+13
Cs-134	3.0266E-06	1,980.076	3,960.152	0.00E+00	5.99E-03	1.20E-02	0.5750	2.140E+14
Cs-135	3.0316E-05	1,980.076	3,960.152	0.00E+00	6.00E-02	1.20E-01	0.8500	2.166E+12
Cs-137	1.4511E+00	1,980.076	3,960.152	0.00E+00	2.87E+03	5.75E+03	1.2500	2.153E+13
Eu-154	6.6955E-04	1,980.076	3,960.152	0.00E+00	1.33E+00	2.65E+00	1.7500	5.589E+10
Eu-155	6.9850E-04	1,980.076	3,960.152	0.00E+00	1.38E+00	2.77E+00	2.2500	1.160E+08
Fe-55	1.2318E-03	1,980.076	3,960.152	0.00E+00	2.44E+00	4.88E+00	2.7500	3.353E+06
H-3	2.5141E-03	1,980.076	3,960.152	0.00E+00	4.98E+00	9.96E+00	3.5000	2.453E+02
I-129	7.3195E-07	1,980.076	3,960.152	0.00E+00	1.45E-03	2.90E-03	5.0000	1.010E+02
Kr-85	4.1281E-02	1,980.076	3,960.152	0.00E+00	8.17E+01	1.63E+02	7.0000	1.116E+01
Np-237	1.1489E-06	1,980.076	3,960.152	0.00E+00	2.27E-03	4.55E-03	11.0000	1.253E+00
Pa-231	4.5241E-08	1,980.076	3,960.152	0.00E+00	8.96E-05	1.79E-04		
Pb-210	6.4476E-13	1,980.076	3,960.152	0.00E+00	1.28E-09	2.55E-09		
Pm-147	1.1651E-03	1,980.076	3,960.152	0.00E+00	2.31E+00	4.61E+00		
Pu-238	2.9517E-04	1,980.076	3,960.152	0.00E+00	5.84E-01	1.17E+00		
Pu-239	6.6772E-04	1,980.076	3,960.152	0.00E+00	1.32E+00	2.64E+00		
Pu-240	8.6839E-05	1,980.076	3,960.152	0.00E+00	1.72E-01	3.44E-01		
Pu-241	7.1514E-04	1,980.076	3,960.152	0.00E+00	1.42E+00	2.83E+00		
Pu-242	1.9717E-09	1,980.076	3,960.152	0.00E+00	3.90E-06	7.81E-06		
Ra-226	1.7654E-12	1,980.076	3,960.152	0.00E+00	3.50E-09	6.99E-09		
Ra-228	8.2928E-12	1,980.076	3,960.152	0.00E+00	1.64E-08	3.28E-08		
Ru-106	1.8419E-10	1,980.076	3,960.152	0.00E+00	3.65E-07	7.29E-07		
Se-79	1.3223E-05	1,980.076	3,960.152	0.00E+00	2.62E-02	5.24E-02		
Sn-126	1.1493E-05	1,980.076	3,960.152	0.00E+00	2.28E-02	4.55E-02		
Sr-90	1.3649E+00	1,980.076	3,960.152	0.00E+00	2.70E+03	5.41E+03		
Tc-99	4.6656E-04	1,980.076	3,960.152	0.00E+00	9.24E-01	1.85E+00		
Th-229	1.4547E-11	1,980.076	3,960.152	0.00E+00	2.88E-08	5.76E-08		
Th-230	1.6617E-10	1,980.076	3,960.152	0.00E+00	3.29E-07	6.58E-07		
Th-232	8.3361E-12	1,980.076	3,960.152	0.00E+00	1.65E-08	3.30E-08		
Tl-208	2.1664E-08	1,980.076	3,960.152	0.00E+00	4.29E-05	8.58E-05		
U-232	5.8669E-08	1,980.076	3,960.152	0.00E+00	1.16E-04	2.32E-04		
U-233	3.1847E-09	1,980.076	3,960.152	0.00E+00	6.31E-06	1.26E-05		
U-234	3.8769E-07	1,980.076	3,960.152	0.00E+00	7.68E-04	1.54E-03		
U-235	-2.7761E-06	1,980.076	0.000	1.10E-01	1.05E-01	1.10E-01		
U-236	1.6190E-05	1,980.076	3,960.152	0.00E+00	3.21E-02	6.41E-02		
U-238	-2.8547E-09	1,980.076	0.000	1.26E-03	1.25E-03	1.26E-03		
Y-90	1.3652E+00	1,980.076	3,960.152	0.00E+00	2.70E+03	5.41E+03		
Other Radionuclides					3.27E+03	6.54E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.46E+01	6.91E+01
Total	Total

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:	SST (316L)	SST	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	93.1500181	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		1,980.076	
Bounding:		3,960.152	

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:	0.78		
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: PBF DRIVER CORE
 SNF ID #: 167
 Fuel Units & Descr: 2425 - ROD
 Heavy Metal Mass: BOL=571.82kg ; EOL=561.63kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1985
 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: 25 years

Estimated
 Canister usage:
 18"x15"
 8.98

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	1.3562E-08	9,621.236	19,242.472	0.00E+00	1.30E-04	2.61E-04	Avg. MeV	
Am-241	1.0168E-04	9,621.236	19,242.472	0.00E+00	9.78E-01	1.96E+00	0.0150	1.831E+15
Am-242m	8.9052E-09	9,621.236	19,242.472	0.00E+00	8.57E-05	1.71E-04	0.0250	3.804E+14
Am-243	9.8602E-10	9,621.236	19,242.472	0.00E+00	9.49E-06	1.90E-05	0.0375	3.284E+14
C-14	2.3045E-04	9,621.236	19,242.472	0.00E+00	2.22E+00	4.43E+00	0.0575	3.543E+14
Cl-36	1.2261E-06	9,621.236	19,242.472	0.00E+00	1.18E-02	2.36E-02	0.0850	2.142E+14
Cm-243	3.1730E-10	9,621.236	19,242.472	0.00E+00	3.05E-06	6.11E-06	0.1250	1.392E+14
Cm-244	3.3977E-09	9,621.236	19,242.472	0.00E+00	3.27E-05	6.54E-05	0.2250	1.838E+14
Co-60	2.6373E-01	9,621.236	19,242.472	0.00E+00	2.54E+03	5.07E+03	0.3750	8.023E+13
Cs-134	8.7072E-05	9,621.236	19,242.472	0.00E+00	8.38E-01	1.68E-00	0.5750	1.310E+15
Cs-135	3.0316E-05	9,621.236	19,242.472	0.00E+00	2.92E-01	5.83E-01	0.8500	1.366E+15
Cs-137	1.8286E+00	9,621.236	19,242.472	0.00E+00	1.76E+04	3.52E+04	1.2500	3.806E+14
Eu-154	1.4982E-03	9,621.236	19,242.472	0.00E+00	1.44E-01	2.88E-01	1.7500	3.520E+11
Eu-155	2.8236E-03	9,621.236	19,242.472	0.00E+00	2.72E+01	5.43E+01	2.2500	2.027E+09
Fe-55	1.7687E-02	9,621.236	19,242.472	0.00E+00	1.70E+02	3.40E+02	2.7500	2.231E+07
H-3	4.4043E-03	9,621.236	19,242.472	0.00E+00	4.24E+01	8.48E+01	3.5000	5.548E+03
I-129	7.3195E-07	9,621.236	19,242.472	0.00E+00	7.04E-03	1.41E-02	5.0000	8.361E+02
Kr-85	7.8769E-02	9,621.236	19,242.472	0.00E+00	7.58E+02	1.52E+03	7.0000	9.401E+01
Np-237	1.1484E-06	9,621.236	19,242.472	0.00E+00	1.10E-02	2.21E-02	11.0000	1.066E+01
Pa-231	3.2396E-08	9,621.236	19,242.472	0.00E+00	3.12E-04	6.23E-04		
Pb-210	2.4409E-13	9,621.236	19,242.472	0.00E+00	2.35E-09	4.70E-09		
Pm-147	1.6331E-02	9,621.236	19,242.472	0.00E+00	1.57E+02	3.14E+02		
Pu-238	3.1947E-04	9,621.236	19,242.472	0.00E+00	3.07E+00	6.15E+00		
Pu-239	6.6789E-04	9,621.236	19,242.472	0.00E+00	6.43E+00	1.29E+01		
Pu-240	8.6922E-05	9,621.236	19,242.472	0.00E+00	8.36E-01	1.67E+00		
Pu-241	1.1567E-03	9,621.236	19,242.472	0.00E+00	1.11E+01	2.23E+01		
Pu-242	1.9717E-09	9,621.236	19,242.472	0.00E+00	1.90E-05	3.79E-05		
Ra-226	8.6190E-13	9,621.236	19,242.472	0.00E+00	8.29E-09	1.66E-08		
Ra-228	8.1498E-12	9,621.236	19,242.472	0.00E+00	7.84E-08	1.57E-07		
Ru-106	1.7770E-07	9,621.236	19,242.472	0.00E+00	1.71E-03	3.42E-03		
Se-79	1.3225E-05	9,621.236	19,242.472	0.00E+00	1.27E-01	2.54E-01		
Sn-126	1.1493E-05	9,621.236	19,242.472	0.00E+00	1.11E-01	2.21E-01		
Sr-90	1.7321E+00	9,621.236	19,242.472	0.00E+00	1.67E+04	3.33E+04		
Tc-99	4.6656E-04	9,621.236	19,242.472	0.00E+00	4.49E+00	8.98E+00		
Th-229	1.0110E-11	9,621.236	19,242.472	0.00E+00	9.73E-08	1.95E-07		
Th-230	1.1466E-10	9,621.236	19,242.472	0.00E+00	1.10E-06	2.21E-06		
Th-232	8.3245E-12	9,621.236	19,242.472	0.00E+00	8.01E-08	1.60E-07		
Ti-208	2.3860E-08	9,621.236	19,242.472	0.00E+00	2.30E-04	4.59E-04		
U-232	6.4576E-08	9,621.236	19,242.472	0.00E+00	6.21E-04	1.24E-03		
U-233	3.1082E-09	9,621.236	19,242.472	0.00E+00	2.99E-05	5.98E-05		
U-234	3.7587E-07	9,621.236	19,242.472	0.00E+00	3.62E-03	7.23E-03		
U-235	-2.7761E-06	9,621.236	0.000	2.28E-01	2.02E-01	2.28E-01		
U-236	1.6190E-05	9,621.236	19,242.472	0.00E+00	1.56E-01	3.12E-01		
U-238	-2.8547E-09	9,621.236	0.000	1.57E-01	1.57E-01	1.57E-01		
Y-90	1.7321E+00	9,621.236	19,242.472	0.00E+00	1.67E+04	3.33E+04		
Other Radionuclides					1.95E+04	3.90E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.39E+02	4.77E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary		
	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	SST (304L)	SST
BOL HM Constituents:	UO2	U
BOL Enrichment %:	18.49024597	60 to 100

Basis for Parameter Differences:
 This Template was used for the following reasons:
 This fuel matches Pathfinder Template on all but one parameter (enrichment) making Pathfinder a reasonable match.

Burnup Summary (MWd) ²		
	From SFD	Estimated
Nominal:	297.344	9,621.236
Bounding:	623.278	19,242.472

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:	0.36	32.36
Bounding:	0.72	30.87

Estimated EOL HW/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: PEACH BOTTOM (ASSEMBLY)
 SNF ID #: 385
 Fuel Units & Descr: 2 - 7 X 7 ROD ARRAY
 Heavy Metal Mass: BOL=288.34kg ; EOL=285.31kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1976
 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"x15"
 1.00

Radionuclide	m		x _n		x _b		b		y _n		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)	Avg. Mev					
Ac-227	6.6376E-10	2,955.434	5,762.773	0.00E+00	1.96E-06	3.83E-06								
Am-241	1.3144E-01	2,955.434	5,762.773	0.00E+00	3.88E+02	7.57E+02		0.0150	3.919E+14					
Am-242m	3.0039E-04	2,955.434	5,762.773	0.00E+00	8.88E-01	1.73E+00		0.0250	7.937E+13					
Am-243	6.2629E-04	2,955.434	5,762.773	0.00E+00	1.85E+00	3.61E+00		0.0375	7.682E+13					
C-14	4.7965E-05	2,955.434	5,762.773	0.00E+00	1.42E-01	2.76E-01		0.0575	8.380E+13					
Cl-36	8.0297E-07	2,955.434	5,762.773	0.00E+00	2.37E-03	4.63E-03		0.0850	4.440E+13					
Cm-243	3.1993E-04	2,955.434	5,762.773	0.00E+00	9.46E-01	1.84E+00		0.1250	3.244E+13					
Cm-244	7.1851E-02	2,955.434	5,762.773	0.00E+00	2.12E+02	4.14E+02		0.2250	3.812E+13					
Co-60	9.5220E-03	2,955.434	5,762.773	0.00E+00	2.81E+01	5.49E+01		0.3750	1.635E+13					
Cs-134	1.1662E-03	2,955.434	5,762.773	0.00E+00	3.45E+00	6.72E+00		0.5750	3.758E+12					
Cs-135	1.4433E-05	2,955.434	5,762.773	0.00E+00	4.27E-02	8.32E-02		0.8500	7.418E+14					
Cs-137	1.7603E+00	2,955.434	5,762.773	0.00E+00	5.20E+03	1.01E+04		1.2500	1.002E+13					
Eu-154	4.5203E-02	2,955.434	5,762.773	0.00E+00	1.34E+02	2.60E+02		1.7500	2.196E+11					
Eu-155	7.1479E-03	2,955.434	5,762.773	0.00E+00	2.11E+01	4.12E+01		2.2500	4.055E+07					
Fe-55	6.1919E-04	2,955.434	5,762.773	0.00E+00	1.83E+00	3.57E+00		2.7500	4.558E+07					
H-3	3.6386E-02	2,955.434	5,762.773	0.00E+00	1.08E+02	2.10E+02		3.5000	5.974E+06					
I-129	9.8288E-07	2,955.434	5,762.773	0.00E+00	2.90E-03	5.66E-03		5.0000	2.553E+06					
Kr-85	5.3844E-02	2,955.434	5,762.773	0.00E+00	1.59E+02	3.10E+02		7.0000	2.943E+05					
Np-237	1.0546E-05	2,955.434	5,762.773	0.00E+00	3.12E-02	6.08E-02		11.0000	3.380E+04					
Pa-231	1.1370E-09	2,955.434	5,762.773	0.00E+00	3.36E-06	6.55E-06								
Pb-210	3.3624E-11	2,955.434	5,762.773	0.00E+00	9.94E-08	1.94E-07								
Pm-147	5.1211E-03	2,955.434	5,762.773	0.00E+00	1.51E+01	2.95E+01								
Pu-238	8.0669E-02	2,955.434	5,762.773	0.00E+00	2.38E+02	4.65E+02								
Pu-239	1.1626E-02	2,955.434	5,762.773	0.00E+00	3.44E+01	6.70E+01								
Pu-240	1.5097E-02	2,955.434	5,762.773	0.00E+00	4.46E+01	8.70E+01								
Pu-241	1.4567E+00	2,955.434	5,762.773	0.00E+00	4.31E+03	8.39E+03								
Pu-242	6.4260E-05	2,955.434	5,762.773	0.00E+00	1.90E-01	3.70E-01								
Ra-226	1.1392E-10	2,955.434	5,762.773	0.00E+00	3.37E-07	6.57E-07								
Ra-228	5.1841E-12	2,955.434	5,762.773	0.00E+00	1.53E-08	2.99E-08								
Ru-106	5.9012E-07	2,955.434	5,762.773	0.00E+00	1.74E-03	3.40E-03								
Se-79	1.2379E-05	2,955.434	5,762.773	0.00E+00	3.66E-02	7.13E-02								
Sn-126	2.5210E-05	2,955.434	5,762.773	0.00E+00	7.45E-02	1.45E-01								
Sr-90	1.1630E+00	2,955.434	5,762.773	0.00E+00	3.44E+03	6.70E+03								
Tc-99	3.9357E-04	2,955.434	5,762.773	0.00E+00	1.16E+00	2.27E+00								
Th-229	8.5691E-11	2,955.434	5,762.773	0.00E+00	2.53E-07	4.94E-07								
Th-230	1.4493E-08	2,955.434	5,762.773	0.00E+00	4.28E-05	8.35E-05								
Th-232	5.2923E-12	2,955.434	5,762.773	0.00E+00	1.56E-08	3.05E-08								
Th-208	1.9202E-07	2,955.434	5,762.773	0.00E+00	5.68E-04	1.11E-03								
U-232	5.2083E-07	2,955.434	5,762.773	0.00E+00	1.54E-03	3.00E-03								
U-233	2.4386E-08	2,955.434	5,762.773	0.00E+00	7.21E-05	1.41E-04								
U-234	4.7012E-05	2,955.434	5,762.773	0.00E+00	1.39E-01	2.71E-01								
U-235	-1.4492E-06	2,955.434	0.000	1.51E-02	1.09E-02	1.51E-02								
U-236	7.5759E-06	2,955.434	5,762.773	0.00E+00	2.24E-02	4.37E-02								
U-238	-2.6129E-07	2,955.434	0.000	9.48E-02	9.38E-02	9.46E-02								
Y-90	1.1631E+00	2,955.434	5,762.773	0.00E+00	3.44E+03	6.70E+03								
Other Radionuclides					4.99E+03	9.74E+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	
Fuel Cladding:	ZIRC-2	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	2.429812544	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	2,955.434	2,881.387	
Bounding:	3,431.187	5,762.773	

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	0.97	
Bounding:	0.57	1.68	

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: PEACH BOTTOM RODS
 SNF ID #: 386
 Fuel Units & Descr: 20 - ROD
 Heavy Metal Mass: BOL=79.00kg ; EOL=71.12kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1976
 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:
 HIC
 0.57

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	6.6376E-10	7,493.507	14,987.015	0.00E+00	4.97E-06	9.95E-06	Avg. MeV	
Am-241	1.3144E-01	7,493.507	14,987.015	0.00E+00	9.85E+02	1.97E+03	0.0150	1.019E+15
Am-242m	3.0039E-04	7,493.507	14,987.015	0.00E+00	2.25E+00	4.50E+00	0.0250	2.064E+14
Am-243	6.2629E-04	7,493.507	14,987.015	0.00E+00	4.69E+00	9.39E+00	0.0375	1.998E+14
C-14	4.7965E-05	7,493.507	14,987.015	0.00E+00	3.59E-01	7.19E-01	0.0575	2.179E+14
Cl-36	8.0297E-07	7,493.507	14,987.015	0.00E+00	6.02E-03	1.20E-02	0.0850	1.155E+14
Cm-243	3.1993E-04	7,493.507	14,987.015	0.00E+00	2.40E+00	4.79E+00	0.1250	8.435E+13
Cm-244	7.1851E-02	7,493.507	14,987.015	0.00E+00	5.38E+02	1.08E+03	0.2250	9.913E+13
Co-60	9.5220E-03	7,493.507	14,987.015	0.00E+00	7.14E+01	1.43E+02	0.3750	4.259E+13
Cs-134	1.1662E-03	7,493.507	14,987.015	0.00E+00	8.74E+00	1.75E+01	0.5750	9.774E+14
Cs-135	1.4433E-05	7,493.507	14,987.015	0.00E+00	1.08E-01	2.16E-01	0.8500	1.929E+13
Cs-137	1.7603E+00	7,493.507	14,987.015	0.00E+00	1.32E+04	2.64E+04	1.2500	2.606E+13
Eu-154	4.5203E-02	7,493.507	14,987.015	0.00E+00	3.39E+02	6.77E+02	1.7500	5.710E+11
Eu-155	7.1479E-03	7,493.507	14,987.015	0.00E+00	5.36E+01	1.07E+02	2.2500	1.055E+08
Fe-55	6.1919E-04	7,493.507	14,987.015	0.00E+00	4.64E+00	9.28E+00	2.7500	1.185E+08
H-3	3.6386E-02	7,493.507	14,987.015	0.00E+00	2.73E+02	5.45E+02	3.5000	1.559E+07
I-129	9.8288E-07	7,493.507	14,987.015	0.00E+00	7.37E-03	1.47E-02	5.0000	6.638E+06
Kr-85	5.3844E-02	7,493.507	14,987.015	0.00E+00	4.03E+02	8.07E+02	7.0000	7.653E+05
Np-237	1.0546E-05	7,493.507	14,987.015	0.00E+00	7.90E-02	1.58E-01	11.0000	8.790E+04
Pa-231	1.1370E-09	7,493.507	14,987.015	0.00E+00	8.52E-06	1.70E-05		
Pb-210	3.3624E-11	7,493.507	14,987.015	0.00E+00	2.52E-07	5.04E-07		
Pm-147	5.1211E-03	7,493.507	14,987.015	0.00E+00	3.84E+01	7.68E+01		
Pu-238	8.0669E-02	7,493.507	14,987.015	0.00E+00	6.04E+02	1.21E+03		
Pu-239	1.1626E-02	7,493.507	14,987.015	0.00E+00	8.71E+01	1.74E+02		
Pu-240	1.5097E-02	7,493.507	14,987.015	0.00E+00	1.13E+02	2.26E+02		
Pu-241	1.4567E+00	7,493.507	14,987.015	0.00E+00	1.09E+04	2.18E+04		
Pu-242	6.4260E-05	7,493.507	14,987.015	0.00E+00	4.82E-01	9.63E-01		
Ra-226	1.1392E-10	7,493.507	14,987.015	0.00E+00	8.54E-07	1.71E-06		
Ra-228	5.1841E-12	7,493.507	14,987.015	0.00E+00	3.88E-08	7.77E-08		
Ru-106	5.9012E-07	7,493.507	14,987.015	0.00E+00	4.42E-03	8.84E-03		
Se-79	1.2379E-05	7,493.507	14,987.015	0.00E+00	9.28E-02	1.86E-01		
Sn-126	2.5210E-05	7,493.507	14,987.015	0.00E+00	1.89E-01	3.78E-01		
Sr-90	1.1630E+00	7,493.507	14,987.015	0.00E+00	8.71E+03	1.74E+04		
Tc-99	3.9357E-04	7,493.507	14,987.015	0.00E+00	2.95E+00	5.90E+00		
Th-229	8.5691E-11	7,493.507	14,987.015	0.00E+00	6.42E-07	1.28E-06		
Th-230	1.4493E-08	7,493.507	14,987.015	0.00E+00	1.09E-04	2.17E-04		
Th-232	5.2923E-12	7,493.507	14,987.015	0.00E+00	3.97E-08	7.93E-08		
Th-208	1.9202E-07	7,493.507	14,987.015	0.00E+00	1.44E-03	2.88E-03		
U-232	5.2083E-07	7,493.507	14,987.015	0.00E+00	3.90E-03	7.81E-03		
U-233	2.4386E-08	7,493.507	14,987.015	0.00E+00	1.83E-04	3.65E-04		
U-234	4.7012E-05	7,493.507	14,987.015	0.00E+00	3.52E-01	7.05E-01		
U-235	-1.4492E-06	7,493.507	0.000	4.15E-03	0.00E+00	4.15E-03		
U-236	7.5759E-06	7,493.507	14,987.015	0.00E+00	5.68E-02	1.14E-01		
U-238	-2.6129E-07	7,493.507	0.000	2.59E-02	2.39E-02	2.59E-02		
Y-90	1.1631E+00	7,493.507	14,987.015	0.00E+00	8.72E+03	1.74E+04		
Other Radionuclides					1.27E+04	2.53E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.05E+02	4.11E+02
Total	Total

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-2	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	2.43	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	809.750	7,493.507	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	940.100	14,987.015	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	2.71	9.25	1.05
Bounding:	5.42	15.94	

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: PEACH BOTTOM UNIT 1 CORE I
 SNF ID #: 169
 Fuel Units & Descr: 2 - ELEMENT
 Heavy Metal Mass: BOL=4.28kg ; EOL=3.44kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1969
 Estimates as of: 2010
 Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
²Template Burnup(MWd): 1270.275
 Template BOL Heavy Metal Mass (MT): 0.012702752
³Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x15"
 0.15

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	3.8818E-06	793.653	1,587.306	0.00E+00	3.08E-03	6.16E-03		
Am-241	3.1387E-03	793.653	1,587.306	0.00E+00	2.49E+00	4.98E+00	0.0150	1.114E+14
Am-242m	2.3971E-06	793.653	1,587.306	0.00E+00	1.90E-03	3.80E-03	0.0250	2.282E+13
Am-243	4.6069E-05	793.653	1,587.306	0.00E+00	3.66E-02	7.31E-02	0.0375	1.989E+13
C-14	2.3121E-05	793.653	1,587.306	0.00E+00	1.84E-02	3.67E-02	0.0575	2.139E+13
Cl-36	1.0667E-06	793.653	1,587.306	0.00E+00	8.47E-04	1.69E-03	0.0850	1.291E+13
Cm-243	2.5357E-05	793.653	1,587.306	0.00E+00	2.01E-02	4.02E-02	0.1250	8.713E+12
Cm-244	6.4458E-03	793.653	1,587.306	0.00E+00	5.12E+00	1.02E+01	0.2250	1.120E+13
Co-60	4.5014E-04	793.653	1,587.306	0.00E+00	3.57E-01	7.15E-01	0.3750	4.844E+12
Cs-134	3.8086E-05	793.653	1,587.306	0.00E+00	3.02E-02	6.05E-02	0.5750	7.862E+13
Cs-135	2.4711E-05	793.653	1,587.306	0.00E+00	1.96E-02	3.92E-02	0.8500	1.242E+12
Cs-137	1.3273E+00	793.653	1,587.306	0.00E+00	1.05E+03	2.11E+03	1.2500	8.009E+11
Eu-154	1.5705E-02	793.653	1,587.306	0.00E+00	1.25E+01	2.49E+01	1.7500	3.804E+10
Eu-155	1.0415E-03	793.653	1,587.306	0.00E+00	8.27E-01	1.65E+00	2.2500	2.803E+06
Fe-55	4.4707E-08	793.653	1,587.306	0.00E+00	3.55E-05	7.10E-05	2.7500	3.318E+10
H-3	3.9094E-03	793.653	1,587.306	0.00E+00	3.10E+00	6.21E+00	3.5000	1.585E+05
I-129	1.0092E-06	793.653	1,587.306	0.00E+00	8.01E-04	1.60E-03	5.0000	6.757E+04
Kr-85	3.9519E-02	793.653	1,587.306	0.00E+00	3.14E+01	6.27E+01	7.0000	7.766E+03
Np-237	1.2541E-05	793.653	1,587.306	0.00E+00	9.95E-03	1.99E-02	11.0000	8.905E+02
Pa-231	4.7376E-06	793.653	1,587.306	0.00E+00	3.76E-03	7.52E-03		
Pb-210	1.4194E-09	793.653	1,587.306	0.00E+00	1.13E-06	2.25E-06		
Pm-147	1.5146E-04	793.653	1,587.306	0.00E+00	1.20E-01	2.40E-01		
Pu-238	1.6248E-01	793.653	1,587.306	0.00E+00	1.29E+02	2.58E+02		
Pu-239	1.3580E-04	793.653	1,587.306	0.00E+00	1.08E-01	2.16E-01		
Pu-240	2.7136E-04	793.653	1,587.306	0.00E+00	2.15E-01	4.31E-01		
Pu-241	1.9342E-02	793.653	1,587.306	0.00E+00	1.54E+01	3.07E+01		
Pu-242	3.8866E-06	793.653	1,587.306	0.00E+00	3.08E-03	6.17E-03		
Ra-226	2.7923E-09	793.653	1,587.306	0.00E+00	2.22E-06	4.43E-06		
Ra-228	9.1791E-07	793.653	1,587.306	0.00E+00	7.29E-04	1.46E-03		
Ru-106	3.5205E-11	793.653	1,587.306	0.00E+00	2.79E-08	5.59E-08		
Se-79	2.1082E-05	793.653	1,587.306	0.00E+00	1.67E-02	3.35E-02		
Sn-126	2.2192E-05	793.653	1,587.306	0.00E+00	1.76E-02	3.52E-02		
Sr-90	1.2667E+00	793.653	1,587.306	0.00E+00	1.01E+03	2.01E+03		
Tc-99	3.3331E-04	793.653	1,587.306	0.00E+00	2.65E-01	5.29E-01		
Th-229	1.0612E-05	793.653	1,587.306	0.00E+00	8.42E-03	1.68E-02		
Th-230	1.8878E-07	793.653	1,587.306	0.00E+00	1.50E-04	3.00E-04		
Th-232	-6.9673E-08	793.653	0.000	4.23E-04	3.68E-04	4.23E-04		
Tl-208	5.9530E-04	793.653	1,587.306	0.00E+00	4.72E-01	9.45E-01		
U-232	1.6115E-03	793.653	1,587.306	0.00E+00	1.28E+00	2.56E+00		
U-233	2.0602E-03	793.653	1,587.306	0.00E+00	1.64E+00	3.27E+00		
U-234	2.8939E-04	793.653	1,587.306	0.00E+00	2.30E-01	4.59E-01		
U-235	-1.7343E-06	793.653	0.000	8.46E-04	0.00E+00	8.46E-04		
U-236	8.6281E-06	793.653	1,587.306	0.00E+00	6.85E-03	1.37E-02		
U-238	-5.6065E-09	793.653	0.000	8.41E-06	3.96E-06	8.41E-06		
Y-90	1.2667E+00	793.653	1,587.306	0.00E+00	1.01E+03	2.01E+03		
Other Radionuclides							1.01E+03	2.02E+03

Thermal Power		
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
1.69E+01	3.38E+01	
Total	Total	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	GRAPHITE	GRAPHITE	
Fuel Cladding:	PYROLYTIC CARBON IN	GRAPHITE	
BOL HM Constituents:	ThC2-UC2	Th and U	
BOL Enrichment %:	93.1526	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		793.653	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	131.655	1,587.306	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	1.86		1.07
Bounding:	3.71	12.06	

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: PEACH BOTTOM UNIT 1 CORE I
 SNF ID #: 170
 Fuel Units & Descr: 814 - ELEMENT
 Heavy Metal Mass: BOL=1707.37kg ; EOL=1646.48kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1969
 Estimates as of: 2010
 Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
²Template Burnup(MWd): 1270.275
 Template BOL Heavy Metal Mass (MT): 0.012702752
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x15"
 62.62

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)		
Ac-227	3.8818E-06	57,582.590	115,165.180	0.00E+00	2.24E-01	4.47E-01	Avg. MeV	
Am-241	3.1387E-03	57,582.590	115,165.180	0.00E+00	1.81E+02	3.61E+02	0.0150	8.081E+15
Am-242m	2.3971E-06	57,582.590	115,165.180	0.00E+00	1.38E-01	2.76E-01	0.0250	1.656E+15
Am-243	4.6069E-05	57,582.590	115,165.180	0.00E+00	2.65E+00	5.31E+00	0.0375	1.443E+15
C-14	2.3121E-05	57,582.590	115,165.180	0.00E+00	1.33E+00	2.66E+00	0.0575	1.552E+15
Cf-252	1.0667E-06	57,582.590	115,165.180	0.00E+00	6.14E-02	1.23E-01	0.0850	9.370E+14
Cm-243	2.5357E-05	57,582.590	115,165.180	0.00E+00	1.46E+00	2.92E+00	0.1250	6.321E+14
Cm-244	6.4458E-03	57,582.590	115,165.180	0.00E+00	3.71E+02	7.42E+02	0.2250	8.129E+14
Co-60	4.5014E-04	57,582.590	115,165.180	0.00E+00	2.59E+01	5.18E+01	0.3750	3.514E+14
Cs-134	3.8086E-05	57,582.590	115,165.180	0.00E+00	2.19E+00	4.39E+00	0.5750	5.704E+15
Cs-135	2.4711E-05	57,582.590	115,165.180	0.00E+00	1.42E+00	2.85E+00	0.8500	9.013E+13
Cs-137	1.3273E+00	57,582.590	115,165.180	0.00E+00	7.64E+04	1.53E+05	1.2500	5.811E+13
Eu-154	1.5705E-02	57,582.590	115,165.180	0.00E+00	9.04E+02	1.81E+03	1.7500	2.760E+12
Eu-155	1.0415E-03	57,582.590	115,165.180	0.00E+00	6.00E+01	1.20E+02	2.2500	2.034E+08
Fe-55	4.4707E-08	57,582.590	115,165.180	0.00E+00	2.57E-03	5.15E-03	2.7500	2.407E+12
H-3	3.9094E-03	57,582.590	115,165.180	0.00E+00	2.25E+02	4.50E+02	3.5000	1.150E+07
I-129	1.0092E-06	57,582.590	115,165.180	0.00E+00	5.81E-02	1.16E-01	5.0000	4.903E+06
Kr-85	3.9519E-02	57,582.590	115,165.180	0.00E+00	2.28E+03	4.55E+03	7.0000	5.635E+05
Np-237	1.2541E-05	57,582.590	115,165.180	0.00E+00	7.22E-01	1.44E+00	11.0000	6.461E+04
Pa-231	4.7376E-06	57,582.590	115,165.180	0.00E+00	2.73E-01	5.46E-01		
Pb-210	1.4194E-09	57,582.590	115,165.180	0.00E+00	8.17E-05	1.63E-04		
Pm-147	1.5146E-04	57,582.590	115,165.180	0.00E+00	8.72E+00	1.74E+01		
Pu-238	1.6248E-01	57,582.590	115,165.180	0.00E+00	9.36E+03	1.87E+04		
Pu-239	1.3580E-04	57,582.590	115,165.180	0.00E+00	7.82E+00	1.56E+01		
Pu-240	2.7136E-04	57,582.590	115,165.180	0.00E+00	1.56E+01	3.13E+01		
Pu-241	1.9342E-02	57,582.590	115,165.180	0.00E+00	1.11E+03	2.23E+03		
Pu-242	3.8866E-06	57,582.590	115,165.180	0.00E+00	2.24E-01	4.48E-01		
Ra-226	2.7923E-09	57,582.590	115,165.180	0.00E+00	1.61E-04	3.22E-04		
Ra-228	9.1791E-07	57,582.590	115,165.180	0.00E+00	5.29E-02	1.06E-01		
Ru-106	3.5205E-11	57,582.590	115,165.180	0.00E+00	2.03E-06	4.05E-06		
Se-79	2.1082E-05	57,582.590	115,165.180	0.00E+00	1.21E+00	2.43E+00		
Sn-126	2.2192E-05	57,582.590	115,165.180	0.00E+00	1.28E+00	2.56E+00		
Sr-90	1.2667E+00	57,582.590	115,165.180	0.00E+00	7.29E+04	1.46E+05		
Tc-99	3.3331E-04	57,582.590	115,165.180	0.00E+00	1.92E+01	3.84E+01		
Th-229	1.0612E-05	57,582.590	115,165.180	0.00E+00	6.11E-01	1.22E+00		
Th-230	1.8878E-07	57,582.590	115,165.180	0.00E+00	1.09E-02	2.17E-02		
Th-232	-6.9673E-08	57,582.590	0.000	1.69E-01	1.65E-01	1.69E-01		
Ti-208	5.9530E-04	57,582.590	115,165.180	0.00E+00	3.43E+01	6.86E+01		
U-232	1.6115E-03	57,582.590	115,165.180	0.00E+00	9.28E+01	1.86E+02		
U-233	2.0602E-03	57,582.590	115,165.180	0.00E+00	1.19E+02	2.37E+02		
U-234	2.8939E-04	57,582.590	115,165.180	0.00E+00	1.67E+01	3.33E+01		
U-235	-1.7343E-06	57,582.590	0.000	3.38E-01	2.38E-01	3.38E-01		
U-236	8.6281E-06	57,582.590	115,165.180	0.00E+00	4.97E-01	9.94E-01		
U-238	-5.6065E-09	57,582.590	0.000	3.36E-03	3.04E-03	3.36E-03		
Y-90	1.2667E+00	57,582.590	115,165.180	0.00E+00	7.29E+04	1.46E+05		
Other Radionuclides					7.33E+04	1.47E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.23E+03	2.45E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	GRAPHITE	GRAPHITE	
Fuel Cladding:	PYROLYTIC CARBON IN	GRAPHITE	
BOL HM Constituents:	ThC2-UC2	Th and U	
BOL Enrichment %:	93.152582	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		57,582.590	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	52,578.305	115,165.180	Bounding burnup assumed to be twice nominal burnup.

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.34	
Bounding:	0.67	2.19

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: PEACH BOTTOM UNIT 1 CORE 1 (PTE-1)
 SNF ID #: 1085
 Fuel Units & Descr: 1 - ELEMENT
 Heavy Metal Mass: BOL=2.25kg ; EOL=2.25kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1969
 Estimates as of: 2010
 Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
²Template Burnup(MWd): 1270.275
 Template BOL Heavy Metal Mass (MT): 0.012702752
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x15"
 0.08

Radionuclide	II. Estimates		x _b	b	y _n	y _b	Gamma Sources	
	m	x _n					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	3.8818E-06	42.633	85.267	0.00E+00	1.65E-04	3.31E-04		
Am-241	3.1387E-03	42.633	85.267	0.00E+00	1.34E-01	2.68E-01	0.0150	5.983E+12
Am-242m	2.3971E-06	42.633	85.267	0.00E+00	1.02E-04	2.04E-04	0.0250	1.226E+12
Am-243	4.6069E-05	42.633	85.267	0.00E+00	1.96E-03	3.93E-03	0.0375	1.068E+12
C-14	2.3121E-05	42.633	85.267	0.00E+00	9.86E-04	1.97E-03	0.0575	1.149E+12
Cl-36	1.0667E-06	42.633	85.267	0.00E+00	4.55E-05	9.10E-05	0.0850	6.938E+11
Cm-249	2.5357E-05	42.633	85.267	0.00E+00	1.08E-03	2.16E-03	0.1250	4.680E+11
Cm-244	6.4458E-03	42.633	85.267	0.00E+00	2.75E-01	5.50E-01	0.2250	6.018E+11
Co-60	4.5014E-04	42.633	85.267	0.00E+00	1.92E-02	3.84E-02	0.3750	2.602E+11
Cs-134	3.8086E-05	42.633	85.267	0.00E+00	1.62E-03	3.25E-03	0.5750	4.223E+12
Cs-135	2.4711E-05	42.633	85.267	0.00E+00	1.05E-03	2.11E-03	0.8500	6.673E+10
Cs-137	1.3273E+00	42.633	85.267	0.00E+00	5.66E+01	1.13E+02	1.2500	4.302E+10
Eu-154	1.5705E-02	42.633	85.267	0.00E+00	6.70E-01	1.34E+00	1.7500	2.044E+09
Eu-155	1.0415E-03	42.633	85.267	0.00E+00	4.44E-02	8.88E-02	2.2500	1.506E+05
Fe-55	4.4707E-08	42.633	85.267	0.00E+00	1.91E-06	3.81E-06	2.7500	1.782E+09
H-3	3.9094E-03	42.633	85.267	0.00E+00	1.67E-01	3.33E-01	3.5000	8.515E+03
I-129	1.0092E-06	42.633	85.267	0.00E+00	4.30E-05	8.61E-05	5.0000	3.630E+03
Kr-85	3.9519E-02	42.633	85.267	0.00E+00	1.68E+00	3.37E+00	7.0000	4.172E+02
Np-237	1.2541E-05	42.633	85.267	0.00E+00	5.35E-04	1.07E-03	11.0000	4.784E+01
Pa-231	4.7376E-06	42.633	85.267	0.00E+00	2.02E-04	4.04E-04		
Pb-210	1.4194E-09	42.633	85.267	0.00E+00	6.05E-08	1.21E-07		
Pm-147	1.5146E-04	42.633	85.267	0.00E+00	6.46E-03	1.29E-02		
Pu-238	1.6248E-01	42.633	85.267	0.00E+00	6.93E+00	1.39E+01		
Pu-239	1.3580E-04	42.633	85.267	0.00E+00	5.79E-03	1.16E-02		
Pu-240	2.7136E-04	42.633	85.267	0.00E+00	1.16E-02	2.31E-02		
Pu-241	1.9342E-02	42.633	85.267	0.00E+00	8.25E-01	1.65E+00		
Pu-242	3.8866E-06	42.633	85.267	0.00E+00	1.66E-04	3.31E-04		
Ra-226	2.7923E-09	42.633	85.267	0.00E+00	1.19E-07	2.38E-07		
Ra-228	9.1791E-07	42.633	85.267	0.00E+00	3.91E-05	7.83E-05		
Ru-106	3.5205E-11	42.633	85.267	0.00E+00	1.50E-09	3.00E-09		
Se-79	2.1082E-05	42.633	85.267	0.00E+00	8.99E-04	1.80E-03		
Sn-126	2.2192E-05	42.633	85.267	0.00E+00	9.46E-04	1.89E-03		
Sr-90	1.2667E+00	42.633	85.267	0.00E+00	5.40E+01	1.08E+02		
Tc-99	3.3331E-04	42.633	85.267	0.00E+00	1.42E-02	2.84E-02		
Th-229	1.0612E-05	42.633	85.267	0.00E+00	4.52E-04	9.05E-04		
Th-230	1.8878E-07	42.633	85.267	0.00E+00	8.05E-06	1.61E-05		
Th-232	-6.9673E-08	42.633	0.000	2.23E-04	2.20E-04	2.23E-04		
Tl-208	5.9530E-04	42.633	85.267	0.00E+00	2.54E-02	5.08E-02		
U-232	1.6115E-03	42.633	85.267	0.00E+00	6.87E-02	1.37E-01		
U-233	2.0602E-03	42.633	85.267	0.00E+00	8.78E-02	1.76E-01		
U-234	2.8939E-04	42.633	85.267	0.00E+00	1.23E-02	2.47E-02		
U-235	-1.7343E-06	42.633	0.000	4.46E-04	3.72E-04	4.46E-04		
U-236	8.6281E-06	42.633	85.267	0.00E+00	3.68E-04	7.36E-04		
U-238	-5.6065E-09	42.633	0.000	4.44E-06	4.20E-06	4.44E-06		
Y-90	1.2667E+00	42.633	85.267	0.00E+00	5.40E+01	1.08E+02		
Other Radionuclides					5.43E+01	1.09E+02		

Thermal Power		
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
9.08E-01	1.82E+00	
Total	Total	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	GRAPHITE	GRAPHITE	
Fuel Cladding:	PYROLYTIC CARBON IN	GRAPHITE	
BOL HM Constituents:	ThC2-UC2	Th and U	
BOL Enrichment %:	93.12359551	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		42.633	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup assumed to be twice nominal burnup.
Bounding:	69.412	85.267	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.19		0.98
Bounding:	0.38	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: PEACH BOTTOM UNIT I CORE II
 SNF ID #: 171
 Fuel Units & Descr: 787 - CONCENTRIC TUBES
 Heavy Metal Mass: BOL=1389.06kg ; EOL=1281.16kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1973
 Estimates as of: 2010
 Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
²Template Burnup(MWd): 1270.275
 Template BOL Heavy Metal Mass (MT): 0.012702752
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x15"
 60.54

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	3.8818E-06	102,041.628	204,083.256	0.00E+00	3.96E-01	7.92E-01	Avg. MeV	
Am-241	3.1387E-03	102,041.628	204,083.256	0.00E+00	3.20E+02	6.41E+02	0.0150	1.432E+16
Am-242m	2.3971E-06	102,041.628	204,083.256	0.00E+00	2.45E-01	4.89E-01	0.0250	2.934E+15
Am-243	4.6069E-05	102,041.628	204,083.256	0.00E+00	4.70E+00	9.40E+00	0.0375	2.557E+15
C-14	2.3121E-05	102,041.628	204,083.256	0.00E+00	2.36E+00	4.72E+00	0.0575	2.750E+15
Cl-36	1.0667E-06	102,041.628	204,083.256	0.00E+00	1.09E-01	2.18E-01	0.0850	1.660E+15
Cm-243	2.5357E-05	102,041.628	204,083.256	0.00E+00	2.59E+00	5.17E+00	0.1250	1.120E+15
Cm-244	6.4458E-03	102,041.628	204,083.256	0.00E+00	6.58E+02	1.32E+03	0.2250	1.440E+15
Co-60	4.5014E-04	102,041.628	204,083.256	0.00E+00	4.59E+01	9.19E+01	0.3750	6.228E+14
Cs-134	3.8086E-05	102,041.628	204,083.256	0.00E+00	3.89E+00	7.77E+00	0.5750	1.011E+16
Cs-135	2.4711E-05	102,041.628	204,083.256	0.00E+00	2.52E+00	5.04E+00	0.8500	1.597E+14
Cs-137	1.3273E+00	102,041.628	204,083.256	0.00E+00	1.35E+05	2.71E+05	1.2500	1.030E+14
Eu-154	1.5705E-02	102,041.628	204,083.256	0.00E+00	1.60E+03	3.21E+03	1.7500	4.891E+12
Eu-155	1.0415E-03	102,041.628	204,083.256	0.00E+00	1.06E+02	2.13E+02	2.2500	3.604E+08
Fe-55	4.4707E-08	102,041.628	204,083.256	0.00E+00	4.56E-03	9.12E-03	2.7500	4.266E+12
H-3	3.9094E-03	102,041.628	204,083.256	0.00E+00	3.99E+02	7.98E+02	3.5000	2.038E+07
I-129	1.0092E-06	102,041.628	204,083.256	0.00E+00	1.03E-01	2.06E-01	5.0000	6.888E+06
Kr-85	3.9519E-02	102,041.628	204,083.256	0.00E+00	4.03E+03	8.07E+03	7.0000	9.985E+05
Np-237	1.2541E-05	102,041.628	204,083.256	0.00E+00	1.28E+00	2.56E+00	11.0000	1.145E+05
Pa-231	4.7376E-06	102,041.628	204,083.256	0.00E+00	4.83E-01	9.67E-01		
Pb-210	1.4194E-09	102,041.628	204,083.256	0.00E+00	1.45E-04	2.90E-04		
Pm-147	1.5146E-04	102,041.628	204,083.256	0.00E+00	1.55E+01	3.09E+01		
Pu-238	1.6248E-01	102,041.628	204,083.256	0.00E+00	1.66E+04	3.32E+04		
Pu-239	1.3580E-04	102,041.628	204,083.256	0.00E+00	1.39E+01	2.77E+01		
Pu-240	2.7136E-04	102,041.628	204,083.256	0.00E+00	2.77E+01	5.54E+01		
Pu-241	1.9342E-02	102,041.628	204,083.256	0.00E+00	1.97E+03	3.95E+03		
Pu-242	3.8866E-06	102,041.628	204,083.256	0.00E+00	3.97E-01	7.93E-01		
Ra-226	2.7923E-09	102,041.628	204,083.256	0.00E+00	2.85E-04	5.70E-04		
Ra-228	9.1791E-07	102,041.628	204,083.256	0.00E+00	9.37E-02	1.87E-01		
Ru-106	3.5205E-11	102,041.628	204,083.256	0.00E+00	3.59E-06	7.18E-06		
Se-79	2.1082E-05	102,041.628	204,083.256	0.00E+00	2.15E+00	4.30E+00		
Sn-126	2.2192E-05	102,041.628	204,083.256	0.00E+00	2.26E+00	4.53E+00		
Sr-90	1.2667E+00	102,041.628	204,083.256	0.00E+00	1.29E+05	2.59E+05		
Tc-99	3.3331E-04	102,041.628	204,083.256	0.00E+00	3.40E+01	6.80E+01		
Th-229	1.0612E-05	102,041.628	204,083.256	0.00E+00	1.08E+00	2.17E+00		
Th-230	1.8878E-07	102,041.628	204,083.256	0.00E+00	1.93E-02	3.85E-02		
Th-232	-6.9673E-08	102,041.628	0.000	1.37E-01	1.30E-01	1.37E-01		
Ti-208	5.9530E-04	102,041.628	204,083.256	0.00E+00	6.07E+01	1.21E+02		
U-232	1.6115E-03	102,041.628	204,083.256	0.00E+00	1.64E+02	3.29E+02		
U-233	2.0602E-03	102,041.628	204,083.256	0.00E+00	2.10E+02	4.20E+02		
U-234	2.8939E-04	102,041.628	204,083.256	0.00E+00	2.95E+01	5.91E+01		
U-235	-1.7343E-06	102,041.628	0.000	2.75E-01	9.79E-02	2.75E-01		
U-236	8.6281E-06	102,041.628	204,083.256	0.00E+00	8.80E-01	1.76E+00		
U-238	-5.6065E-09	102,041.628	0.000	2.73E-03	2.16E-03	2.73E-03		
Y-90	1.2667E+00	102,041.628	204,083.256	0.00E+00	1.29E+05	2.59E+05		
Other Radionuclides					1.30E+05	2.60E+05		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							2.17E+03	4.35E+03
							Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	GRAPHITE	GRAPHITE	
Fuel Cladding:	BISO IN GRAPHIT	GRAPHITE	
BOL HM Constituents:	ThC2-UC2	Th and U	
BOL Enrichment %:	93.15000286	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		102,041.628	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	101,007.912	204,083.256	

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.73	
Bounding:	1.47	2.02
		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: PEACH BOTTOM UNIT I CORE II (INTACT)
 SNF ID #: 206
 Fuel Units & Descr: 9 - CONCENTRIC TUBES
 Heavy Metal Mass: BOL=11.93kg ; EOL=10.74kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1974
 Estimates as of: 2010
 Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
²Template Burnup(MWd): 1270.275
 Template BOL Heavy Metal Mass (MT): 0.012702752
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x15"
 0.69

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.8818E-06	6,455.527	2,241.937	0.00E+00	2.51E-02	8.70E-03	Avg. MeV	
Am-241	3.1387E-03	6,455.527	2,241.937	0.00E+00	2.03E+01	7.04E+00	0.0150	1.573E+14
Am-242m	2.3971E-06	6,455.527	2,241.937	0.00E+00	1.55E-02	5.37E-03	0.0250	3.223E+13
Am-243	4.6069E-05	6,455.527	2,241.937	0.00E+00	2.97E-01	1.03E-01	0.0375	2.809E+13
C-14	2.3121E-05	6,455.527	2,241.937	0.00E+00	1.49E-01	5.18E-02	0.0575	3.021E+13
Cl-36	1.0667E-06	6,455.527	2,241.937	0.00E+00	6.89E-03	2.39E-03	0.0850	1.824E+13
Cm-243	2.5357E-05	6,455.527	2,241.937	0.00E+00	1.64E-01	5.68E-02	0.1250	1.231E+13
Cm-244	6.4458E-03	6,455.527	2,241.937	0.00E+00	4.16E+01	1.45E+01	0.2250	1.582E+13
Co-60	4.5014E-04	6,455.527	2,241.937	0.00E+00	2.91E+00	1.01E+00	0.3750	6.841E+12
Cs-134	3.8086E-05	6,455.527	2,241.937	0.00E+00	2.46E-01	8.54E-02	0.5750	1.110E+14
Cs-135	2.4711E-05	6,455.527	2,241.937	0.00E+00	1.60E-01	5.54E-02	0.8500	1.755E+12
Cs-137	1.3273E+00	6,455.527	2,241.937	0.00E+00	8.57E+03	2.98E+03	1.2500	1.131E+12
Eu-154	1.5705E-02	6,455.527	2,241.937	0.00E+00	1.01E+02	3.52E+01	1.7500	5.373E+10
Eu-155	1.0415E-03	6,455.527	2,241.937	0.00E+00	6.72E+00	2.33E+00	2.2500	3.959E+06
Fe-55	4.4707E-08	6,455.527	2,241.937	0.00E+00	2.89E-04	1.00E-04	2.7500	4.686E+10
H-3	3.9094E-03	6,455.527	2,241.937	0.00E+00	2.52E+01	8.76E+00	3.5000	2.239E+05
I-129	1.0092E-06	6,455.527	2,241.937	0.00E+00	6.52E-03	2.26E-03	5.0000	9.544E+04
Kr-85	3.9519E-02	6,455.527	2,241.937	0.00E+00	2.55E+02	8.86E+01	7.0000	1.097E+04
Np-237	1.2541E-05	6,455.527	2,241.937	0.00E+00	8.10E-02	2.81E-02	11.0000	1.258E+03
Pa-231	4.7376E-06	6,455.527	2,241.937	0.00E+00	3.06E-02	1.06E-02		
Pb-210	1.4194E-09	6,455.527	2,241.937	0.00E+00	9.16E-06	3.18E-06		
Pm-147	1.5146E-04	6,455.527	2,241.937	0.00E+00	9.78E-01	3.40E-01		
Pu-238	1.6248E-01	6,455.527	2,241.937	0.00E+00	1.05E+03	3.64E+02		
Pu-239	1.3580E-04	6,455.527	2,241.937	0.00E+00	8.77E-01	3.04E-01		
Pu-240	2.7136E-04	6,455.527	2,241.937	0.00E+00	1.75E+00	6.08E-01		
Pu-241	1.9342E-02	6,455.527	2,241.937	0.00E+00	1.25E+02	4.34E+01		
Pu-242	3.8866E-06	6,455.527	2,241.937	0.00E+00	2.51E-02	8.71E-03		
Ra-226	2.7923E-09	6,455.527	2,241.937	0.00E+00	1.80E-05	6.26E-06		
Ra-228	9.1791E-07	6,455.527	2,241.937	0.00E+00	5.93E-03	2.06E-03		
Ru-106	3.5205E-11	6,455.527	2,241.937	0.00E+00	2.27E-07	7.89E-08		
Se-79	2.1082E-05	6,455.527	2,241.937	0.00E+00	1.36E-01	4.73E-02		
Sn-126	2.2192E-05	6,455.527	2,241.937	0.00E+00	1.43E-01	4.98E-02		
Sr-90	1.2667E+00	6,455.527	2,241.937	0.00E+00	8.18E+03	2.84E+03		
Tc-99	3.3331E-04	6,455.527	2,241.937	0.00E+00	2.15E+00	7.47E-01		
Th-229	1.0612E-05	6,455.527	2,241.937	0.00E+00	6.85E-02	2.38E-02		
Th-230	1.8878E-07	6,455.527	2,241.937	0.00E+00	1.22E-03	4.23E-04		
Th-232	-6.9673E-08	6,455.527	0.000	1.18E-03	7.30E-04	1.18E-03		
Tl-208	5.9530E-04	6,455.527	2,241.937	0.00E+00	3.84E+00	1.33E+00		
U-232	1.6115E-03	6,455.527	2,241.937	0.00E+00	1.04E+01	3.61E+00		
U-233	2.0602E-03	6,455.527	2,241.937	0.00E+00	1.33E+01	4.62E+00		
U-234	2.8939E-04	6,455.527	2,241.937	0.00E+00	1.87E+00	6.49E-01		
U-235	-1.7343E-06	6,455.527	0.000	2.36E-03	0.00E+00	2.36E-03		
U-236	8.6281E-06	6,455.527	2,241.937	0.00E+00	5.57E-02	1.93E-02		
U-238	-5.6065E-09	6,455.527	0.000	2.35E-05	0.00E+00	2.35E-05		
Y-90	1.2667E+00	6,455.527	2,241.937	0.00E+00	8.18E+03	2.84E+03		
Other Radionuclides								
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							1.37E+02	4.77E+01
							Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	GRAPHITE	GRAPHITE	
Fuel Cladding:	BISO IN GRAPHIT	GRAPHITE	
BOL HM Constituents:	ThC2-UC2	Th and U	
BOL Enrichment %:	93.15206879	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	6,455.527	1,120.969	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.
Bounding:	867.055	2,241.937	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	5.41	0.17	0.86
Bounding:	1.88	2.59	

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: PNL MIXED MATERIAL EXP.DCC-1
 SNF ID #: 430
 Fuel Units & Descr: 1 - EXPERIMENT CAPSULE
 Heavy Metal Mass: BOL= : EOL=23.63kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1983
 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: 25 years

Estimated
 Canister usage:
 18"x15"
 0.07

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3562E-08	22,320.134	22,320.134	0.00E+00	3.03E-04	3.03E-04	Avg. MeV	
Am-241	1.0168E-04	22,320.134	22,320.134	0.00E+00	2.27E+00	2.27E+00	0.0150	2.124E+15
Am-242m	8.9052E-09	22,320.134	22,320.134	0.00E+00	1.99E-04	1.99E-04	0.0250	4.413E+14
Am-243	9.8602E-10	22,320.134	22,320.134	0.00E+00	2.20E-05	2.20E-05	0.0375	3.809E+14
C-14	2.3045E-04	22,320.134	22,320.134	0.00E+00	5.14E+00	5.14E+00	0.0575	4.109E+14
Cl-36	1.2261E-06	22,320.134	22,320.134	0.00E+00	2.74E-02	2.74E-02	0.0850	2.485E+14
Cm-243	3.1730E-10	22,320.134	22,320.134	0.00E+00	7.08E-06	7.08E-06	0.1250	1.614E+14
Cm-244	3.3977E-09	22,320.134	22,320.134	0.00E+00	7.58E-05	7.58E-05	0.2250	2.132E+14
Co-60	2.6373E-01	22,320.134	22,320.134	0.00E+00	5.89E+03	5.89E+03	0.3750	9.307E+13
Cs-134	8.7072E-05	22,320.134	22,320.134	0.00E+00	1.94E+00	1.94E+00	0.5750	1.520E+15
Cs-135	3.0316E-05	22,320.134	22,320.134	0.00E+00	6.77E-01	6.77E-01	0.8500	1.585E+13
Cs-137	1.8286E+00	22,320.134	22,320.134	0.00E+00	4.08E+04	4.08E+04	1.2500	4.414E+14
Eu-154	1.4982E-03	22,320.134	22,320.134	0.00E+00	3.34E+01	3.34E+01	1.7500	4.084E+11
Eu-155	2.8236E-03	22,320.134	22,320.134	0.00E+00	6.30E+01	6.30E+01	2.2500	2.352E+09
Fe-55	1.7687E-02	22,320.134	22,320.134	0.00E+00	3.95E+02	3.95E+02	2.7500	2.588E+07
H-3	4.4043E-03	22,320.134	22,320.134	0.00E+00	9.83E+01	9.83E+01	3.5000	5.467E+03
I-129	7.3195E-07	22,320.134	22,320.134	0.00E+00	1.63E-02	1.63E-02	5.0000	5.537E+02
Kr-85	7.8769E-02	22,320.134	22,320.134	0.00E+00	1.76E+03	1.76E+03	7.0000	6.114E+01
Np-237	1.1484E-06	22,320.134	22,320.134	0.00E+00	2.56E-02	2.56E-02	11.0000	6.860E+00
Pa-231	3.2396E-08	22,320.134	22,320.134	0.00E+00	7.23E-04	7.23E-04		
Pb-210	2.4409E-13	22,320.134	22,320.134	0.00E+00	5.45E-09	5.45E-09		
Pm-147	1.6331E-02	22,320.134	22,320.134	0.00E+00	3.65E+02	3.65E+02		
Pu-238	3.1947E-04	22,320.134	22,320.134	0.00E+00	7.13E+00	7.13E+00		
Pu-239	6.6789E-04	22,320.134	22,320.134	0.00E+00	1.49E+01	1.49E+01		
Pu-240	8.6922E-05	22,320.134	22,320.134	0.00E+00	1.94E+00	1.94E+00		
Pu-241	1.1567E-03	22,320.134	22,320.134	0.00E+00	2.58E+01	2.58E+01		
Pu-242	1.9717E-09	22,320.134	22,320.134	0.00E+00	4.40E-05	4.40E-05		
Ra-226	8.6190E-13	22,320.134	22,320.134	0.00E+00	1.92E-08	1.92E-08		
Ra-228	8.1498E-12	22,320.134	22,320.134	0.00E+00	1.82E-07	1.82E-07		
Ru-106	1.7770E-07	22,320.134	22,320.134	0.00E+00	3.97E-03	3.97E-03		
Se-79	1.3225E-05	22,320.134	22,320.134	0.00E+00	2.95E-01	2.95E-01		
Sn-126	1.1493E-05	22,320.134	22,320.134	0.00E+00	2.57E-01	2.57E-01		
Sr-90	1.7321E+00	22,320.134	22,320.134	0.00E+00	3.87E+04	3.87E+04		
Tc-99	4.6656E-04	22,320.134	22,320.134	0.00E+00	1.04E+01	1.04E+01		
Th-229	1.0110E-11	22,320.134	22,320.134	0.00E+00	2.26E-07	2.26E-07		
Th-230	1.1466E-10	22,320.134	22,320.134	0.00E+00	2.56E-06	2.56E-06		
Th-232	8.3245E-12	22,320.134	22,320.134	0.00E+00	1.86E-07	1.86E-07		
Tl-208	2.3860E-08	22,320.134	22,320.134	0.00E+00	5.33E-04	5.33E-04		
U-232	6.4576E-08	22,320.134	22,320.134	0.00E+00	1.44E-03	1.44E-03		
U-233	3.1082E-09	22,320.134	22,320.134	0.00E+00	6.94E-05	6.94E-05		
U-234	3.7587E-07	22,320.134	22,320.134	0.00E+00	8.39E-03	8.39E-03		
U-235	-2.7761E-06	22,320.134	0.000	9.54E-02	3.35E-02	9.54E-02		
U-236	1.6190E-05	22,320.134	22,320.134	0.00E+00	3.61E-01	3.61E-01		
U-238	-2.8547E-09	22,320.134	0.000	1.03E-03	9.68E-04	1.03E-03		
Y-90	1.7321E+00	22,320.134	22,320.134	0.00E+00	3.87E+04	3.87E+04		
Other Radionuclides					4.53E+04	4.53E+04		

Thermal Power	
Nominal Heat Output (Watts)	6.94E-05
Bounding Heat Output (Watts)	8.39E-03
Total	5.54E+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	This Template was used for the following reasons: This fuel matches on all parameters except cladding (SST is conservative) and enrichment (unknown).
Fuel Cladding:	NONE	SST	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		22,320.134	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		22,320.134	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	10.12		
Bounding:	10.12		

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: PNL MIXED MATERIAL EXP.DCC-2
 SNF ID #: 431
 Fuel Units & Descr: 1 - EXPERIMENT CAPSULE
 Heavy Metal Mass: BOL= ; EOL=20.63kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1984
 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
³Template Decay Time: 25 years

Estimated
 Canister usage:
 18"x15"
 0.07

Radionuclide	m		x _n		x _b		b		y _n		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)	Avg. MeV					
Ac-227	1.3562E-08	19,489.025	19,489.025	0.00E+00	2.64E-04	2.64E-04								
Am-241	1.0168E-04	19,489.025	19,489.025	0.00E+00	1.98E+00	1.98E+00	0.0150	1.854E+15						
Am-242m	8.9052E-09	19,489.025	19,489.025	0.00E+00	1.74E-04	1.74E-04	0.0250	3.853E+14						
Am-243	9.8602E-10	19,489.025	19,489.025	0.00E+00	1.92E-05	1.92E-05	0.0375	3.326E+14						
C-14	2.3045E-04	19,489.025	19,489.025	0.00E+00	4.49E+00	4.49E+00	0.0575	3.588E+14						
Cf-252	1.2261E-06	19,489.025	19,489.025	0.00E+00	2.39E-02	2.39E-02	0.0850	2.170E+14						
Cm-243	3.1730E-10	19,489.025	19,489.025	0.00E+00	6.18E-06	6.18E-06	0.1250	1.409E+14						
Cm-244	3.3977E-09	19,489.025	19,489.025	0.00E+00	6.62E-05	6.62E-05	0.2250	1.862E+14						
Co-60	2.6373E-01	19,489.025	19,489.025	0.00E+00	5.14E+03	5.14E+03	0.3750	8.126E+13						
Cs-134	8.7072E-05	19,489.025	19,489.025	0.00E+00	1.70E+00	1.70E+00	0.5750	1.327E+15						
Cs-135	3.0316E-05	19,489.025	19,489.025	0.00E+00	5.91E-01	5.91E-01	0.8500	1.384E+13						
Cs-137	1.8286E+00	19,489.025	19,489.025	0.00E+00	3.56E+04	3.56E+04	1.2500	3.854E+14						
Eu-154	1.4982E-03	19,489.025	19,489.025	0.00E+00	2.92E+01	2.92E+01	1.7500	3.566E+11						
Eu-155	2.8236E-03	19,489.025	19,489.025	0.00E+00	5.50E+01	5.50E+01	2.2500	2.053E+09						
Fe-55	1.7687E-02	19,489.025	19,489.025	0.00E+00	3.45E+02	3.45E+02	2.7500	2.260E+07						
H-3	4.4043E-03	19,489.025	19,489.025	0.00E+00	8.58E+01	8.58E+01	3.5000	4.774E+03						
I-129	7.3195E-07	19,489.025	19,489.025	0.00E+00	1.43E-02	1.43E-02	5.0000	4.835E+02						
Kr-85	7.8769E-02	19,489.025	19,489.025	0.00E+00	1.54E+03	1.54E+03	7.0000	5.338E+01						
Np-237	1.1484E-06	19,489.025	19,489.025	0.00E+00	2.24E-02	2.24E-02	11.0000	5.990E+00						
Pa-231	3.2396E-08	19,489.025	19,489.025	0.00E+00	6.31E-04	6.31E-04								
Pb-210	2.4409E-13	19,489.025	19,489.025	0.00E+00	4.76E-09	4.76E-09								
Pm-147	1.6331E-02	19,489.025	19,489.025	0.00E+00	3.18E+02	3.18E+02								
Pu-238	3.1947E-04	19,489.025	19,489.025	0.00E+00	6.23E+00	6.23E+00								
Pu-239	6.6789E-04	19,489.025	19,489.025	0.00E+00	1.30E+01	1.30E+01								
Pu-240	8.6922E-05	19,489.025	19,489.025	0.00E+00	1.69E+00	1.69E+00								
Pu-241	1.1567E-03	19,489.025	19,489.025	0.00E+00	2.25E+01	2.25E+01								
Pu-242	1.9717E-09	19,489.025	19,489.025	0.00E+00	3.84E-05	3.84E-05								
Ra-226	8.6190E-13	19,489.025	19,489.025	0.00E+00	1.68E-08	1.68E-08								
Ra-228	8.1498E-12	19,489.025	19,489.025	0.00E+00	1.59E-07	1.59E-07								
Ru-106	1.7770E-07	19,489.025	19,489.025	0.00E+00	3.46E-03	3.46E-03								
Se-79	1.3225E-05	19,489.025	19,489.025	0.00E+00	2.58E-01	2.58E-01								
Sn-126	1.1493E-05	19,489.025	19,489.025	0.00E+00	2.24E-01	2.24E-01								
Sr-90	1.7321E+00	19,489.025	19,489.025	0.00E+00	3.38E+04	3.38E+04								
Tc-99	4.6656E-04	19,489.025	19,489.025	0.00E+00	9.09E+00	9.09E+00								
Th-229	1.0110E-11	19,489.025	19,489.025	0.00E+00	1.97E-07	1.97E-07								
Th-230	1.1466E-10	19,489.025	19,489.025	0.00E+00	2.23E-06	2.23E-06								
Th-232	8.3245E-12	19,489.025	19,489.025	0.00E+00	1.62E-07	1.62E-07								
Tl-208	2.3860E-08	19,489.025	19,489.025	0.00E+00	4.65E-04	4.65E-04								
U-232	6.4576E-08	19,489.025	19,489.025	0.00E+00	1.26E-03	1.26E-03								
U-233	3.1082E-09	19,489.025	19,489.025	0.00E+00	6.06E-05	6.06E-05								
U-234	3.7587E-07	19,489.025	19,489.025	0.00E+00	7.33E-03	7.33E-03								
U-235	-2.7761E-06	19,489.025	0.000	8.33E-02	2.92E-02	8.33E-02								
U-236	1.6190E-05	19,489.025	19,489.025	0.00E+00	3.16E-01	3.16E-01								
U-238	-2.8547E-09	19,489.025	0.000	9.01E-04	8.45E-04	9.01E-04								
Y-90	1.7321E+00	19,489.025	19,489.025	0.00E+00	3.38E+04	3.38E+04								
Other Radionuclides					3.95E+04	3.95E+04								

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.84E+02	4.84E+02
Total	Total

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 cladding (SST is conservative) and enrichment (unknown).
Fuel Cladding:	NONE	SST	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		19,489.025	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		19,489.025	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	10.12		1.02
Bounding:	10.12		

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: PNL MIXED MATERIAL EXP.DCC-3
 SNF ID #: 432
 Fuel Units & Descr: 1 - FUEL MELTED IN EXP
 Heavy Metal Mass: BOL= ; EOL=20.36kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1985
 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: 25 years

Estimated
 Canister usage:
 18"x15"
 0.07

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	1.3562E-08	19,237.748	19,237.748	0.00E+00	2.61E-04	2.61E-04	Avg. MeV	
Am-241	1.0168E-04	19,237.748	19,237.748	0.00E+00	1.96E+00	1.96E+00	0.0150	1.831E+15
Am-242m	8.9052E-09	19,237.748	19,237.748	0.00E+00	1.71E-04	1.71E-04	0.0250	3.803E+14
Am-243	9.8602E-10	19,237.748	19,237.748	0.00E+00	1.90E-05	1.90E-05	0.0375	3.283E+14
C-14	2.3045E-04	19,237.748	19,237.748	0.00E+00	4.43E+00	4.43E+00	0.0575	3.542E+14
Cl-36	1.2261E-06	19,237.748	19,237.748	0.00E+00	2.36E-02	2.36E-02	0.0850	2.142E+14
Cm-243	3.1730E-10	19,237.748	19,237.748	0.00E+00	6.10E-06	6.10E-06	0.1250	1.391E+14
Cm-244	3.3977E-09	19,237.748	19,237.748	0.00E+00	6.54E-05	6.54E-05	0.2250	1.839E+14
Co-60	2.6373E-01	19,237.748	19,237.748	0.00E+00	5.07E+03	5.07E+03	0.3750	8.021E+13
Cs-134	8.7072E-05	19,237.748	19,237.748	0.00E+00	1.68E+00	1.68E+00	0.5750	1.310E+15
Cs-135	3.0316E-05	19,237.748	19,237.748	0.00E+00	5.83E-01	5.83E-01	0.8500	1.366E+13
Cs-137	1.8286E+00	19,237.748	19,237.748	0.00E+00	3.52E+04	3.52E+04	1.2500	3.805E+14
Eu-154	1.4982E-03	19,237.748	19,237.748	0.00E+00	2.88E+01	2.88E+01	1.7500	3.520E+11
Eu-155	2.8236E-03	19,237.748	19,237.748	0.00E+00	5.43E+01	5.43E+01	2.2500	2.027E+09
Fe-55	1.7687E-02	19,237.748	19,237.748	0.00E+00	3.40E+02	3.40E+02	2.7500	2.230E+07
H-3	4.4043E-03	19,237.748	19,237.748	0.00E+00	8.47E+01	8.47E+01	3.5000	4.712E+03
I-129	7.3195E-07	19,237.748	19,237.748	0.00E+00	1.41E-02	1.41E-02	5.0000	4.773E+02
Kr-85	7.8769E-02	19,237.748	19,237.748	0.00E+00	1.52E+03	1.52E+03	7.0000	5.269E+01
Np-237	1.1484E-06	19,237.748	19,237.748	0.00E+00	2.21E-02	2.21E-02	11.0000	5.913E+00
Pa-231	3.2396E-08	19,237.748	19,237.748	0.00E+00	6.23E-04	6.23E-04		
Pb-210	2.4409E-13	19,237.748	19,237.748	0.00E+00	4.70E-09	4.70E-09		
Pm-147	1.6331E-02	19,237.748	19,237.748	0.00E+00	3.14E+02	3.14E+02		
Pu-238	3.1947E-04	19,237.748	19,237.748	0.00E+00	6.15E+00	6.15E+00		
Pu-239	6.6789E-04	19,237.748	19,237.748	0.00E+00	1.28E+01	1.28E+01		
Pu-240	8.6922E-05	19,237.748	19,237.748	0.00E+00	1.67E+00	1.67E+00		
Pu-241	1.1567E-03	19,237.748	19,237.748	0.00E+00	2.23E+01	2.23E+01		
Pu-242	1.9717E-09	19,237.748	19,237.748	0.00E+00	3.79E-05	3.79E-05		
Ra-226	8.6190E-13	19,237.748	19,237.748	0.00E+00	1.66E-08	1.66E-08		
Ra-228	8.1498E-12	19,237.748	19,237.748	0.00E+00	1.57E-07	1.57E-07		
Ru-106	1.7770E-07	19,237.748	19,237.748	0.00E+00	3.42E-03	3.42E-03		
Se-79	1.3225E-05	19,237.748	19,237.748	0.00E+00	2.54E-01	2.54E-01		
Sn-126	1.1493E-05	19,237.748	19,237.748	0.00E+00	2.21E-01	2.21E-01		
Sr-90	1.7321E+00	19,237.748	19,237.748	0.00E+00	3.33E+04	3.33E+04		
Tc-99	4.6656E-04	19,237.748	19,237.748	0.00E+00	8.98E+00	8.98E+00		
Th-229	1.0110E-11	19,237.748	19,237.748	0.00E+00	1.94E-07	1.94E-07		
Th-230	1.1466E-10	19,237.748	19,237.748	0.00E+00	2.21E-06	2.21E-06		
Th-232	8.3245E-12	19,237.748	19,237.748	0.00E+00	1.60E-07	1.60E-07		
Tl-208	2.3860E-08	19,237.748	19,237.748	0.00E+00	4.59E-04	4.59E-04		
U-232	6.4576E-08	19,237.748	19,237.748	0.00E+00	1.24E-03	1.24E-03		
U-233	3.1082E-09	19,237.748	19,237.748	0.00E+00	5.98E-05	5.98E-05		
U-234	3.7587E-07	19,237.748	19,237.748	0.00E+00	7.23E-03	7.23E-03		
U-235	-2.7761E-06	19,237.748	0.000	8.23E-02	2.89E-02	8.23E-02		
U-236	1.6190E-05	19,237.748	19,237.748	0.00E+00	3.11E-01	3.11E-01		
U-238	-2.8547E-09	19,237.748	0.000	8.89E-04	8.35E-04	8.89E-04		
Y-90	1.7321E+00	19,237.748	19,237.748	0.00E+00	3.33E+04	3.33E+04		
Other Radionuclides					3.90E+04	3.90E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.77E+02	4.77E+02
Total	Total

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 cladding (SST is conservative) and enrichment (unknown).
Fuel Cladding:	NONE	SST	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		19,237.748	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		19,237.748	

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	10.12	
Bounding:	10.12	
		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: PNL MOX FUEL
 SNF ID #: 414
 Fuel Units & Descr: 5 - SCRAP
 Heavy Metal Mass: BOL= ; EOL=23kg
 ROD Storage Sits: INEEL

¹Fuel decay start date: 1988
 Estimates as of: 2010
 Template: (Worst Case)
²Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 20 years

Estimated
 Carister usage:
 18"x15"
 0.36

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	1.6288E-06	218.581	218.581	0.00E+00	3.56E-04	3.56E-04		
Am-241	6.9216E+00	218.581	218.581	0.00E+00	1.51E+03	1.51E+03	0.0150	4.467E+14
Am-242m	1.8032E-02	218.581	218.581	0.00E+00	3.94E+00	3.94E+00	0.0250	8.798E+13
Am-243	1.6336E-02	218.581	218.581	0.00E+00	3.57E+00	3.57E+00	0.0375	7.896E+13
C-14	1.2112E-01	218.581	218.581	0.00E+00	2.65E+01	2.65E+01	0.0575	9.858E+13
Cl-36	2.2860E-03	218.581	218.581	0.00E+00	5.00E-01	5.00E-01	0.0850	4.533E+13
Cm-243	1.2475E-03	218.581	218.581	0.00E+00	2.73E-01	2.73E-01	0.1250	4.178E+13
Cm-244	2.9920E-01	218.581	218.581	0.00E+00	6.54E+01	6.54E+01	0.2250	3.746E+13
Co-60	2.0197E+02	218.581	218.581	0.00E+00	4.41E+04	4.41E+04	0.3750	1.567E+13
Cs-134	5.2728E-02	218.581	218.581	0.00E+00	1.15E+01	1.15E+01	0.5750	2.462E+14
Cs-135	4.3976E-04	218.581	218.581	0.00E+00	9.61E-02	9.61E-02	0.8500	1.914E+13
Cs-137	2.9760E+01	218.581	218.581	0.00E+00	6.50E+03	6.50E+03	1.2500	3.286E+15
Eu-154	4.1838E+00	218.581	218.581	0.00E+00	9.14E+02	9.14E+02	1.7500	5.976E+11
Eu-155	5.6060E-01	218.581	218.581	0.00E+00	1.23E+02	1.23E+02	2.2500	1.733E+10
Fe-55	1.5985E+01	218.581	218.581	0.00E+00	3.49E+03	3.49E+03	2.7500	8.315E+08
H-3	5.6412E-01	218.581	218.581	0.00E+00	1.23E+02	1.23E+02	3.5000	9.728E+05
I-129	1.0618E-05	218.581	218.581	0.00E+00	2.32E-03	2.32E-03	5.0000	4.029E+05
Kr-85	1.5783E+00	218.581	218.581	0.00E+00	3.45E+02	3.45E+02	7.0000	4.631E+04
Np-237	1.5632E-04	218.581	218.581	0.00E+00	3.42E-02	3.42E-02	11.0000	5.311E+03
Pa-231	2.8608E-06	218.581	218.581	0.00E+00	6.25E-04	6.25E-04		
Pb-210	3.7448E-09	218.581	218.581	0.00E+00	8.19E-07	8.19E-07		
Pm-147	8.8701E-01	218.581	218.581	0.00E+00	1.94E+02	1.94E+02		
Pu-238	-4.8843E-01	218.581	0.000	5.91E+01	0.00E+00	5.91E+01		
Pu-239	-4.8280E-02	218.581	0.000	7.15E+00	0.00E+00	7.15E+00		
Pu-240	-3.0095E-01	218.581	0.000	9.13E+00	0.00E+00	9.13E+00		
Pu-241	-5.2560E+01	218.581	0.000	2.35E+03	0.00E+00	2.35E+03		
Pu-242	-1.1381E-04	218.581	0.000	3.95E-02	1.47E-02	3.95E-02		
Ra-226	1.6815E-08	218.581	218.581	0.00E+00	3.68E-06	3.68E-06		
Ra-228	5.6880E-07	218.581	218.581	0.00E+00	1.24E-04	1.24E-04		
Ru-106	1.2188E-04	218.581	218.581	0.00E+00	2.66E-02	2.66E-02		
Se-79	1.9186E-04	218.581	218.581	0.00E+00	4.19E-02	4.19E-02		
Sn-126	1.6671E-04	218.581	218.581	0.00E+00	3.64E-02	3.64E-02		
Sr-90	2.8288E+01	218.581	218.581	0.00E+00	6.18E+03	6.18E+03		
Tc-99	6.7678E-03	218.581	218.581	0.00E+00	1.48E+00	1.48E+00		
Th-229	8.9952E-07	218.581	218.581	0.00E+00	1.97E-04	1.97E-04		
Th-230	2.9941E-06	218.581	218.581	0.00E+00	6.54E-04	6.54E-04		
Th-232	6.0208E-07	218.581	218.581	0.00E+00	1.32E-04	1.32E-04		
Tl-208	1.0120E-04	218.581	218.581	0.00E+00	2.21E-02	2.21E-02		
U-232	2.7388E-04	218.581	218.581	0.00E+00	5.99E-02	5.99E-02		
U-233	3.6128E-04	218.581	218.581	0.00E+00	7.90E-02	7.90E-02		
U-234	1.2788E-02	218.581	218.581	0.00E+00	2.80E+00	2.80E+00		
U-235	5.7486E-04	218.581	218.581	1.98E-04	1.26E-01	1.26E-01		
U-236	2.3485E-04	218.581	218.581	0.00E+00	5.13E-02	5.13E-02		
U-238	1.1581E-04	218.581	218.581	2.46E-05	2.53E-02	2.53E-02		
Y-90	2.8288E+01	218.581	218.581	0.00E+00	6.18E+03	6.18E+03		
Other Radionuclides					1.64E+04	1.64E+04		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							8.25E+02	8.27E+02
							Total	Total

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 Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	SST	SST/Inconel	
BOL HM Constituents:	PuO2-UO2	U, Th, & Pu	
BOL Enrichment %:		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		218.581	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		218.581	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
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: PNL MOX FUEL (7010)
 SNF ID #: 415
 Fuel Units & Descr: 7 - FUEL MELTED IN EXP
 Heavy Metal Mass: BOL= : EOL=.01kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1988
 Estimates as of: 2010
 Template: (Worst Case)
²Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 20 years

Estimated
 Canister usage:
 18"x15"
 0.51

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	1.6288E-06	9.313	9.313	0.00E+00	1.52E-05	1.52E-05	Avg. MeV	
Am-241	6.9216E+00	9.313	9.313	0.00E+00	6.45E+01	6.45E+01	0.0150	1.903E+13
Am-242m	1.8032E-02	9.313	9.313	0.00E+00	1.68E-01	1.68E-01	0.0250	3.749E+12
Am-243	1.6336E-02	9.313	9.313	0.00E+00	1.52E-01	1.52E-01	0.0375	3.364E+12
C-14	1.2112E-01	9.313	9.313	0.00E+00	1.13E+00	1.13E+00	0.0575	4.200E+12
Cl-36	2.2860E-03	9.313	9.313	0.00E+00	2.13E-02	2.13E-02	0.0850	1.932E+12
Cm-243	1.2475E-03	9.313	9.313	0.00E+00	1.16E-02	1.16E-02	0.1250	1.780E+12
Cm-244	2.9920E-01	9.313	9.313	0.00E+00	2.79E+00	2.79E+00	0.2250	1.596E+12
Co-60	2.0197E+02	9.313	9.313	0.00E+00	1.88E+03	1.88E+03	0.3750	6.675E+11
Cs-134	5.2728E-02	9.313	9.313	0.00E+00	4.91E-01	4.91E-01	0.5750	1.049E+13
Cs-135	4.3976E-04	9.313	9.313	0.00E+00	4.10E-03	4.10E-03	0.8500	8.154E+11
Cs-137	2.9760E+01	9.313	9.313	0.00E+00	2.77E+02	2.77E+02	1.2500	1.400E+14
Eu-154	4.1838E+00	9.313	9.313	0.00E+00	3.90E+01	3.90E+01	1.7500	2.546E+10
Eu-155	5.6060E-01	9.313	9.313	0.00E+00	5.22E+00	5.22E+00	2.2500	7.382E+08
Fe-55	1.5985E+01	9.313	9.313	0.00E+00	1.49E+02	1.49E+02	2.7500	3.543E+07
H-3	5.6412E-01	9.313	9.313	0.00E+00	5.25E+00	5.25E+00	3.5000	4.145E+04
I-129	1.0618E-05	9.313	9.313	0.00E+00	9.89E-05	9.89E-05	5.0000	1.717E+04
Kr-85	1.5783E+00	9.313	9.313	0.00E+00	1.47E+01	1.47E+01	7.0000	1.973E+03
Np-237	1.5632E-04	9.313	9.313	0.00E+00	1.46E-03	1.46E-03	11.0000	2.263E+02
Pa-231	2.8608E-06	9.313	9.313	0.00E+00	2.66E-05	2.66E-05		
Pb-210	3.7448E-09	9.313	9.313	0.00E+00	3.49E-08	3.49E-08		
Pm-147	8.8701E-01	9.313	9.313	0.00E+00	8.26E+00	8.26E+00		
Pu-238	-4.8843E-01	9.313	0.000	2.52E+00	0.00E+00	2.52E+00		
Pu-239	-4.8280E-02	9.313	0.000	3.05E-01	0.00E+00	3.05E-01		
Pu-240	-3.0095E-01	9.313	0.000	3.89E-01	0.00E+00	3.89E-01		
Pu-241	-5.2560E+01	9.313	0.000	1.00E+02	0.00E+00	1.00E+02		
Pu-242	-1.1381E-04	9.313	0.000	1.68E-03	6.25E-04	1.68E-03		
Ra-226	1.6815E-08	9.313	9.313	0.00E+00	1.57E-07	1.57E-07		
Ra-228	5.6880E-07	9.313	9.313	0.00E+00	5.30E-06	5.30E-06		
Ru-106	1.2188E-04	9.313	9.313	0.00E+00	1.14E-03	1.14E-03		
Se-79	1.9186E-04	9.313	9.313	0.00E+00	1.79E-03	1.79E-03		
Sn-126	1.6671E-04	9.313	9.313	0.00E+00	1.55E-03	1.55E-03		
Sr-90	2.8288E+01	9.313	9.313	0.00E+00	2.63E+02	2.63E+02		
Tc-99	6.7678E-03	9.313	9.313	0.00E+00	6.30E-02	6.30E-02		
Th-229	8.9952E-07	9.313	9.313	0.00E+00	8.38E-06	8.38E-06		
Th-230	2.9941E-06	9.313	9.313	0.00E+00	2.79E-05	2.79E-05		
Th-232	6.0208E-07	9.313	9.313	0.00E+00	5.61E-06	5.61E-06		
Ti-208	1.0120E-04	9.313	9.313	0.00E+00	9.43E-04	9.43E-04		
U-232	2.7388E-04	9.313	9.313	0.00E+00	2.55E-03	2.55E-03		
U-233	3.6128E-04	9.313	9.313	0.00E+00	3.36E-03	3.36E-03		
U-234	1.2788E-02	9.313	9.313	0.00E+00	1.19E-01	1.19E-01		
U-235	5.7486E-04	9.313	9.313	8.43E-06	5.36E-03	5.36E-03		
U-236	2.3485E-04	9.313	9.313	0.00E+00	2.19E-03	2.19E-03		
U-238	1.1581E-04	9.313	9.313	1.05E-06	1.08E-03	1.08E-03		
Y-90	2.8288E+01	9.313	9.313	0.00E+00	2.63E+02	2.63E+02		
Other Radionuclides					6.98E+02	6.98E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.51E+01	3.52E+01
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 Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
BOL HM Constituents:	SST	SST/Inconel	
BOL Enrichment %:	PuO2-UO2	U, Th, & Pu	
		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		9.313	Nominal burnup set equal to bounding burnup.
Bounding:		9.313	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		

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: PNL MOX FUEL (7055)
 SNF ID #: 416
 Fuel Units & Desc: 12 - SCRAP
 Heavy Metal Mass: BOL= : EOL=.06kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1988
 Estimates as of: 2010
 Template: (Worst Case)
²Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 20 years

Estimated
 Canister usage:
 18"x15"
 0.88

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.6288E-06	54.740	54.740	0.00E+00	8.92E-05	8.92E-05	Avg. MeV	
Am-241	6.9216E+00	54.740	54.740	0.00E+00	3.79E+02	3.79E+02	0.0150	1.119E+14
Am-242m	1.8032E-02	54.740	54.740	0.00E+00	9.87E-01	9.87E-01	0.0250	2.203E+13
Am-243	1.6336E-01	54.740	54.740	0.00E+00	8.94E-01	8.94E-01	0.0375	1.977E+13
C-14	1.2112E-02	54.740	54.740	0.00E+00	6.63E+00	6.63E+00	0.0575	2.469E+13
Cl-36	2.2860E-03	54.740	54.740	0.00E+00	1.25E-01	1.25E-01	0.0850	1.135E+13
Cm-243	1.2475E-03	54.740	54.740	0.00E+00	6.83E-02	6.83E-02	0.1250	1.046E+13
Cm-244	2.9920E-01	54.740	54.740	0.00E+00	1.64E+01	1.64E+01	0.2250	9.382E+12
Co-60	2.0197E+02	54.740	54.740	0.00E+00	1.11E+04	1.11E+04	0.3750	3.923E+12
Cs-134	5.2728E-02	54.740	54.740	0.00E+00	2.89E+00	2.89E+00	0.5750	6.165E+13
Cs-135	4.3976E-04	54.740	54.740	0.00E+00	2.41E-02	2.41E-02	0.8500	4.793E+12
Cs-137	2.9760E+01	54.740	54.740	0.00E+00	1.63E+03	1.63E+03	1.2500	8.229E+14
Eu-154	4.1838E+00	54.740	54.740	0.00E+00	2.29E+02	2.29E+02	1.7500	1.496E+11
Eu-155	5.6060E-01	54.740	54.740	0.00E+00	3.07E+01	3.07E+01	2.2500	4.339E+09
Fe-55	1.5985E+01	54.740	54.740	0.00E+00	8.75E+02	8.75E+02	2.7500	2.082E+08
H-3	5.6412E-01	54.740	54.740	0.00E+00	3.09E+01	3.09E+01	3.5000	2.436E+05
I-129	1.0618E-05	54.740	54.740	0.00E+00	5.81E-04	5.81E-04	5.0000	1.009E+05
Kr-85	1.5783E+00	54.740	54.740	0.00E+00	8.64E+01	8.64E+01	7.0000	1.160E+04
Np-237	1.5632E-04	54.740	54.740	0.00E+00	8.56E-03	8.56E-03	11.0000	1.330E+03
Pa-231	2.8608E-06	54.740	54.740	0.00E+00	1.57E-04	1.57E-04		
Pb-210	3.7448E-09	54.740	54.740	0.00E+00	2.05E-07	2.05E-07		
Pm-147	8.8701E-01	54.740	54.740	0.00E+00	4.86E+01	4.86E+01		
Pu-238	-4.8843E-01	54.740	0.000	1.48E+01	0.00E+00	1.48E+01		
Pu-239	-4.8280E-02	54.740	0.000	1.79E+00	0.00E+00	1.79E+00		
Pu-240	-3.0095E-01	54.740	0.000	2.29E+00	0.00E+00	2.29E+00		
Pu-241	-5.2560E+01	54.740	0.000	5.89E+02	0.00E+00	5.89E+02		
Pu-242	-1.1381E-04	54.740	0.000	9.90E-03	3.67E-03	9.90E-03		
Ra-226	1.6815E-08	54.740	54.740	0.00E+00	9.20E-07	9.20E-07		
Ra-228	5.6880E-07	54.740	54.740	0.00E+00	3.11E-05	3.11E-05		
Ru-106	1.2188E-04	54.740	54.740	0.00E+00	6.67E-03	6.67E-03		
Se-79	1.9186E-04	54.740	54.740	0.00E+00	1.05E-02	1.05E-02		
Sn-126	1.6671E-04	54.740	54.740	0.00E+00	9.13E-03	9.13E-03		
Sr-90	2.8288E+01	54.740	54.740	0.00E+00	1.55E+03	1.55E+03		
Tc-99	6.7678E-03	54.740	54.740	0.00E+00	3.70E-01	3.70E-01		
Th-229	8.9952E-07	54.740	54.740	0.00E+00	4.92E-05	4.92E-05		
Th-230	2.9941E-06	54.740	54.740	0.00E+00	1.64E-04	1.64E-04		
Th-232	6.0208E-07	54.740	54.740	0.00E+00	3.30E-05	3.30E-05		
Ti-208	1.0120E-04	54.740	54.740	0.00E+00	5.54E-03	5.54E-03		
U-232	2.7388E-04	54.740	54.740	0.00E+00	1.50E-02	1.50E-02		
U-233	3.6128E-04	54.740	54.740	0.00E+00	1.98E-02	1.98E-02		
U-234	1.2788E-02	54.740	54.740	0.00E+00	7.00E-01	7.00E-01		
U-235	5.7486E-04	54.740	54.740	4.96E-05	3.15E-02	3.15E-02		
U-236	2.3485E-04	54.740	54.740	0.00E+00	1.29E-02	1.29E-02		
U-238	1.1581E-04	54.740	54.740	6.17E-06	6.35E-03	6.35E-03		
Y-90	2.8288E+01	54.740	54.740	0.00E+00	1.55E+03	1.55E+03		
Other Radionuclides					4.10E+03	4.10E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.06E+02	2.07E+02
Total	Total

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 Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	SST	SST/Inconel	
BOL HM Constituents:	PuO2-UO2	U, Th, & Pu	
BOL Enrichment %:		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		54.740	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		54.740	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
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: PNL MOX FUEL (7057)
 SNF ID #: 417
 Fuel Units & Descr: 4 - SCRAP
 Heavy Metal Mass: BOL= : EOL=2.44kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1988
 Estimates as of: 2010
 Template: (Worst Case)
²Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 20 years

Estimated
 Canister usage:
 18"x15"
 0.29

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	1.6288E-06	2,318.860	2,318.860	0.00E+00	3.78E-03	3.78E-03	0.0150	4.739E+15
Am-241	6.9216E+00	2,318.860	2,318.860	0.00E+00	1.61E+04	1.61E+04	0.0250	9.334E+14
Am-242m	1.8032E-02	2,318.860	2,318.860	0.00E+00	4.18E+01	4.18E+01	0.0375	8.376E+14
Am-243	1.6336E-02	2,318.860	2,318.860	0.00E+00	3.79E+01	3.79E+01	0.0575	1.046E+15
C-14	1.2112E-01	2,318.860	2,318.860	0.00E+00	2.81E+02	2.81E+02	0.0850	4.809E+14
Cl-36	2.2860E-03	2,318.860	2,318.860	0.00E+00	5.30E+00	5.30E+00	0.1250	4.432E+14
Cm-243	1.2475E-03	2,318.860	2,318.860	0.00E+00	2.89E+00	2.89E+00	0.2250	3.974E+14
Cm-244	2.9920E-01	2,318.860	2,318.860	0.00E+00	6.94E+02	6.94E+02	0.3750	1.662E+14
Co-60	2.0197E+02	2,318.860	2,318.860	0.00E+00	4.68E+05	4.68E+05	0.5750	2.612E+15
Cs-134	5.2728E-02	2,318.860	2,318.860	0.00E+00	1.22E+02	1.22E+02	0.8500	2.030E+14
Cs-135	4.3976E-04	2,318.860	2,318.860	0.00E+00	1.02E+00	1.02E+00	1.2500	3.486E+16
Cs-137	2.9760E+01	2,318.860	2,318.860	0.00E+00	6.90E+04	6.90E+04	1.7500	6.339E+12
Eu-154	4.1838E+00	2,318.860	2,318.860	0.00E+00	9.70E+03	9.70E+03	2.2500	1.838E+11
Eu-155	5.6060E-01	2,318.860	2,318.860	0.00E+00	1.30E+03	1.30E+03	2.7500	8.821E+09
Fe-55	1.5985E+01	2,318.860	2,318.860	0.00E+00	3.71E+04	3.71E+04	3.5000	1.032E+07
H-3	5.6412E-01	2,318.860	2,318.860	0.00E+00	1.31E+03	1.31E+03	5.0000	4.274E+06
I-129	1.0618E-05	2,318.860	2,318.860	0.00E+00	2.46E-02	2.46E-02	7.0000	4.913E+05
Kr-85	1.5783E+00	2,318.860	2,318.860	0.00E+00	3.66E+03	3.66E+03	11.0000	5.634E+04
Np-237	1.5632E-04	2,318.860	2,318.860	0.00E+00	3.62E-01	3.62E-01		
Pa-231	2.8608E-06	2,318.860	2,318.860	0.00E+00	6.63E-03	6.63E-03		
Pb-210	3.7448E-09	2,318.860	2,318.860	0.00E+00	8.68E-06	8.68E-06		
Pm-147	8.8701E-01	2,318.860	2,318.860	0.00E+00	2.06E+03	2.06E+03		
Pu-238	-4.8843E-01	2,318.860	0.000	6.27E+02	0.00E+00	6.27E+02		
Pu-239	-4.8280E-02	2,318.860	0.000	7.59E+01	0.00E+00	7.59E+01		
Pu-240	-3.0095E-01	2,318.860	0.000	9.69E+01	0.00E+00	9.69E+01		
Pu-241	-5.2560E+01	2,318.860	0.000	2.49E+04	0.00E+00	2.49E+04		
Pu-242	-1.1381E-04	2,318.860	0.000	4.19E-01	1.56E-01	4.19E-01		
Ra-226	1.6815E-08	2,318.860	2,318.860	0.00E+00	3.90E-05	3.90E-05		
Ra-228	5.6880E-07	2,318.860	2,318.860	0.00E+00	1.32E-03	1.32E-03		
Ru-106	1.2188E-04	2,318.860	2,318.860	0.00E+00	2.83E-01	2.83E-01		
Se-79	1.9186E-04	2,318.860	2,318.860	0.00E+00	4.45E-01	4.45E-01		
Sn-126	1.6671E-04	2,318.860	2,318.860	0.00E+00	3.87E-01	3.87E-01		
Sr-90	2.8288E+01	2,318.860	2,318.860	0.00E+00	6.56E+04	6.56E+04		
Tc-99	6.7678E-03	2,318.860	2,318.860	0.00E+00	1.57E+01	1.57E+01		
Th-229	8.9952E-07	2,318.860	2,318.860	0.00E+00	2.09E-03	2.09E-03		
Th-230	2.9941E-06	2,318.860	2,318.860	0.00E+00	6.94E-03	6.94E-03		
Th-232	6.0208E-07	2,318.860	2,318.860	0.00E+00	1.40E-03	1.40E-03		
Ti-208	1.0120E-04	2,318.860	2,318.860	0.00E+00	2.35E-01	2.35E-01		
U-232	2.7388E-04	2,318.860	2,318.860	0.00E+00	6.35E-01	6.35E-01		
U-233	3.6128E-04	2,318.860	2,318.860	0.00E+00	8.38E-01	8.38E-01		
U-234	1.2788E-02	2,318.860	2,318.860	0.00E+00	2.97E+01	2.97E+01		
U-235	5.7486E-04	2,318.860	2,318.860	2.10E-03	1.34E+00	1.34E+00		
U-236	2.3485E-04	2,318.860	2,318.860	0.00E+00	5.45E-01	5.45E-01		
U-238	1.1581E-04	2,318.860	2,318.860	2.61E-04	2.69E-01	2.69E-01		
Y-90	2.8288E+01	2,318.860	2,318.860	0.00E+00	6.56E+04	6.56E+04		
Other Radionuclides					1.74E+05	1.74E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.75E+03	8.77E+03
Total	Total

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 Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	UNKNOWN	SST/Inconel	
BOL HM Constituents:	PuO2-UO2	U, Th, & Pu	
BOL Enrichment %:		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		2,318.860	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		2,318.860	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	14.21		
Bounding:	14.21		

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: PNL MOX PELLETS (7057)
 SNF ID #: 418
 Fuel Units & Descr: 1 - SCRAP
 Heavy Metal Mass: BOL= : EOL= 65kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1988
 Estimates as of: 2010
 Template: (Worst Case)
²Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 20 years

Estimated
 Canister usage:
 18"x15"
 0.07

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.6288E-06	614.878	614.878	0.00E+00	1.00E-03	1.00E-03	Avg. MeV	
Am-241	6.9216E+00	614.878	614.878	0.00E+00	4.26E+03	4.26E+03	0.0150	1.257E+15
Am-242m	1.8032E-02	614.878	614.878	0.00E+00	1.11E+01	1.11E+01	0.0250	2.475E+14
Am-243	1.6336E-02	614.878	614.878	0.00E+00	1.00E+01	1.00E+01	0.0375	2.221E+14
C-14	1.2112E-01	614.878	614.878	0.00E+00	7.45E+01	7.45E+01	0.0575	2.773E+14
Cl-36	2.2860E-03	614.878	614.878	0.00E+00	1.41E+00	1.41E+00	0.0850	1.275E+14
Cm-243	1.2475E-03	614.878	614.878	0.00E+00	7.67E-01	7.67E-01	0.1250	1.175E+14
Cm-244	2.9920E-01	614.878	614.878	0.00E+00	1.84E-02	1.84E-02	0.2250	1.054E+14
Co-60	2.0197E+02	614.878	614.878	0.00E+00	1.24E+05	1.24E+05	0.3750	4.407E+13
Cs-134	5.2728E-02	614.878	614.878	0.00E+00	3.24E+01	3.24E+01	0.5750	6.925E+14
Cs-135	4.3976E-04	614.878	614.878	0.00E+00	2.70E-01	2.70E-01	0.8500	5.383E+13
Cs-137	2.9760E+01	614.878	614.878	0.00E+00	1.83E+04	1.83E+04	1.2500	9.243E+15
Eu-154	4.1838E+00	614.878	614.878	0.00E+00	2.57E+03	2.57E+03	1.7500	1.681E+12
Eu-155	5.6060E-01	614.878	614.878	0.00E+00	3.45E+02	3.45E+02	2.2500	4.874E+10
Fe-55	1.5985E+01	614.878	614.878	0.00E+00	9.83E+03	9.83E+03	2.7500	2.339E+09
H-3	5.6412E-01	614.878	614.878	0.00E+00	3.47E+02	3.47E+02	3.5000	2.737E+06
I-129	1.0618E-05	614.878	614.878	0.00E+00	6.53E-03	6.53E-03	5.0000	1.133E+06
Kr-85	1.5783E+00	614.878	614.878	0.00E+00	9.70E+02	9.70E+02	7.0000	1.303E+05
Np-237	1.5632E-04	614.878	614.878	0.00E+00	9.61E-02	9.61E-02	11.0000	1.494E+04
Pa-231	2.8608E-06	614.878	614.878	0.00E+00	1.76E-03	1.76E-03		
Pb-210	3.7448E-09	614.878	614.878	0.00E+00	2.30E-06	2.30E-06		
Pm-147	8.8701E-01	614.878	614.878	0.00E+00	5.45E+02	5.45E+02		
Pu-238	-4.8843E-01	614.878	0.000	1.66E+02	0.00E+00	1.66E+02		
Pu-239	-4.8280E-02	614.878	0.000	2.01E+01	0.00E+00	2.01E+01		
Pu-240	-3.0095E-01	614.878	0.000	2.57E+01	0.00E+00	2.57E+01		
Pu-241	-5.2560E+01	614.878	0.000	6.61E+03	0.00E+00	6.61E+03		
Pu-242	-1.1381E-04	614.878	0.000	1.11E-01	4.12E-02	1.11E-01		
Ra-226	1.6815E-08	614.878	614.878	0.00E+00	1.03E-05	1.03E-05		
Ra-228	5.6880E-07	614.878	614.878	0.00E+00	3.50E-04	3.50E-04		
Ru-106	1.2188E-04	614.878	614.878	0.00E+00	7.49E-02	7.49E-02		
Se-79	1.9186E-04	614.878	614.878	0.00E+00	1.18E-01	1.18E-01		
Sn-126	1.6671E-04	614.878	614.878	0.00E+00	1.03E-01	1.03E-01		
Sr-90	2.8288E+01	614.878	614.878	0.00E+00	1.74E+04	1.74E+04		
Tc-99	6.7678E-03	614.878	614.878	0.00E+00	4.16E+00	4.16E+00		
Th-229	8.9952E-07	614.878	614.878	0.00E+00	5.53E-04	5.53E-04		
Th-230	2.9941E-06	614.878	614.878	0.00E+00	1.84E-03	1.84E-03		
Th-232	6.0208E-07	614.878	614.878	0.00E+00	3.70E-04	3.70E-04		
Th-208	1.0120E-04	614.878	614.878	0.00E+00	6.22E-02	6.22E-02		
U-232	2.7388E-04	614.878	614.878	0.00E+00	1.68E-01	1.68E-01		
U-233	3.6128E-04	614.878	614.878	0.00E+00	2.22E-01	2.22E-01		
U-234	1.2788E-02	614.878	614.878	0.00E+00	7.86E+00	7.86E+00		
U-235	5.7486E-04	614.878	614.878	5.57E-04	3.54E-01	3.54E-01		
U-236	2.3485E-04	614.878	614.878	0.00E+00	1.44E-01	1.44E-01		
U-238	1.1581E-04	614.878	614.878	6.93E-05	7.13E-02	7.13E-02		
Y-90	2.8288E+01	614.878	614.878	0.00E+00	1.74E+04	1.74E+04		
Other Radionuclides					4.61E+04	4.61E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.32E+03	2.33E+03
Total	Total

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 Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	UNKNOWN	SST/Inconel	
BOL HM Constituents:	PuO2-UO2	U, Th, & Pu	
BOL Enrichment %:		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		614.878	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		614.878	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	14.21		
Bounding:	14.21		

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: PNL MOX PINS (7057)
 SNF ID #: 419
 Fuel Units & Descr: 1 - SCRAP
 Heavy Metal Mass: BOL = : EOL = .00kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1988
 Estimates as of: 2010
 Template: (Worst Case)
²Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 20 years

Estimated
 Canister usage:
 18"x15"
 0.07

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	1.6288E-06	4.752	4.752	0.00E+00	7.74E-06	7.74E-06	Avg. MeV	
Am-241	6.9216E+00	4.752	4.752	0.00E+00	3.29E+01	3.29E+01	0.0150	9.711E+12
Am-242m	1.8032E-02	4.752	4.752	0.00E+00	8.57E-02	8.57E-02	0.0250	1.913E+12
Am-243	1.6336E-02	4.752	4.752	0.00E+00	7.76E-02	7.76E-02	0.0375	1.716E+12
C-14	1.2112E-01	4.752	4.752	0.00E+00	5.76E-01	5.76E-01	0.0575	2.143E+12
Cl-36	2.2860E-03	4.752	4.752	0.00E+00	1.09E-02	1.09E-02	0.0850	9.855E+11
Cm-243	1.2475E-03	4.752	4.752	0.00E+00	5.93E-03	5.93E-03	0.1250	9.082E+11
Cm-244	2.9920E-01	4.752	4.752	0.00E+00	1.42E+00	1.42E+00	0.2250	8.144E+11
Co-60	2.0197E+02	4.752	4.752	0.00E+00	9.60E+02	9.60E+02	0.3750	3.406E+11
Cs-134	5.2728E-02	4.752	4.752	0.00E+00	2.51E-01	2.51E-01	0.5750	5.352E+12
Cs-135	4.3976E-04	4.752	4.752	0.00E+00	2.09E-03	2.09E-03	0.8500	4.160E+11
Cs-137	2.9760E+01	4.752	4.752	0.00E+00	1.41E+02	1.41E+02	1.2500	7.143E+13
Eu-154	4.1838E+00	4.752	4.752	0.00E+00	1.99E+01	1.99E+01	1.7500	1.299E+10
Eu-155	5.6060E-01	4.752	4.752	0.00E+00	2.66E+00	2.66E+00	2.2500	3.767E+08
Fe-55	1.5985E+01	4.752	4.752	0.00E+00	7.60E+01	7.60E+01	2.7500	1.808E+07
H-3	5.6412E-01	4.752	4.752	0.00E+00	2.68E+00	2.68E+00	3.5000	2.115E+04
I-129	1.0618E-05	4.752	4.752	0.00E+00	5.05E-05	5.05E-05	5.0000	8.759E+03
Kr-85	1.5783E+00	4.752	4.752	0.00E+00	7.50E+00	7.50E+00	7.0000	1.007E+03
Np-237	1.5632E-04	4.752	4.752	0.00E+00	7.43E-04	7.43E-04	11.0000	1.155E+02
Pa-231	2.8608E-06	4.752	4.752	0.00E+00	1.36E-05	1.36E-05		
Pb-210	3.7448E-09	4.752	4.752	0.00E+00	1.78E-08	1.78E-08		
Pm-147	8.8701E-01	4.752	4.752	0.00E+00	4.21E+00	4.21E+00		
Pu-238	-4.8843E-01	4.752	0.000	1.29E+00	0.00E+00	1.29E+00		
Pu-239	-4.8280E-02	4.752	0.000	1.55E-01	0.00E+00	1.55E-01		
Pu-240	-3.0095E-01	4.752	0.000	1.99E-01	0.00E+00	1.99E-01		
Pu-241	-5.2560E+01	4.752	0.000	5.11E+01	0.00E+00	5.11E+01		
Pu-242	-1.1381E-04	4.752	0.000	8.60E-04	3.19E-04	8.60E-04		
Ra-226	1.6815E-08	4.752	4.752	0.00E+00	7.99E-08	7.99E-08		
Ra-228	5.6880E-07	4.752	4.752	0.00E+00	2.70E-06	2.70E-06		
Ru-106	1.2188E-04	4.752	4.752	0.00E+00	5.79E-04	5.79E-04		
Se-79	1.9186E-04	4.752	4.752	0.00E+00	9.12E-04	9.12E-04		
Sn-126	1.6671E-04	4.752	4.752	0.00E+00	7.92E-04	7.92E-04		
Sr-90	2.8288E+01	4.752	4.752	0.00E+00	1.34E+02	1.34E+02		
Tc-99	6.7678E-03	4.752	4.752	0.00E+00	3.22E-02	3.22E-02		
Th-229	8.9952E-07	4.752	4.752	0.00E+00	4.27E-06	4.27E-06		
Th-230	2.9941E-06	4.752	4.752	0.00E+00	1.42E-05	1.42E-05		
Th-232	6.0208E-07	4.752	4.752	0.00E+00	2.86E-06	2.86E-06		
Ti-208	1.0120E-04	4.752	4.752	0.00E+00	4.81E-04	4.81E-04		
U-232	2.7388E-04	4.752	4.752	0.00E+00	1.30E-03	1.30E-03		
U-233	3.6128E-04	4.752	4.752	0.00E+00	1.72E-03	1.72E-03		
U-234	1.2788E-02	4.752	4.752	0.00E+00	6.08E-02	6.08E-02		
U-235	5.7486E-04	4.752	4.752	4.30E-06	2.74E-03	2.74E-03		
U-236	2.3485E-04	4.752	4.752	0.00E+00	1.12E-03	1.12E-03		
U-238	1.1581E-04	4.752	4.752	5.35E-07	5.51E-04	5.51E-04		
Y-90	2.8288E+01	4.752	4.752	0.00E+00	1.34E+02	1.34E+02		
Other Radionuclides					3.56E+02	3.56E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.79E+01	1.80E+01
Total	Total

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 Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	UNKNOWN	SST/Inconel	
BOL HM Constituents:	PuO2-UO2	U, Th, & Pu	
BOL Enrichment %:		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		4.752	Nominal burnup set equal to bounding burnup.
Bounding:		4.752	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		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: PNL MOX STAR 3
 SNF ID #: 433
 Fuel Units & Descr: 1 - SCRAP
 Heavy Metal Mass: BOL= ; EOL=.06kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1984
 Estimates as of: 2010
 Template: (Worst Case)
²Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 25 years

Estimated
 Canister usage:
 18"x15"
 0.07

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	1.9648E-06	52.269	52.269	0.00E+00	1.03E-04	1.03E-04	Avg. MeV	
Am-241	7.8064E+00	52.269	52.269	0.00E+00	4.08E+02	4.08E+02	0.0150	8.753E+13
Am-242m	1.7632E-02	52.269	52.269	0.00E+00	9.22E-01	9.22E-01	0.0250	1.734E+13
Am-243	1.6336E-02	52.269	52.269	0.00E+00	8.54E-01	8.54E-01	0.0375	1.547E+13
C-14	1.2101E-01	52.269	52.269	0.00E+00	6.33E+00	6.33E+00	0.0575	2.112E+13
Cl-36	2.2849E-03	52.269	52.269	0.00E+00	1.19E-01	1.19E-01	0.0850	9.133E+12
Cm-243	1.1046E-03	52.269	52.269	0.00E+00	5.77E-02	5.77E-02	0.1250	7.943E+12
Cm-244	2.4704E-01	52.269	52.269	0.00E+00	1.29E+01	1.29E+01	0.2250	7.759E+12
Co-60	1.0466E+02	52.269	52.269	0.00E+00	5.47E+03	5.47E+03	0.3750	3.270E+12
Cs-134	9.8289E-03	52.269	52.269	0.00E+00	5.14E-01	5.14E-01	0.5750	5.216E+13
Cs-135	4.3976E-04	52.269	52.269	0.00E+00	2.30E-02	2.30E-02	0.8500	3.143E+12
Cs-137	2.6526E+01	52.269	52.269	0.00E+00	1.39E+03	1.39E+03	1.2500	4.079E+14
Eu-154	2.7975E+00	52.269	52.269	0.00E+00	1.46E+02	1.46E+02	1.7500	9.883E+10
Eu-155	2.7881E-01	52.269	52.269	0.00E+00	1.46E+01	1.46E+01	2.2500	2.147E+09
Fe-55	4.2151E+00	52.269	52.269	0.00E+00	2.20E+02	2.20E+02	2.7500	1.839E+08
H-3	4.2599E-01	52.269	52.269	0.00E+00	2.23E+01	2.23E+01	3.5000	1.881E+05
I-129	1.0618E-05	52.269	52.269	0.00E+00	5.55E-04	5.55E-04	5.0000	7.999E+04
Kr-85	1.1426E+00	52.269	52.269	0.00E+00	5.97E+01	5.97E+01	7.0000	9.184E+03
Np-237	1.5647E-04	52.269	52.269	0.00E+00	8.18E-03	8.18E-03	11.0000	1.052E+03
Pa-231	2.8624E-06	52.269	52.269	0.00E+00	1.50E-04	1.50E-04		
Pb-210	9.2770E-09	52.269	52.269	0.00E+00	4.85E-07	4.85E-07		
Pm-147	2.3690E-01	52.269	52.269	0.00E+00	1.24E+01	1.24E+01		
Pu-238	-6.1803E-01	52.269	0.00	1.41E+01	0.00E+00	1.41E+01		
Pu-239	-4.8280E-02	52.269	0.00	1.71E+00	0.00E+00	1.71E+00		
Pu-240	-3.0095E-01	52.269	0.00	2.18E+00	0.00E+00	2.18E+00		
Pu-241	-7.4000E+01	52.269	0.00	5.62E+02	0.00E+00	5.62E+02		
Pu-242	-1.1381E-04	52.269	0.00	9.45E-03	3.51E-03	9.45E-03		
Ra-226	3.2167E-08	52.269	52.269	0.00E+00	1.68E-06	1.68E-06		
Ra-228	5.9024E-07	52.269	52.269	0.00E+00	3.09E-05	3.09E-05		
Ru-106	3.9140E-06	52.269	52.269	0.00E+00	2.05E-04	2.05E-04		
Se-79	1.9184E-04	52.269	52.269	0.00E+00	1.00E-02	1.00E-02		
Sn-126	1.6671E-04	52.269	52.269	0.00E+00	8.71E-03	8.71E-03		
Sr-90	2.5126E+01	52.269	52.269	0.00E+00	1.31E+03	1.31E+03		
Tc-99	6.7678E-03	52.269	52.269	0.00E+00	3.54E-01	3.54E-01		
Th-229	1.2398E-06	52.269	52.269	0.00E+00	6.48E-05	6.48E-05		
Th-230	4.1442E-06	52.269	52.269	0.00E+00	2.17E-04	2.17E-04		
Th-232	6.0208E-07	52.269	52.269	0.00E+00	3.15E-05	3.15E-05		
Tl-208	9.6478E-05	52.269	52.269	0.00E+00	5.04E-03	5.04E-03		
U-232	2.6103E-04	52.269	52.269	0.00E+00	1.36E-02	1.36E-02		
U-233	3.6128E-04	52.269	52.269	0.00E+00	1.89E-02	1.89E-02		
U-234	1.2788E-02	52.269	52.269	0.00E+00	6.68E-01	6.68E-01		
U-235	5.7486E-04	52.269	52.269	4.73E-05	3.01E-02	3.01E-02		
U-236	2.3485E-04	52.269	52.269	0.00E+00	1.23E-02	1.23E-02		
U-238	1.1581E-04	52.269	52.269	5.89E-06	6.06E-03	6.06E-03		
Y-90	2.5126E+01	52.269	52.269	0.00E+00	1.31E+03	1.31E+03		
Other Radionuclides					3.66E+03	3.66E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.17E+02	1.17E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: LIGHT WATER	Used: (Worst Case)	This Template was used for the following reasons:
Fuel Cladding:	SST (316)	SST/Inconel	This fuel didn't closely match any existing templates, therefore the worst case template was used.
BOL HM Constituents:	PuO2-UO2	U, Th, & Pu	
BOL Enrichment %:		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD: 52.269	Estimated: 52.269	Nominal burnup set equal to bounding burnup.
Bounding:		52.269	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks		
Nominal:	Burnup Multiplier: 14.21	Estimated Burnup/ Given Burnup: 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: PNL MOX STAR 4
 SNF ID #: 434
 Fuel Units & Descr: 1 - SCRAP
 Heavy Metal Mass: BOL = 1 EOL = .06kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1984
 Estimates as of: 2010
 Template: (Worst Case)
²Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 25 years

Estimated
 Canister usage:
 18"x15"
 0.07

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	1.9648E-06	57.021	57.021	0.00E+00	1.12E-04	1.12E-04	0.0150	9.548E+13
Am-241	7.8064E+00	57.021	57.021	0.00E+00	4.45E+02	4.45E+02	0.0250	1.892E+13
Am-242m	1.7632E-02	57.021	57.021	0.00E+00	1.01E+00	1.01E+00	0.0375	1.688E+13
Am-243	1.6336E-02	57.021	57.021	0.00E+00	9.31E-01	9.31E-01	0.0575	2.304E+13
C-14	1.2101E-01	57.021	57.021	0.00E+00	6.90E+00	6.90E+00	0.0850	9.963E+12
Cl-36	2.2849E-03	57.021	57.021	0.00E+00	1.30E-01	1.30E-01	0.1250	8.665E+12
Cm-243	1.1046E-03	57.021	57.021	0.00E+00	6.30E-02	6.30E-02	0.2250	8.464E+12
Cm-244	2.4704E-01	57.021	57.021	0.00E+00	1.41E+01	1.41E+01	0.3750	3.567E+12
Co-60	1.0466E+02	57.021	57.021	0.00E+00	5.97E+03	5.97E+03	0.5750	5.690E+13
Cs-134	9.8289E-03	57.021	57.021	0.00E+00	5.60E-01	5.60E-01	0.8500	3.428E+12
Cs-135	4.3976E-04	57.021	57.021	0.00E+00	2.51E-02	2.51E-02	1.2500	4.450E+14
Cs-137	2.6526E+01	57.021	57.021	0.00E+00	1.51E+03	1.51E+03	1.7500	1.078E+11
Eu-154	2.7975E+00	57.021	57.021	0.00E+00	1.60E+02	1.60E+02	2.2500	2.343E+09
Eu-155	2.7881E-01	57.021	57.021	0.00E+00	1.59E+01	1.59E+01	2.7500	2.006E+08
Fe-55	4.2151E+00	57.021	57.021	0.00E+00	2.40E+02	2.40E+02	3.5000	2.052E+05
H-3	4.2599E-01	57.021	57.021	0.00E+00	2.43E+01	2.43E+01	5.0000	8.726E+04
I-129	1.0618E-05	57.021	57.021	0.00E+00	6.05E-04	6.05E-04	7.0000	1.002E+04
Kr-85	1.1426E+00	57.021	57.021	0.00E+00	6.52E+01	6.52E+01	11.0000	1.148E+03
Np-237	1.5647E-04	57.021	57.021	0.00E+00	8.92E-03	8.92E-03		
Pa-231	2.8624E-06	57.021	57.021	0.00E+00	1.63E-04	1.63E-04		
Pb-210	9.2770E-09	57.021	57.021	0.00E+00	5.29E-07	5.29E-07		
Pm-147	2.3690E-01	57.021	57.021	0.00E+00	1.35E+01	1.35E+01		
Pu-238	-6.1803E-01	57.021	0.000	1.54E+01	0.00E+00	1.54E+01		
Pu-239	-4.8280E-02	57.021	0.000	1.87E+00	0.00E+00	1.87E+00		
Pu-240	-3.0095E-01	57.021	0.000	2.38E+00	0.00E+00	2.38E+00		
Pu-241	-7.4000E+01	57.021	0.000	6.13E+02	0.00E+00	6.13E+02		
Pu-242	-1.1381E-04	57.021	0.000	1.03E-02	3.82E-03	1.03E-02		
Ra-226	3.2167E-08	57.021	57.021	0.00E+00	1.83E-06	1.83E-06		
Ra-228	5.9024E-07	57.021	57.021	0.00E+00	3.37E-05	3.37E-05		
Ru-106	3.9140E-06	57.021	57.021	0.00E+00	2.23E-04	2.23E-04		
Se-79	1.9184E-04	57.021	57.021	0.00E+00	1.09E-02	1.09E-02		
Sn-126	1.6671E-04	57.021	57.021	0.00E+00	9.51E-03	9.51E-03		
Sr-90	2.5126E+01	57.021	57.021	0.00E+00	1.43E+03	1.43E+03		
Tc-99	6.7678E-03	57.021	57.021	0.00E+00	3.86E-01	3.86E-01		
Th-229	1.2398E-06	57.021	57.021	0.00E+00	7.07E-05	7.07E-05		
Th-230	4.1442E-06	57.021	57.021	0.00E+00	2.36E-04	2.36E-04		
Th-232	6.0208E-07	57.021	57.021	0.00E+00	3.43E-05	3.43E-05		
Th-232	9.6478E-05	57.021	57.021	0.00E+00	5.50E-03	5.50E-03		
U-232	2.6103E-04	57.021	57.021	0.00E+00	1.49E-02	1.49E-02		
U-233	3.6128E-04	57.021	57.021	0.00E+00	2.06E-02	2.06E-02		
U-234	1.2788E-02	57.021	57.021	0.00E+00	7.29E-01	7.29E-01		
U-235	5.7486E-04	57.021	57.021	5.16E-05	3.28E-02	3.28E-02		
U-236	2.3485E-04	57.021	57.021	0.00E+00	1.34E-02	1.34E-02		
U-238	1.1581E-04	57.021	57.021	6.42E-06	6.61E-03	6.61E-03		
Y-90	2.5126E+01	57.021	57.021	0.00E+00	1.43E+03	1.43E+03		
Other Radionuclides					4.00E+03	4.00E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.27E+02	1.28E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: LIGHT WATER	Used: (Worst Case)	This Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	SST (316)	SST/Inconel	
BOL HM Constituents:	PuO2-UO2	U, Th, & Pu	
BOL Enrichment %:		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD: 57.021	Estimated: 57.021	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		57.021	

Checks		
Nominal:	Burnup Multiplier: 14.21	Estimated Burnup/ Given Burnup: 591.64
Bounding:	14.21	

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: PNL MOX STAR 5
 SNF ID #: 435
 Fuel Units & Descr: 1 - SCRAP
 Heavy Metal Mass: BOL= ; EOL=14kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1985
 Estimates as of: 2010
 Template: (Worst Case)
²Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 25 years

Estimated
 Canister usage:
 18"x15"
 0.07

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	1.9648E-06	132.099	132.099	0.00E+00	2.60E-04	2.60E-04	0.0150	2.212E+14
Am-241	7.8064E+00	132.099	132.099	0.00E+00	1.03E+03	1.03E+03	0.0250	4.383E+13
Am-242m	1.7632E-02	132.099	132.099	0.00E+00	2.33E+00	2.33E+00	0.0375	3.911E+13
Am-243	1.6336E-02	132.099	132.099	0.00E+00	2.16E+00	2.16E+00	0.0375	3.911E+13
C-14	1.2101E-01	132.099	132.099	0.00E+00	1.60E+01	1.60E+01	0.0575	5.337E+13
Cl-36	2.2849E-03	132.099	132.099	0.00E+00	3.02E-01	3.02E-01	0.0850	2.308E+13
Cm-243	1.1046E-03	132.099	132.099	0.00E+00	1.46E-01	1.46E-01	0.1250	2.007E+13
Cm-244	2.4704E-01	132.099	132.099	0.00E+00	3.26E+01	3.26E+01	0.2250	1.961E+13
Co-60	1.0466E+02	132.099	132.099	0.00E+00	1.38E+04	1.38E+04	0.3750	8.264E+12
Cs-134	9.8289E-03	132.099	132.099	0.00E+00	1.30E+00	1.30E+00	0.5750	1.318E+14
Cs-135	4.3976E-04	132.099	132.099	0.00E+00	5.81E-02	5.81E-02	0.8500	7.942E+12
Cs-137	2.6526E+01	132.099	132.099	0.00E+00	3.50E+03	3.50E+03	1.2500	1.031E+15
Eu-154	2.7975E+00	132.099	132.099	0.00E+00	3.70E+02	3.70E+02	1.7500	2.498E+11
Eu-155	2.7881E-01	132.099	132.099	0.00E+00	3.68E+01	3.68E+01	2.2500	5.427E+09
Fe-55	4.2151E+00	132.099	132.099	0.00E+00	5.57E+02	5.57E+02	2.7500	4.649E+08
H-3	4.2599E-01	132.099	132.099	0.00E+00	5.63E+01	5.63E+01	3.5000	4.753E+05
I-129	1.0618E-05	132.099	132.099	0.00E+00	1.40E-03	1.40E-03	5.0000	2.022E+05
Kr-85	1.1426E+00	132.099	132.099	0.00E+00	1.51E+02	1.51E+02	7.0000	2.321E+04
Np-237	1.5647E-04	132.099	132.099	0.00E+00	2.07E-02	2.07E-02	11.0000	2.660E+03
Pa-231	2.8624E-06	132.099	132.099	0.00E+00	3.78E-04	3.78E-04		
Pb-210	9.2770E-09	132.099	132.099	0.00E+00	1.23E-06	1.23E-06		
Pm-147	2.3690E-01	132.099	132.099	0.00E+00	3.13E+01	3.13E+01		
Pu-238	-6.1803E-01	132.099	0.000	3.57E+01	0.00E+00	3.57E+01		
Pu-239	-4.8280E-02	132.099	0.000	4.32E+00	0.00E+00	4.32E+00		
Pu-240	-3.0095E-01	132.099	0.000	5.52E+00	0.00E+00	5.52E+00		
Pu-241	-7.4000E+01	132.099	0.000	1.42E+03	0.00E+00	1.42E+03		
Pu-242	-1.1381E-04	132.099	0.000	2.39E-02	8.86E-03	2.39E-02		
Ra-226	3.2167E-08	132.099	132.099	0.00E+00	4.25E-06	4.25E-06		
Ra-228	5.9024E-07	132.099	132.099	0.00E+00	7.80E-05	7.80E-05		
Ru-106	3.9140E-06	132.099	132.099	0.00E+00	5.17E-04	5.17E-04		
Se-79	1.9184E-04	132.099	132.099	0.00E+00	2.53E-02	2.53E-02		
Sn-126	1.6671E-04	132.099	132.099	0.00E+00	2.20E-02	2.20E-02		
Sr-90	2.5126E+01	132.099	132.099	0.00E+00	3.32E+03	3.32E+03		
Tc-99	6.7678E-03	132.099	132.099	0.00E+00	8.94E-01	8.94E-01		
Th-229	1.2398E-06	132.099	132.099	0.00E+00	1.64E-04	1.64E-04		
Th-230	4.1442E-06	132.099	132.099	0.00E+00	5.47E-04	5.47E-04		
Th-232	6.0208E-07	132.099	132.099	0.00E+00	7.95E-05	7.95E-05		
Tl-208	9.6478E-05	132.099	132.099	0.00E+00	1.27E-02	1.27E-02		
U-232	2.6103E-04	132.099	132.099	0.00E+00	3.45E-02	3.45E-02		
U-233	3.6128E-04	132.099	132.099	0.00E+00	4.77E-02	4.77E-02		
U-234	1.2788E-02	132.099	132.099	0.00E+00	1.69E+00	1.69E+00		
U-235	5.7486E-04	132.099	132.099	1.20E-04	7.61E-02	7.61E-02		
U-236	2.3485E-04	132.099	132.099	0.00E+00	3.10E-02	3.10E-02		
U-238	1.1581E-04	132.099	132.099	1.49E-05	1.53E-02	1.53E-02		
Y-90	2.5126E+01	132.099	132.099	0.00E+00	3.32E+03	3.32E+03		
Other Radionuclides					9.26E+03	9.26E+03		

Thermal Power		
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
2.95E+02	2.96E+02	
Total	Total	

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 Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	SST (304)	SST/Inconel	
BOL HM Constituents:	PuO2-UO2	U, Th, & Pu	
BOL Enrichment %:		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		132.099	Nominal burnup set equal to bounding burnup.
Bounding:		132.099	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		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: PNL MOX STAR 6
 SNF ID #: 436
 Fuel Units & Descr: 1 - SCRAP
 Heavy Metal Mass: BOL= ; EOL=07kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1985
 Estimates as of: 2010
 Template: (Worst Case)
²Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 25 years

Estimated
 Canister usage:
 18"x15"
 0.07

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	1.9648E-06	65.574	65.574	0.00E+00	1.29E-04	1.29E-04		
Am-241	7.8064E+00	65.574	65.574	0.00E+00	5.12E+02	5.12E+02	0.0150	1.098E+14
Am-242m	1.7632E-02	65.574	65.574	0.00E+00	1.16E+00	1.16E+00	0.0250	2.176E+13
Am-243	1.6336E-02	65.574	65.574	0.00E+00	1.07E+00	1.07E+00	0.0375	1.941E+13
C-14	1.2101E-01	65.574	65.574	0.00E+00	7.94E+00	7.94E+00	0.0575	2.649E+13
Cf-252	2.2849E-03	65.574	65.574	0.00E+00	1.50E-01	1.50E-01	0.0850	1.146E+13
Cm-243	1.1046E-03	65.574	65.574	0.00E+00	7.24E-02	7.24E-02	0.1250	9.965E+12
Cm-244	2.4704E-01	65.574	65.574	0.00E+00	1.62E+01	1.62E+01	0.2250	9.734E+12
Co-60	1.0466E+02	65.574	65.574	0.00E+00	6.86E+03	6.86E+03	0.3750	4.102E+12
Cs-134	9.8289E-03	65.574	65.574	0.00E+00	6.45E-01	6.45E-01	0.5750	6.544E+13
Cs-135	4.3976E-04	65.574	65.574	0.00E+00	2.88E-02	2.88E-02	0.8500	3.943E+12
Cs-137	2.6526E+01	65.574	65.574	0.00E+00	1.74E+03	1.74E+03	1.2500	5.117E+14
Eu-154	2.7975E+00	65.574	65.574	0.00E+00	1.83E+02	1.83E+02	1.7500	1.240E+11
Eu-155	2.7881E-01	65.574	65.574	0.00E+00	1.83E+01	1.83E+01	2.2500	2.694E+09
Fe-55	4.2151E+00	65.574	65.574	0.00E+00	2.76E+02	2.76E+02	2.7500	2.507E+08
H-3	4.2599E-01	65.574	65.574	0.00E+00	2.79E+01	2.79E+01	3.5000	2.359E+05
I-129	1.0618E-05	65.574	65.574	0.00E+00	6.96E-04	6.96E-04	5.0000	1.004E+05
Kr-85	1.1426E+00	65.574	65.574	0.00E+00	7.49E+01	7.49E+01	7.0000	1.152E+04
Np-237	1.5647E-04	65.574	65.574	0.00E+00	1.03E-02	1.03E-02	11.0000	1.320E+03
Pa-231	2.8624E-06	65.574	65.574	0.00E+00	1.88E-04	1.88E-04		
Pb-210	9.2770E-09	65.574	65.574	0.00E+00	6.08E-07	6.08E-07		
Pm-147	2.3690E-01	65.574	65.574	0.00E+00	1.55E+01	1.55E+01		
Pu-238	-6.1803E-01	65.574	0.000	1.77E+01	0.00E+00	1.77E+01		
Pu-239	-4.8280E-02	65.574	0.000	2.15E+00	0.00E+00	2.15E+00		
Pu-240	-3.0095E-01	65.574	0.000	2.74E+00	0.00E+00	2.74E+00		
Pu-241	-7.4000E+01	65.574	0.000	7.05E+02	0.00E+00	7.05E+02		
Pu-242	-1.1381E-04	65.574	0.000	1.19E-02	4.40E-03	1.19E-02		
Ra-226	3.2167E-08	65.574	65.574	0.00E+00	2.11E-06	2.11E-06		
Ra-228	5.9024E-07	65.574	65.574	0.00E+00	3.87E-05	3.87E-05		
Ru-106	3.9140E-06	65.574	65.574	0.00E+00	2.57E-04	2.57E-04		
Se-79	1.9184E-04	65.574	65.574	0.00E+00	1.26E-02	1.26E-02		
Sn-126	1.6671E-04	65.574	65.574	0.00E+00	1.09E-02	1.09E-02		
Sr-90	2.5126E+01	65.574	65.574	0.00E+00	1.65E+03	1.65E+03		
Tc-99	6.7678E-03	65.574	65.574	0.00E+00	4.44E-01	4.44E-01		
Th-229	1.2398E-06	65.574	65.574	0.00E+00	8.13E-05	8.13E-05		
Th-230	4.1442E-06	65.574	65.574	0.00E+00	2.72E-04	2.72E-04		
Th-232	6.0208E-07	65.574	65.574	0.00E+00	3.95E-05	3.95E-05		
Tl-208	9.6478E-05	65.574	65.574	0.00E+00	6.33E-03	6.33E-03		
U-232	2.6103E-04	65.574	65.574	0.00E+00	1.71E-02	1.71E-02		
U-233	3.6128E-04	65.574	65.574	0.00E+00	2.37E-02	2.37E-02		
U-234	1.2788E-02	65.574	65.574	0.00E+00	8.39E-01	8.39E-01		
U-235	5.7486E-04	65.574	65.574	5.94E-05	3.78E-02	3.78E-02		
U-236	2.3485E-04	65.574	65.574	0.00E+00	1.54E-02	1.54E-02		
U-238	1.1581E-04	65.574	65.574	7.39E-06	7.60E-03	7.60E-03		
Y-90	2.5126E+01	65.574	65.574	0.00E+00	1.65E+03	1.65E+03		
Other Radionuclides					4.60E+03	4.60E+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 Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	SST (316)	SST/Inconel	
BOL HM Constituents:	PuO2-UO2	U, Th, & Pu	
BOL Enrichment %:		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		65.574	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		65.574	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	14.21		591.64
Bounding:	14.21		

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: PNL MOX STAR 7
 SNF ID #: 422
 Fuel Units & Descr: 1 - SCRAP
 Heavy Metal Mass: BOL= : EOL=.35kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1985
 Estimates as of: 2010
 Template: (Worst Case)
²Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 25 years

Estimated
 Canister usage:
 18"x15"
 0.07

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	1.9648E-06	330.723	330.723	0.00E+00	6.50E-04	6.50E-04		
Am-241	7.8064E+00	330.723	330.723	0.00E+00	2.58E+03	2.58E+03	0.0150	5.538E+14
Am-242m	1.7632E-02	330.723	330.723	0.00E+00	5.83E+00	5.83E+00	0.0250	1.097E+14
Am-243	1.6336E-02	330.723	330.723	0.00E+00	5.40E+00	5.40E+00	0.0375	9.791E+13
C-14	1.2101E-01	330.723	330.723	0.00E+00	4.00E+01	4.00E+01	0.0575	1.336E+14
Cl-36	2.2849E-03	330.723	330.723	0.00E+00	7.56E-01	7.56E-01	0.0850	5.779E+13
Cm-243	1.1046E-03	330.723	330.723	0.00E+00	3.65E-01	3.65E-01	0.1250	5.026E+13
Cm-244	2.4704E-01	330.723	330.723	0.00E+00	8.17E+01	8.17E+01	0.2250	4.909E+13
Co-60	1.0466E+02	330.723	330.723	0.00E+00	3.46E+04	3.46E+04	0.3750	2.069E+13
Cs-134	9.8289E-03	330.723	330.723	0.00E+00	3.25E+00	3.25E+00	0.5750	3.300E+14
Cs-135	4.3976E-04	330.723	330.723	0.00E+00	1.45E-01	1.45E-01	0.8500	1.988E+13
Cs-137	2.6526E+01	330.723	330.723	0.00E+00	8.77E+03	8.77E+03	1.2500	2.581E+15
Eu-154	2.7975E+00	330.723	330.723	0.00E+00	9.25E+02	9.25E+02	1.7500	6.253E+11
Eu-155	2.7881E-01	330.723	330.723	0.00E+00	9.22E+01	9.22E+01	2.2500	1.359E+10
Fe-55	4.2151E+00	330.723	330.723	0.00E+00	1.39E+03	1.39E+03	2.7500	1.164E+09
H-3	4.2599E-01	330.723	330.723	0.00E+00	1.41E+02	1.41E+02	3.5000	1.190E+06
I-129	1.0618E-05	330.723	330.723	0.00E+00	3.51E-03	3.51E-03	5.0000	5.061E+05
Kr-85	1.1426E+00	330.723	330.723	0.00E+00	3.78E+02	3.78E+02	7.0000	5.811E+04
Np-237	1.5647E-04	330.723	330.723	0.00E+00	5.17E-02	5.17E-02	11.0000	6.659E+03
Pa-231	2.8624E-06	330.723	330.723	0.00E+00	9.47E-04	9.47E-04		
Pb-210	9.2770E-09	330.723	330.723	0.00E+00	3.07E-06	3.07E-06		
Pm-147	2.3690E-01	330.723	330.723	0.00E+00	7.83E+01	7.83E+01		
Pu-238	-6.1803E-01	330.723	0.000	8.94E+01	0.00E+00	8.94E+01		
Pu-239	-4.8280E-02	330.723	0.000	1.08E+01	0.00E+00	1.08E+01		
Pu-240	-3.0095E-01	330.723	0.000	1.38E+01	0.00E+00	1.38E+01		
Pu-241	-7.4000E+01	330.723	0.000	3.56E+03	0.00E+00	3.56E+03		
Pu-242	-1.1381E-04	330.723	0.000	5.98E-02	2.22E-02	5.98E-02		
Ra-226	3.2167E-08	330.723	330.723	0.00E+00	1.06E-05	1.06E-05		
Ra-228	5.9024E-07	330.723	330.723	0.00E+00	1.95E-04	1.95E-04		
Ru-106	3.9140E-06	330.723	330.723	0.00E+00	1.29E-03	1.29E-03		
Se-79	1.9184E-04	330.723	330.723	0.00E+00	6.34E-02	6.34E-02		
Sn-126	1.6671E-04	330.723	330.723	0.00E+00	5.51E-02	5.51E-02		
Sr-90	2.5126E+01	330.723	330.723	0.00E+00	8.31E+03	8.31E+03		
Tc-99	6.7678E-03	330.723	330.723	0.00E+00	2.24E+00	2.24E+00		
Th-229	1.2398E-06	330.723	330.723	0.00E+00	4.10E-04	4.10E-04		
Th-230	4.1442E-06	330.723	330.723	0.00E+00	1.37E-03	1.37E-03		
Th-232	6.0208E-07	330.723	330.723	0.00E+00	1.99E-04	1.99E-04		
Ti-208	9.6478E-05	330.723	330.723	0.00E+00	3.19E-02	3.19E-02		
U-232	2.6103E-04	330.723	330.723	0.00E+00	8.63E-02	8.63E-02		
U-233	3.6128E-04	330.723	330.723	0.00E+00	1.19E-01	1.19E-01		
U-234	1.2788E-02	330.723	330.723	0.00E+00	4.23E+00	4.23E+00		
U-235	5.7486E-04	330.723	330.723	2.99E-04	1.90E-01	1.90E-01		
U-236	2.3485E-04	330.723	330.723	0.00E+00	7.77E-02	7.77E-02		
U-238	1.1581E-04	330.723	330.723	3.73E-05	3.83E-02	3.83E-02		
Y-90	2.5126E+01	330.723	330.723	0.00E+00	8.31E+03	8.31E+03		
Other Radionuclides					2.32E+04	2.32E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.38E+02	7.42E+02
Total	Total

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 didn't closely match any existing templates, therefore the worst case template was used.
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	(Worst Case)	
Fuel Cladding:	SST (316)	SST/Inconel	
BOL HM Constituents:	PuO2-UO2	U, Th, & Pu	
BOL Enrichment %:		0 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:		330.723	
Bounding:		330.723	

Checks			Estimated EOL HM/Given EOL HM 591.64
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	14.21		
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: PNL-3
 SNF ID #: 420
 Fuel Units & Descr: 6 - ROD
 Heavy Metal Mass: BOL = : EOL = .06kg
 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): 0.00186865
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x15"
 0.44

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	2.3072E-06	61.013	61.013	0.00E+00	1.41E-04	1.41E-04	Avg. MeV	
Am-241	8.4448E+00	61.013	61.013	0.00E+00	5.15E+02	5.15E+02	0.0150	7.476E+13
Am-242m	1.6848E-02	61.013	61.013	0.00E+00	1.03E+00	1.03E+00	0.0250	1.488E+13
Am-243	1.6320E-02	61.013	61.013	0.00E+00	9.96E-01	9.96E-01	0.0375	1.300E+13
C-14	1.2090E-01	61.013	61.013	0.00E+00	7.38E+00	7.38E+00	0.0575	2.045E+13
Cl-36	2.2849E-03	61.013	61.013	0.00E+00	1.39E-01	1.39E-01	0.0850	7.982E+12
Cm-243	8.6624E-04	61.013	61.013	0.00E+00	5.29E-02	5.29E-02	0.1250	6.256E+12
Cm-244	1.6848E-01	61.013	61.013	0.00E+00	1.03E+01	1.03E+01	0.2250	6.915E+12
Co-60	2.8086E+01	61.013	61.013	0.00E+00	1.71E+03	1.71E+03	0.3750	2.957E+12
Cs-134	3.4148E-04	61.013	61.013	0.00E+00	2.08E-02	2.08E-02	0.5750	4.809E+13
Cs-135	4.3976E-04	61.013	61.013	0.00E+00	2.68E-02	2.68E-02	0.8500	1.838E+12
Cs-137	2.1049E+01	61.013	61.013	0.00E+00	1.28E+03	1.28E+03	1.2500	1.285E+14
Eu-154	1.2500E+00	61.013	61.013	0.00E+00	7.63E+01	7.63E+01	1.7500	5.683E+10
Eu-155	6.8986E-02	61.013	61.013	0.00E+00	4.21E+00	4.21E+00	2.2500	6.737E+08
Fe-55	2.9308E-01	61.013	61.013	0.00E+00	1.79E+01	1.79E+01	2.7500	1.898E+08
H-3	2.4311E-01	61.013	61.013	0.00E+00	1.48E+01	1.48E+01	3.5000	1.520E+05
I-129	1.0618E-05	61.013	61.013	0.00E+00	6.48E-04	6.48E-04	5.0000	6.453E+04
Kr-85	5.9882E-01	61.013	61.013	0.00E+00	3.65E+01	3.65E+01	7.0000	7.390E+03
Np-237	1.5668E-04	61.013	61.013	0.00E+00	9.56E-03	9.56E-03	11.0000	8.455E+02
Pa-231	2.8656E-06	61.013	61.013	0.00E+00	1.75E-04	1.75E-04		
Pb-210	2.3918E-08	61.013	61.013	0.00E+00	1.46E-06	1.46E-06		
Pm-147	1.6900E-02	61.013	61.013	0.00E+00	1.03E+00	1.03E+00		
Pu-238	-8.6123E-01	61.013	0.000	1.65E+01	0.00E+00	1.65E+01		
Pu-239	-4.8440E-02	61.013	0.000	2.00E+00	0.00E+00	2.00E+00		
Pu-240	-3.0095E-01	61.013	0.000	2.55E+00	0.00E+00	2.55E+00		
Pu-241	-1.0411E+02	61.013	0.000	6.56E+02	0.00E+00	6.56E+02		
Pu-242	-1.1381E-04	61.013	0.000	1.10E-02	4.09E-03	1.10E-02		
Ra-226	6.4400E-08	61.013	61.013	0.00E+00	3.93E-06	3.93E-06		
Ra-228	5.9952E-07	61.013	61.013	0.00E+00	3.66E-05	3.66E-05		
Ru-106	8.5526E-07	61.013	61.013	0.00E+00	5.22E-05	5.22E-05		
Se-79	1.9181E-04	61.013	61.013	0.00E+00	1.17E-02	1.17E-02		
Sn-126	1.6671E-04	61.013	61.013	0.00E+00	1.02E-02	1.02E-02		
Sr-90	1.9799E+01	61.013	61.013	0.00E+00	1.21E+03	1.21E+03		
Tc-99	6.7678E-03	61.013	61.013	0.00E+00	4.13E-01	4.13E-01		
Th-229	1.7488E-06	61.013	61.013	0.00E+00	1.07E-04	1.07E-04		
Th-230	5.8704E-06	61.013	61.013	0.00E+00	3.58E-04	3.58E-04		
Th-232	6.0208E-07	61.013	61.013	0.00E+00	3.67E-05	3.67E-05		
Tl-208	8.7573E-05	61.013	61.013	0.00E+00	5.34E-03	5.34E-03		
U-232	2.3706E-04	61.013	61.013	0.00E+00	1.45E-02	1.45E-02		
U-233	3.6128E-04	61.013	61.013	0.00E+00	2.20E-02	2.20E-02		
U-234	1.2788E-02	61.013	61.013	0.00E+00	7.80E-01	7.80E-01		
U-235	5.7486E-04	61.013	61.013	5.52E-05	3.51E-02	3.51E-02		
U-236	2.3485E-04	61.013	61.013	0.00E+00	1.43E-02	1.43E-02		
U-238	1.1581E-04	61.013	61.013	6.87E-06	7.07E-03	7.07E-03		
Y-90	1.9804E+01	61.013	61.013	0.00E+00	1.21E+03	1.21E+03		
Other Radionuclides					3.76E+03	3.76E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.01E+01	6.08E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	FAST	(Worst Case)	This Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
BOL HM Constituents:	SST (316)	SST/Inconel	
BOL Enrichment %:	PuO2-UO2	U, Th, & Pu 0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:	61.013	61.013	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks		
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup
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: POINT BEACH
 SNF ID #: 311
 Fuel Units & Descr: 3 - 14 X 14 ROD ARRAY
 Heavy Metal Mass: BOL=1167.00kg ; EOL=1161.50kg
 ROD Storage Site: HANFORD

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:
 18"x15"
 1.50

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	6.6376E-10	38,160.900	38,160.900	0.00E+00	2.53E-05	2.53E-05		
Am-241	1.3144E-01	38,160.900	38,160.900	0.00E+00	5.02E+03	5.02E+03	0.0150	2.595E+15
Am-242m	3.0039E-04	38,160.900	38,160.900	0.00E+00	1.15E+01	1.15E+01	0.0250	5.256E+14
Am-243	6.2629E-04	38,160.900	38,160.900	0.00E+00	2.39E+01	2.39E+01	0.0375	5.087E+14
C-14	4.7965E-05	38,160.900	38,160.900	0.00E+00	1.83E+00	1.83E+00	0.0575	5.549E+14
Ci-36	8.0297E-07	38,160.900	38,160.900	0.00E+00	3.06E-02	3.06E-02	0.0850	2.940E+14
Cm-243	3.1993E-04	38,160.900	38,160.900	0.00E+00	1.22E+01	1.22E+01	0.1250	2.148E+14
Cm-244	7.1851E-02	38,160.900	38,160.900	0.00E+00	2.74E+03	2.74E+03	0.2250	2.524E+14
Co-60	9.5220E-03	38,160.900	38,160.900	0.00E+00	3.63E+02	3.63E+02	0.3750	1.083E+14
Cs-134	1.1662E-03	38,160.900	38,160.900	0.00E+00	4.45E+01	4.45E+01	0.5750	2.489E+15
Cs-135	1.4433E-05	38,160.900	38,160.900	0.00E+00	5.51E-01	5.51E-01	0.8500	4.912E+13
Cs-137	1.7603E+00	38,160.900	38,160.900	0.00E+00	6.72E+04	6.72E+04	1.2500	6.636E+13
Eu-154	4.5203E-02	38,160.900	38,160.900	0.00E+00	1.73E+03	1.73E+03	1.7500	1.454E+12
Eu-155	7.1479E-03	38,160.900	38,160.900	0.00E+00	2.73E+02	2.73E+02	2.2500	2.686E+08
Fe-55	6.1919E-04	38,160.900	38,160.900	0.00E+00	2.36E+01	2.36E+01	2.7500	3.018E+08
H-3	3.6386E-02	38,160.900	38,160.900	0.00E+00	1.39E+03	1.39E+03	3.5000	3.956E+07
I-129	9.8288E-07	38,160.900	38,160.900	0.00E+00	3.75E-02	3.75E-02	5.0000	1.690E+07
Kr-85	5.3844E-02	38,160.900	38,160.900	0.00E+00	2.05E+03	2.05E+03	7.0000	1.949E+06
Np-237	1.0546E-05	38,160.900	38,160.900	0.00E+00	4.02E-01	4.02E-01	11.0000	2.238E+05
Pa-231	1.1370E-09	38,160.900	38,160.900	0.00E+00	4.34E-05	4.34E-05		
Pb-210	3.3624E-11	38,160.900	38,160.900	0.00E+00	1.28E-06	1.28E-06		
Pm-147	5.1211E-03	38,160.900	38,160.900	0.00E+00	1.95E+02	1.95E+02		
Pu-238	8.0669E-02	38,160.900	38,160.900	0.00E+00	3.08E+03	3.08E+03		
Pu-239	1.1626E-02	38,160.900	38,160.900	0.00E+00	4.44E+02	4.44E+02		
Pu-240	1.5097E-02	38,160.900	38,160.900	0.00E+00	5.76E+02	5.76E+02		
Pu-241	1.4567E+00	38,160.900	38,160.900	0.00E+00	5.56E+04	5.56E+04		
Pu-242	6.4260E-05	38,160.900	38,160.900	0.00E+00	2.45E+00	2.45E+00		
Ra-226	1.1392E-10	38,160.900	38,160.900	0.00E+00	4.35E-06	4.35E-06		
Ra-228	5.1841E-12	38,160.900	38,160.900	0.00E+00	1.98E-07	1.98E-07		
Ru-106	5.9012E-07	38,160.900	38,160.900	0.00E+00	2.25E-02	2.25E-02		
Se-79	1.2379E-05	38,160.900	38,160.900	0.00E+00	4.72E-01	4.72E-01		
Sn-126	2.5210E-05	38,160.900	38,160.900	0.00E+00	9.62E-01	9.62E-01		
Sr-90	1.1630E+00	38,160.900	38,160.900	0.00E+00	4.44E+04	4.44E+04		
Tc-99	3.9357E-04	38,160.900	38,160.900	0.00E+00	1.50E+01	1.50E+01		
Th-229	8.5691E-11	38,160.900	38,160.900	0.00E+00	3.27E-06	3.27E-06		
Th-230	1.4493E-08	38,160.900	38,160.900	0.00E+00	5.53E-04	5.53E-04		
Th-232	5.2923E-12	38,160.900	38,160.900	0.00E+00	2.02E-07	2.02E-07		
Tl-208	1.9202E-07	38,160.900	38,160.900	0.00E+00	7.33E-03	7.33E-03		
U-232	5.2083E-07	38,160.900	38,160.900	0.00E+00	1.99E-02	1.99E-02		
U-233	2.4386E-08	38,160.900	38,160.900	0.00E+00	9.31E-04	9.31E-04		
U-234	4.7012E-05	38,160.900	38,160.900	0.00E+00	1.79E+00	1.79E+00		
U-235	-1.4492E-06	38,160.900	0.000	6.30E-02	7.74E-03	6.30E-02		
U-236	7.5759E-06	38,160.900	38,160.900	0.00E+00	2.89E-01	2.89E-01		
U-238	-2.6129E-07	38,160.900	0.000	3.82E-01	3.72E-01	3.82E-01	1.05E+03	1.05E+03
Y-90	1.1631E+00	38,160.900	38,160.900	0.00E+00	4.44E+04	4.44E+04	Total	Total
Other Radionuclides					6.45E+04	6.45E+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:	ZIRC-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	2.5	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	38,160.900	5,230.145	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	38,160.900	10,460.290	Bounding burnup taken directly from SFD (converted to MWd).

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.93	0.14	0.97
Bounding:	0.93	0.27	

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: PRR-1 (PHILIPPINES) ¹Fuel decay start date: 1998
 SNF ID #: 638 Estimates as of: 2010
 Fuel Units & Descr: 21 - 18 FLAT PLATES Template: TRIGA-AI (LW/U-Zrx, Alum., 10 to 20%, U)
 Heavy Metal Mass: BOL=3.29kg ; EOL=3.29kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00018
 Template Decay Time: 10 years

Estimated
 Canister usage:
 18"x10"
 0.88

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	1.2892E-09	62.741	125.481	0.00E+00	8.09E-08	1.62E-07	Avg. MeV	
Am-241	2.9429E-03	62.741	125.481	0.00E+00	1.85E-01	3.69E-01	0.0150	1.687E+13
Am-242m	1.9489E-06	62.741	125.481	0.00E+00	1.22E-04	2.45E-04	0.0250	3.528E+12
Am-243	2.3308E-07	62.741	125.481	0.00E+00	1.46E-05	2.92E-05	0.0375	4.166E+12
C-14	4.3278E-05	62.741	125.481	0.00E+00	2.72E-03	5.43E-03	0.0575	3.445E+12
Cl-36	4.3023E-08	62.741	125.481	0.00E+00	2.70E-06	5.40E-06	0.0850	2.239E+12
Cm-243	2.4286E-07	62.741	125.481	0.00E+00	1.52E-05	3.05E-05	0.1250	3.099E+12
Cm-244	2.6015E-06	62.741	125.481	0.00E+00	1.63E-04	3.26E-04	0.2250	1.966E+12
Co-60	1.6075E-02	62.741	125.481	0.00E+00	1.01E+00	2.02E+00	0.3750	8.090E+11
Cs-134	1.9323E-02	62.741	125.481	0.00E+00	1.21E+00	2.42E+00	0.5750	1.205E+13
Cs-135	3.1549E-05	62.741	125.481	0.00E+00	1.98E-03	3.96E-03	0.8500	2.196E+12
Cs-137	2.4556E+00	62.741	125.481	0.00E+00	1.54E+02	3.08E+02	1.2500	2.414E+12
Eu-154	9.0180E-01	62.741	125.481	0.00E+00	5.66E+01	1.13E+02	1.7500	6.922E+10
Eu-155	2.1820E-01	62.741	125.481	0.00E+00	1.37E+01	2.74E+01	2.2500	1.647E+08
Fe-55	2.2902E-03	62.741	125.481	0.00E+00	1.44E-01	2.87E-01	2.7500	3.229E+06
H-3	8.1609E-03	62.741	125.481	0.00E+00	5.12E-01	1.02E+00	3.5000	3.940E+05
I-129	7.3805E-07	62.741	125.481	0.00E+00	4.63E-05	9.26E-05	5.0000	7.134E+01
Kr-85	1.8256E-01	62.741	125.481	0.00E+00	1.15E+01	2.29E+01	7.0000	8.065E+00
Np-237	1.4505E-06	62.741	125.481	0.00E+00	9.10E-05	1.82E-04	11.0000	9.179E-01
Pa-231	4.5564E-09	62.741	125.481	0.00E+00	2.86E-07	5.72E-07		
Pb-210	1.8842E-14	62.741	125.481	0.00E+00	1.18E-12	2.36E-12		
Pm-147	5.5459E-01	62.741	125.481	0.00E+00	3.48E+01	6.96E+01		
Pu-238	1.2992E-03	62.741	125.481	0.00E+00	8.15E-02	1.63E-01		
Pu-239	5.6932E-03	62.741	125.481	0.00E+00	3.57E-01	7.14E-01		
Pu-240	2.2632E-03	62.741	125.481	0.00E+00	1.42E-01	2.84E-01		
Pu-241	9.8857E-02	62.741	125.481	0.00E+00	6.20E+00	1.24E+01		
Pu-242	3.0602E-07	62.741	125.481	0.00E+00	1.92E-05	3.84E-05		
Ra-226	1.0823E-13	62.741	125.481	0.00E+00	6.79E-12	1.36E-11		
Ra-228	2.0406E-10	62.741	125.481	0.00E+00	1.28E-08	2.56E-08		
Ru-106	3.0180E-03	62.741	125.481	0.00E+00	1.89E-01	3.79E-01		
Se-79	1.2937E-05	62.741	125.481	0.00E+00	8.12E-04	1.62E-03		
Sn-126	1.2238E-05	62.741	125.481	0.00E+00	7.68E-04	1.54E-03		
Sr-90	2.3098E+00	62.741	125.481	0.00E+00	1.45E+02	2.90E+02		
Tc-99	4.4120E-04	62.741	125.481	0.00E+00	2.77E-02	5.54E-02		
Th-229	2.0932E-10	62.741	125.481	0.00E+00	1.31E-08	2.63E-08		
Th-230	2.7744E-11	62.741	125.481	0.00E+00	1.74E-09	3.48E-09		
Th-232	2.3744E-10	62.741	125.481	0.00E+00	1.49E-08	2.98E-08		
Tl-208	1.9459E-08	62.741	125.481	0.00E+00	1.22E-06	2.44E-06		
U-232	5.3850E-08	62.741	125.481	0.00E+00	3.38E-06	6.76E-06		
U-233	1.3135E-07	62.741	125.481	0.00E+00	8.24E-06	1.65E-05		
U-234	1.9143E-07	62.741	125.481	0.00E+00	1.20E-05	2.40E-05		
U-235	-2.6159E-06	62.741	0.000	6.62E-03	6.45E-03	6.62E-03		
U-236	1.2719E-05	62.741	125.481	0.00E+00	7.98E-04	1.60E-03		
U-238	-3.8857E-08	62.741	0.000	7.57E-05	7.33E-05	7.57E-05		
Y-90	2.3098E+00	62.741	125.481	0.00E+00	1.45E+02	2.90E+02		
Other Radionuclides					1.66E+02	3.31E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.33E+00	4.65E+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	This Template was used for the following reasons: This fuel matches on all parameters except enrichment.
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	93.14680552	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		62.741	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup assumed to be twice nominal burnup.
Bounding:		125.481	

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.52	
Bounding:	1.03	
		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: PRR-1 (PHILIPPINES) 1 Fuel decay start date: 1998
 SNF ID #: 558 Estimates as of: 2010
 Fuel Units & Descr: 30 - 17 FLAT PLATES Template: TRIGA-AI (LW/U-Zrx, Alum., 10 to 20%, U)
 Heavy Metal Mass: BOL=20.33kg ; EOL=19.71kg 2 Template Burnup(MWd): 6.65
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.0018
Template Decay Time: 10 years

Estimated
Canister usage:
18"x10"
1.25

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	1.2892E-09	587.029	1,174.058	0.00E+00	7.57E-07	1.51E-06	0.0150	1.578E+14
Am-241	2.9429E-03	587.029	1,174.058	0.00E+00	1.73E+00	3.46E+00	0.0250	3.301E+13
Am-242m	1.9489E-06	587.029	1,174.058	0.00E+00	1.14E-03	2.29E-03	0.0375	3.898E+13
Am-243	2.3308E-07	587.029	1,174.058	0.00E+00	1.37E-04	2.74E-04	0.0575	3.224E+13
C-14	4.3278E-05	587.029	1,174.058	0.00E+00	2.54E-02	5.08E-02	0.0850	2.095E+13
Ci-36	4.3023E-08	587.029	1,174.058	0.00E+00	2.53E-05	5.05E-05	0.1250	2.900E+13
Cm-243	2.4286E-07	587.029	1,174.058	0.00E+00	1.43E-04	2.85E-04	0.2250	1.839E+13
Cm-244	2.6015E-06	587.029	1,174.058	0.00E+00	1.53E-03	3.05E-03	0.3750	7.569E+12
Co-60	1.6075E-02	587.029	1,174.058	0.00E+00	9.44E+00	1.89E+01	0.5750	1.128E+14
Cs-134	1.9323E-02	587.029	1,174.058	0.00E+00	1.13E+01	2.27E+01	0.8500	2.054E+13
Cs-135	3.1549E-05	587.029	1,174.058	0.00E+00	1.85E-02	3.70E-02	1.2500	2.259E+13
Cs-137	2.4556E+00	587.029	1,174.058	0.00E+00	1.44E+03	2.88E+03	1.7500	6.477E+11
Eu-154	9.0180E-01	587.029	1,174.058	0.00E+00	5.29E+02	1.06E+03	2.2500	1.541E+09
Eu-155	2.1820E-01	587.029	1,174.058	0.00E+00	1.28E+02	2.56E+02	2.7500	3.021E+07
Fe-55	2.2902E-03	587.029	1,174.058	0.00E+00	1.34E+00	2.69E+00	3.5000	3.687E+06
H-3	8.1609E-03	587.029	1,174.058	0.00E+00	4.79E+00	9.58E+00	5.0000	6.777E+02
I-129	7.3805E-07	587.029	1,174.058	0.00E+00	4.33E-04	8.67E-04	7.0000	7.664E+01
Kr-85	1.8256E-01	587.029	1,174.058	0.00E+00	1.07E+02	2.14E+02	11.0000	8.725E+00
Np-237	1.4505E-06	587.029	1,174.058	0.00E+00	8.52E-04	1.70E-03		
Pa-231	4.5564E-09	587.029	1,174.058	0.00E+00	2.67E-06	5.35E-06		
Pb-210	1.8842E-14	587.029	1,174.058	0.00E+00	1.11E-11	2.21E-11		
Pm-147	5.5459E-01	587.029	1,174.058	0.00E+00	3.26E+02	6.51E+02		
Pu-238	1.2992E-03	587.029	1,174.058	0.00E+00	7.63E-01	1.53E+00		
Pu-239	5.6932E-03	587.029	1,174.058	0.00E+00	3.34E+00	6.68E+00		
Pu-240	2.2632E-03	587.029	1,174.058	0.00E+00	1.33E+00	2.66E+00		
Pu-241	9.8857E-02	587.029	1,174.058	0.00E+00	5.80E+01	1.16E+02		
Pu-242	3.0602E-07	587.029	1,174.058	0.00E+00	1.80E-04	3.59E-04		
Ra-226	1.0823E-13	587.029	1,174.058	0.00E+00	6.35E-11	1.27E-10		
Ra-228	2.0406E-10	587.029	1,174.058	0.00E+00	1.20E-07	2.40E-07		
Ru-106	3.0180E-03	587.029	1,174.058	0.00E+00	1.77E+00	3.54E+00		
Se-79	1.2937E-05	587.029	1,174.058	0.00E+00	7.59E-03	1.52E-02		
Sn-126	1.2238E-05	587.029	1,174.058	0.00E+00	7.18E-03	1.44E-02		
Sr-90	2.3098E+00	587.029	1,174.058	0.00E+00	1.36E+03	2.71E+03		
Tc-99	4.4120E-04	587.029	1,174.058	0.00E+00	2.59E-01	5.18E-01		
Th-229	2.0932E-10	587.029	1,174.058	0.00E+00	1.23E-07	2.46E-07		
Th-230	2.7744E-11	587.029	1,174.058	0.00E+00	1.63E-08	3.26E-08		
Th-232	2.3744E-10	587.029	1,174.058	0.00E+00	1.39E-07	2.79E-07		
Ti-208	1.9459E-08	587.029	1,174.058	0.00E+00	1.14E-05	2.28E-05		
U-232	5.3850E-08	587.029	1,174.058	0.00E+00	3.16E-05	6.32E-05		
U-233	1.3135E-07	587.029	1,174.058	0.00E+00	7.71E-05	1.54E-04		
U-234	1.9143E-07	587.029	1,174.058	0.00E+00	1.12E-04	2.25E-04		
U-235	-2.6159E-06	587.029	0.000	8.73E-03	7.20E-03	8.73E-03		
U-236	1.2719E-05	587.029	1,174.058	0.00E+00	7.47E-03	1.49E-02		
U-238	-3.8857E-08	587.029	0.000	5.47E-03	5.45E-03	5.47E-03		
Y-90	2.3098E+00	587.029	1,174.058	0.00E+00	1.36E+03	2.71E+03		
Other Radionuclides					1.55E+03	3.10E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.18E+01	4.35E+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:	ALUM	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	19.87821382	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		587.029	
Bounding:		1,174.058	

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	
Bounding:	1.56	

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: PULSTAR - BUFFALO
 SNF ID #: 174
 Fuel Units & Descr: 24 - CANISTER OF RODS
 Heavy Metal Mass: BOL=254.67kg ; EOL=252.20kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1978
 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"
 2.00

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	6.6376E-10	2,348.473	4,696.946	0.00E+00	1.56E-06	3.12E-06	0.0150	3.194E+14
Am-241	1.3144E-01	2,348.473	4,696.946	0.00E+00	3.09E+02	6.17E+02	0.0250	6.469E+13
Am-242m	3.0039E-04	2,348.473	4,696.946	0.00E+00	7.05E-01	1.41E+00	0.0375	6.261E+13
Am-243	6.2629E-04	2,348.473	4,696.946	0.00E+00	1.47E+00	2.94E+00	0.0575	6.830E+13
C-14	4.7965E-05	2,348.473	4,696.946	0.00E+00	1.13E-01	2.25E-01	0.0850	3.619E+13
Ci-36	8.0297E-07	2,348.473	4,696.946	0.00E+00	1.89E-03	3.77E-03	0.1250	2.644E+13
Cm-243	3.1993E-04	2,348.473	4,696.946	0.00E+00	7.51E-01	1.50E+00	0.2250	3.107E+13
Cm-244	7.1851E-02	2,348.473	4,696.946	0.00E+00	1.69E+02	3.37E+02	0.3750	1.339E+13
Co-60	9.5220E-03	2,348.473	4,696.946	0.00E+00	2.24E+01	4.47E+01	0.8500	6.046E+12
Cs-134	1.1662E-03	2,348.473	4,696.946	0.00E+00	2.74E+00	5.48E+00	1.2500	8.167E+12
Cs-135	1.4433E-05	2,348.473	4,696.946	0.00E+00	3.39E-02	6.78E-02	1.7500	1.790E+11
Cs-137	1.7603E+00	2,348.473	4,696.946	0.00E+00	4.13E+03	8.27E+03	2.2500	3.305E+07
Eu-154	4.5203E-02	2,348.473	4,696.946	0.00E+00	1.06E+02	2.12E+02	2.7500	3.715E+07
Eu-155	7.1479E-03	2,348.473	4,696.946	0.00E+00	1.68E+01	3.36E+01	3.5000	4.869E+06
Fe-55	6.1919E-04	2,348.473	4,696.946	0.00E+00	1.45E+00	2.91E+00	5.0000	2.081E+06
H-3	3.6386E-02	2,348.473	4,696.946	0.00E+00	8.55E+01	1.71E+02	7.0000	2.399E+05
I-129	9.8288E-07	2,348.473	4,696.946	0.00E+00	2.31E-03	4.62E-03	11.0000	2.755E+04
Kr-85	5.3844E-02	2,348.473	4,696.946	0.00E+00	1.26E+02	2.53E+02		
Np-237	1.0546E-05	2,348.473	4,696.946	0.00E+00	2.48E-02	4.95E-02		
Pa-231	1.1370E-09	2,348.473	4,696.946	0.00E+00	2.67E-06	5.34E-06		
Pb-210	3.3624E-11	2,348.473	4,696.946	0.00E+00	7.90E-08	1.58E-07		
Pm-147	5.1211E-03	2,348.473	4,696.946	0.00E+00	1.20E+01	2.41E+01		
Pu-238	8.0669E-02	2,348.473	4,696.946	0.00E+00	1.89E+02	3.79E+02		
Pu-239	1.1626E-02	2,348.473	4,696.946	0.00E+00	2.73E+01	5.46E+01		
Pu-240	1.5097E-02	2,348.473	4,696.946	0.00E+00	3.55E+01	7.09E+01		
Pu-241	1.4567E+00	2,348.473	4,696.946	0.00E+00	3.42E+03	6.84E+03		
Pu-242	6.4260E-05	2,348.473	4,696.946	0.00E+00	1.51E-01	3.02E-01		
Ra-226	1.1392E-10	2,348.473	4,696.946	0.00E+00	2.68E-07	5.35E-07		
Ra-228	5.1841E-12	2,348.473	4,696.946	0.00E+00	1.22E-08	2.43E-08		
Ru-106	5.9012E-07	2,348.473	4,696.946	0.00E+00	1.39E-03	2.77E-03		
Se-79	1.2379E-05	2,348.473	4,696.946	0.00E+00	2.91E-02	5.81E-02		
Sn-126	2.5210E-05	2,348.473	4,696.946	0.00E+00	5.92E-02	1.18E-01		
Sr-90	1.1630E+00	2,348.473	4,696.946	0.00E+00	2.73E+03	5.46E+03		
Tc-99	3.9357E-04	2,348.473	4,696.946	0.00E+00	9.24E-01	1.85E+00		
Th-229	8.5691E-11	2,348.473	4,696.946	0.00E+00	2.01E-07	4.02E-07		
Th-230	1.4493E-08	2,348.473	4,696.946	0.00E+00	3.40E-05	6.81E-05		
Th-232	5.2923E-12	2,348.473	4,696.946	0.00E+00	1.24E-08	2.49E-08		
Ti-208	1.9202E-07	2,348.473	4,696.946	0.00E+00	4.51E-04	9.02E-04		
U-232	5.2083E-07	2,348.473	4,696.946	0.00E+00	1.22E-03	2.45E-03		
U-233	2.4386E-08	2,348.473	4,696.946	0.00E+00	5.73E-05	1.15E-04		
U-234	4.7012E-05	2,348.473	4,696.946	0.00E+00	1.10E-01	2.21E-01		
U-235	-1.4492E-06	2,348.473	0.000	3.30E-02	2.96E-02	3.30E-02		
U-236	7.5759E-06	2,348.473	4,696.946	0.00E+00	1.78E-02	3.56E-02		
U-238	-2.6129E-07	2,348.473	0.000	8.05E-02	7.98E-02	8.05E-02		
Y-90	1.1631E+00	2,348.473	4,696.946	0.00E+00	2.73E+03	5.46E+03		
Other Radionuclides					3.97E+03	7.94E+03		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							6.44E+01	1.29E+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	This Template was used for the following reasons: This fuel matches PWR Template on all but one parameter (enrichment) making PWR a reasonable match.
BOL HM Constituents:	ZIRC-2	ZIRC	
BOL Enrichment %:	UO2	U	
	5.99643776	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	2,348.473	2,348.473	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	2,546.712	4,696.946	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.26		1.00
Bounding:	0.53	1.84	

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: PULSTAR-N.C. STATE UNIV.
 SNF ID #: 175
 Fuel Units & Descr: 25 - 5 X 5 ROD ARRAY
 Heavy Metal Mass: BOL=316.87kg ; EOL=315.90kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 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: 5 years

Estimated
 Canister usage:
 18"x10"
 1.25

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	2.3547E-10	920.047	1,840.093	0.00E+00	2.17E-07	4.33E-07	Avg. MeV	
Am-241	6.5811E-02	920.047	1,840.093	0.00E+00	6.05E+01	1.21E+02	0.0150	2.626E+14
Am-242m	3.2913E-04	920.047	1,840.093	0.00E+00	3.03E-01	6.06E-01	0.0250	6.048E+13
Am-243	6.2742E-04	920.047	1,840.093	0.00E+00	5.77E-01	1.15E+00	0.0375	5.662E+13
C-14	4.8078E-05	920.047	1,840.093	0.00E+00	4.42E-02	8.85E-02	0.0575	5.276E+13
Cl-36	8.0313E-07	920.047	1,840.093	0.00E+00	7.39E-04	1.48E-03	0.0850	3.332E+13
Cm-243	5.2003E-04	920.047	1,840.093	0.00E+00	4.78E-01	9.57E-01	0.1250	3.016E+13
Cm-244	1.5441E-01	920.047	1,840.093	0.00E+00	1.42E+02	2.84E+02	0.2250	2.835E+13
Co-60	1.3196E-01	920.047	1,840.093	0.00E+00	1.21E+02	2.43E+02	0.3750	1.591E+13
Cs-134	9.6528E-01	920.047	1,840.093	0.00E+00	8.88E+02	1.78E+03	0.5750	2.933E+14
Cs-135	1.4433E-05	920.047	1,840.093	0.00E+00	1.33E-02	2.66E-02	0.8500	6.785E+13
Cs-137	2.7939E+00	920.047	1,840.093	0.00E+00	2.57E+03	5.14E+03	1.2500	3.156E+13
Eu-154	2.2626E-01	920.047	1,840.093	0.00E+00	2.08E+02	4.16E+02	1.7500	4.894E+11
Eu-155	1.1680E-01	920.047	1,840.093	0.00E+00	1.07E+02	2.15E+02	2.2500	2.456E+11
Fe-55	1.2760E-01	920.047	1,840.093	0.00E+00	1.17E+02	2.35E+02	2.7500	8.226E+09
H-3	1.1168E-01	920.047	1,840.093	0.00E+00	1.03E+02	2.05E+02	3.5000	1.055E+09
I-129	9.8288E-07	920.047	1,840.093	0.00E+00	9.04E-04	1.81E-03	5.0000	1.732E+06
Kr-85	1.9606E-01	920.047	1,840.093	0.00E+00	1.80E+02	3.61E+02	7.0000	1.997E+05
Np-237	9.6915E-06	920.047	1,840.093	0.00E+00	8.92E-03	1.78E-02	11.0000	2.294E+04
Pa-231	8.5917E-10	920.047	1,840.093	0.00E+00	7.90E-07	1.58E-06		
Pb-210	1.6247E-12	920.047	1,840.093	0.00E+00	1.49E-09	2.99E-09		
Pm-147	1.0063E+00	920.047	1,840.093	0.00E+00	9.26E+02	1.85E+03		
Pu-238	9.4428E-02	920.047	1,840.093	0.00E+00	8.69E+01	1.74E+02		
Pu-239	1.1631E-02	920.047	1,840.093	0.00E+00	1.07E+01	2.14E+01		
Pu-240	1.4919E-02	920.047	1,840.093	0.00E+00	1.37E+01	2.75E+01		
Pu-241	3.8130E+00	920.047	1,840.093	0.00E+00	3.51E+03	7.02E+03		
Pu-242	6.4260E-05	920.047	1,840.093	0.00E+00	5.91E-02	1.18E-01		
Ra-226	1.2608E-11	920.047	1,840.093	0.00E+00	1.16E-08	2.32E-08		
Ra-228	3.8986E-12	920.047	1,840.093	0.00E+00	3.59E-09	7.17E-09		
Ru-106	5.4910E-01	920.047	1,840.093	0.00E+00	5.05E+02	1.01E+03		
Se-79	1.2380E-05	920.047	1,840.093	0.00E+00	1.14E-02	2.28E-02		
Sn-126	2.5210E-05	920.047	1,840.093	0.00E+00	2.32E-02	4.64E-02		
Sr-90	1.8718E+00	920.047	1,840.093	0.00E+00	1.72E+03	3.44E+03		
Tc-99	3.9357E-04	920.047	1,840.093	0.00E+00	3.62E-01	7.24E-01		
Th-229	2.9603E-11	920.047	1,840.093	0.00E+00	2.72E-08	5.45E-08		
Th-230	4.5559E-09	920.047	1,840.093	0.00E+00	4.19E-06	8.38E-06		
Th-232	5.2826E-12	920.047	1,840.093	0.00E+00	4.86E-09	9.72E-09		
Tl-208	1.9654E-07	920.047	1,840.093	0.00E+00	1.81E-04	3.62E-04		
U-232	5.7607E-07	920.047	1,840.093	0.00E+00	5.30E-04	1.06E-03		
U-233	2.3288E-08	920.047	1,840.093	0.00E+00	2.14E-05	4.29E-05		
U-234	4.1182E-05	920.047	1,840.093	0.00E+00	3.79E-02	7.58E-02		
U-235	-1.4494E-06	920.047	0.000	2.76E-02	2.62E-02	2.76E-02		
U-236	7.5646E-06	920.047	1,840.093	0.00E+00	6.96E-03	1.39E-02		
U-238	-2.6129E-07	920.047	0.000	1.02E-01	1.02E-01	1.02E-01	5.84E+01	1.13E+02
Y-90	1.8718E+00	920.047	1,840.093	0.00E+00	1.72E+03	3.44E+03	Total	Total
Other Radionuclides					3.82E+03	7.64E+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	
Fuel Cladding:	ZIRC-2	ZIRC	
BOL HM Constituent:	UO2	U	
BOL Enrichment %:	4.025941269	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		920.047	
Bounding:		1,840.093	

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:	0.08		
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: PULSTAR-SUNY-BUFFALO
 SNF ID #: 176
 Fuel Units & Descr: 996 - ROD
 Heavy Metal Mass: BOL=537.54kg ; EOL=499.99kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1965
 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"
 2.96

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	8.7758E-10	35,707.513	71,415.026	0.00E+00	3.13E-05	6.27E-05	Avg. MeV	
Am-241	1.4352E-01	35,707.513	71,415.026	0.00E+00	5.12E+03	1.02E+04	0.0150	3.842E+15
Am-242m	2.8698E-04	35,707.513	71,415.026	0.00E+00	1.02E+01	2.05E+01	0.0250	7.749E+14
Am-243	6.2565E-04	35,707.513	71,415.026	0.00E+00	2.23E+01	4.47E+01	0.0375	7.390E+14
C-14	4.7901E-05	35,707.513	71,415.026	0.00E+00	1.71E+00	3.42E+00	0.0575	8.539E+14
Cl-36	8.0297E-07	35,707.513	71,415.026	0.00E+00	2.87E-02	5.73E-02	0.0850	4.300E+14
Cm-243	2.5081E-04	35,707.513	71,415.026	0.00E+00	8.96E+00	1.79E+01	0.1250	2.933E+14
Cm-244	4.9015E-02	35,707.513	71,415.026	0.00E+00	1.75E+03	3.50E+03	0.2250	3.687E+14
Co-60	2.5581E-03	35,707.513	71,415.026	0.00E+00	9.13E+01	1.83E+02	0.3750	1.585E+14
Cs-134	4.0536E-05	35,707.513	71,415.026	0.00E+00	1.45E+00	2.89E+00	0.5750	3.687E+15
Cs-135	1.4433E-05	35,707.513	71,415.026	0.00E+00	5.15E-01	1.03E+00	0.8500	5.101E+13
Cs-137	1.3979E+00	35,707.513	71,415.026	0.00E+00	4.99E+04	9.98E+04	1.2500	5.011E+13
Eu-154	2.0203E-02	35,707.513	71,415.026	0.00E+00	7.21E+02	1.44E+03	1.7500	1.501E+12
Eu-155	1.7684E-03	35,707.513	71,415.026	0.00E+00	6.31E+01	1.26E+02	2.2500	2.416E+08
Fe-55	4.3136E-05	35,707.513	71,415.026	0.00E+00	1.54E+00	3.08E+00	2.7500	4.950E+08
H-3	2.0769E-02	35,707.513	71,415.026	0.00E+00	7.42E+02	1.48E+03	3.5000	5.098E+07
I-129	9.8288E-07	35,707.513	71,415.026	0.00E+00	3.51E-02	7.02E-02	5.0000	2.179E+07
Kr-85	2.8214E-02	35,707.513	71,415.026	0.00E+00	1.01E+03	2.01E+03	7.0000	2.512E+06
Np-237	1.1218E-05	35,707.513	71,415.026	0.00E+00	4.01E-01	8.01E-01	11.0000	2.885E+05
Pa-231	1.3036E-09	35,707.513	71,415.026	0.00E+00	4.65E-05	9.31E-05		
Pb-210	8.5078E-11	35,707.513	71,415.026	0.00E+00	3.04E-06	6.08E-06		
Pm-147	3.6531E-04	35,707.513	71,415.026	0.00E+00	1.30E+01	2.61E+01		
Pu-238	7.4564E-02	35,707.513	71,415.026	0.00E+00	2.66E+03	5.32E+03		
Pu-239	1.1623E-02	35,707.513	71,415.026	0.00E+00	4.15E+02	8.30E+02		
Pu-240	1.5132E-02	35,707.513	71,415.026	0.00E+00	5.40E+02	1.08E+03		
Pu-241	9.0036E-01	35,707.513	71,415.026	0.00E+00	3.21E+04	6.43E+04		
Pu-242	6.4260E-05	35,707.513	71,415.026	0.00E+00	2.29E+00	4.59E+00		
Ra-226	2.2804E-10	35,707.513	71,415.026	0.00E+00	8.14E-06	1.63E-05		
Ra-228	5.2713E-12	35,707.513	71,415.026	0.00E+00	1.88E-07	3.76E-07		
Ru-106	6.1160E-10	35,707.513	71,415.026	0.00E+00	2.18E-05	4.37E-05		
Se-79	1.2377E-05	35,707.513	71,415.026	0.00E+00	4.42E-01	8.84E-01		
Sn-126	2.5210E-05	35,707.513	71,415.026	0.00E+00	9.00E-01	1.80E+00		
Sr-90	9.1667E-01	35,707.513	71,415.026	0.00E+00	3.27E+04	6.55E+04		
Tc-99	3.9357E-04	35,707.513	71,415.026	0.00E+00	1.41E+01	2.81E+01		
Th-229	1.2057E-10	35,707.513	71,415.026	0.00E+00	4.31E-06	8.61E-06		
Th-230	2.1043E-08	35,707.513	71,415.026	0.00E+00	7.51E-04	1.50E-03		
Th-232	5.2972E-12	35,707.513	71,415.026	0.00E+00	1.89E-07	3.78E-07		
Tl-208	1.7474E-07	35,707.513	71,415.026	0.00E+00	6.24E-03	1.25E-02		
U-232	4.7368E-07	35,707.513	71,415.026	0.00E+00	1.69E-02	3.38E-02		
U-233	2.5097E-08	35,707.513	71,415.026	0.00E+00	8.96E-04	1.79E-03		
U-234	5.0000E-05	35,707.513	71,415.026	0.00E+00	1.79E+00	3.57E+00		
U-235	-1.4489E-06	35,707.513	0.000	6.93E-02	1.76E-02	6.93E-02		
U-236	7.5824E-06	35,707.513	71,415.026	0.00E+00	2.71E-01	5.41E-01		
U-238	-2.6129E-07	35,707.513	0.000	1.70E-01	1.61E-01	1.70E-01		
Y-90	9.1699E-01	35,707.513	71,415.026	0.00E+00	3.27E+04	6.55E+04		
Other Radionuclides							4.79E+04	9.59E+04

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.21E+02	1.64E+03
Total	Total

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 PWR Template on all but one parameter (enrichment) making PWR a reasonable match.
Fuel Cladding:	ZIRC-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	5.965123646	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		35,707.513	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		71,415.026	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	1.90		
Bounding:	3.80		

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: PURDUE UNIVERSITY
 SNF ID #: 178
 Fuel Units & Descr: 16 - 10 FLAT PLATES
 Heavy Metal Mass: BOL=18.18kg ; EOL=18.18kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2035
 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"
 0.44

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	344.382	688.763	0.00E+00	5.01E-08	1.00E-07		
Am-241	1.1190E-03	344.382	688.763	0.00E+00	3.85E-01	7.71E-01	0.0150	1.329E+14
Am-242m	4.5425E-07	344.382	688.763	0.00E+00	1.56E-04	3.13E-04	0.0250	2.863E+13
Am-243	1.4921E-06	344.382	688.763	0.00E+00	5.14E-04	1.03E-03	0.0375	2.642E+13
C-14	5.7244E-09	344.382	688.763	0.00E+00	1.97E-06	3.94E-06	0.0575	2.598E+13
Cl-36	1.3124E-32	344.382	688.763	0.00E+00	4.52E-30	9.04E-30	0.0850	1.556E+13
Cm-243	2.3676E-07	344.382	688.763	0.00E+00	8.15E-05	1.63E-04	0.1250	1.434E+13
Cm-244	5.2042E-05	344.382	688.763	0.00E+00	1.79E-02	3.58E-02	0.2250	1.404E+13
Co-60	3.8208E-05	344.382	688.763	0.00E+00	1.32E-02	2.63E-02	0.3750	6.794E+12
Cs-134	4.8693E-01	344.382	688.763	0.00E+00	1.68E+02	3.35E+02	0.5750	9.332E+13
Cs-135	3.4477E-06	344.382	688.763	0.00E+00	1.19E-03	2.37E-03	0.8500	1.307E+13
Cs-137	2.8731E+00	344.382	688.763	0.00E+00	9.89E+02	1.98E+03	1.2500	2.431E+12
Eu-154	8.2053E-02	344.382	688.763	0.00E+00	2.83E+01	5.65E+01	1.7500	1.020E+11
Eu-155	3.9134E-02	344.382	688.763	0.00E+00	1.35E+01	2.70E+01	2.2500	2.139E+11
Fe-55	6.7429E-03	344.382	688.763	0.00E+00	2.32E+00	4.64E+00	2.7500	1.230E+09
H-3	1.0599E-02	344.382	688.763	0.00E+00	3.65E+00	7.30E+00	3.5000	1.365E+08
I-129	7.5300E-07	344.382	688.763	0.00E+00	2.59E-04	5.19E-04	5.0000	4.199E+02
Kr-85	2.8595E-01	344.382	688.763	0.00E+00	9.85E+01	1.97E+02	7.0000	4.679E+01
Np-237	9.5479E-06	344.382	688.763	0.00E+00	3.29E-03	6.58E-03	11.0000	5.277E+00
Pa-231	8.9297E-10	344.382	688.763	0.00E+00	3.08E-07	6.15E-07		
Pb-210	3.7609E-12	344.382	688.763	0.00E+00	1.30E-09	2.59E-09		
Pm-147	2.5452E+00	344.382	688.763	0.00E+00	8.77E+02	1.75E+03		
Pu-238	2.0550E-02	344.382	688.763	0.00E+00	7.08E+00	1.42E+01		
Pu-239	4.2638E-04	344.382	688.763	0.00E+00	1.48E-01	2.95E-01		
Pu-240	2.4401E-04	344.382	688.763	0.00E+00	8.40E-02	1.68E-01		
Pu-241	6.8764E-02	344.382	688.763	0.00E+00	2.37E+01	4.74E+01		
Pu-242	3.6329E-07	344.382	688.763	0.00E+00	1.25E-04	2.50E-04		
Ra-226	3.8045E-11	344.382	688.763	0.00E+00	1.31E-08	2.62E-08		
Ra-228	2.9902E-15	344.382	688.763	0.00E+00	1.03E-12	2.06E-12		
Ru-106	1.9055E-01	344.382	688.763	0.00E+00	6.56E+01	1.31E+02		
Se-79	1.2936E-05	344.382	688.763	0.00E+00	4.45E-03	8.91E-03		
Sn-126	1.1574E-05	344.382	688.763	0.00E+00	3.99E-03	7.97E-03		
Sr-90	2.7505E+00	344.382	688.763	0.00E+00	9.47E+02	1.89E+03		
Tc-99	4.2239E-04	344.382	688.763	0.00E+00	1.45E-01	2.91E-01		
Th-229	1.8848E-12	344.382	688.763	0.00E+00	6.49E-10	1.30E-09		
Th-230	1.7042E-08	344.382	688.763	0.00E+00	5.87E-06	1.17E-05		
Th-232	7.8132E-15	344.382	688.763	0.00E+00	2.69E-12	5.38E-12		
Tl-208	4.4063E-08	344.382	688.763	0.00E+00	1.52E-05	3.03E-05		
U-232	1.3151E-07	344.382	688.763	0.00E+00	4.53E-05	9.06E-05		
U-233	1.9564E-09	344.382	688.763	0.00E+00	6.74E-07	1.35E-06		
U-234	1.8371E-04	344.382	688.763	0.00E+00	6.33E-02	1.27E-01		
U-235	-2.7235E-06	344.382	0.000	7.47E-03	6.53E-03	7.47E-03		
U-236	1.5493E-05	344.382	688.763	0.00E+00	5.34E-03	1.07E-02		
U-238	-4.2851E-09	344.382	0.000	4.95E-03	4.95E-03	4.95E-03		
Y-90	2.7505E+00	344.382	688.763	0.00E+00	9.47E+02	1.89E+03		
Other Radionuclides					1.77E+03	3.54E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.75E+01	3.49E+01
Total	Total

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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	ALUM (1100)	ALUM	
BOL HM Constituents:	U3Si2	U	
BOL Enrichment %:	19.0001402	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		344.382	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup assumed to be twice nominal burnup.
Bounding:		688.763	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.06		0.98
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: PURDUE UNIVERSITY
 SNF ID #: 177
 Fuel Units & Descr: 124 - ELEMENT
 Heavy Metal Mass: BOL=2.22kg ; EOL=2.22kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2035
 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"
 3.44

Radionuclide	II. Estimates		Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
	m	x _n						x _b	y _n
Ac-227	1.4545E-10	42.040	84.080	84.080	0.00E+00	6.11E-09	1.22E-08	Avg. MeV	
Am-241	1.1190E-03	42.040	84.080	84.080	0.00E+00	4.70E-02	9.41E-02	0.0150	1.622E+13
Am-242m	4.5425E-07	42.040	84.080	84.080	0.00E+00	1.91E-05	3.82E-05	0.0250	3.495E+12
Am-243	1.4921E-06	42.040	84.080	84.080	0.00E+00	6.27E-05	1.25E-04	0.0375	3.225E+12
C-14	5.7244E-09	42.040	84.080	84.080	0.00E+00	2.41E-07	4.81E-07	0.0575	3.171E+12
Cl-36	1.3124E-32	42.040	84.080	84.080	0.00E+00	5.52E-31	1.10E-30	0.0850	2.021E+12
Cm-243	2.3676E-07	42.040	84.080	84.080	0.00E+00	9.95E-06	1.99E-05	0.1250	1.751E+12
Cm-244	5.2042E-05	42.040	84.080	84.080	0.00E+00	2.19E-03	4.38E-03	0.2250	1.713E+12
Co-60	3.8208E-05	42.040	84.080	84.080	0.00E+00	1.61E-03	3.21E-03	0.3750	8.293E+11
Cs-134	4.8693E-01	42.040	84.080	84.080	0.00E+00	2.05E+01	4.09E+01	0.5750	1.139E+13
Cs-135	3.4477E-06	42.040	84.080	84.080	0.00E+00	1.45E-04	2.90E-04	0.8500	1.595E+13
Cs-137	2.8731E+00	42.040	84.080	84.080	0.00E+00	1.21E+02	2.42E+02	1.2500	2.968E+11
Eu-154	8.2053E-02	42.040	84.080	84.080	0.00E+00	3.45E+00	6.90E+00	1.7500	1.245E+10
Eu-155	3.9134E-02	42.040	84.080	84.080	0.00E+00	1.65E+00	3.29E+00	2.2500	2.611E+10
Fe-55	6.7429E-03	42.040	84.080	84.080	0.00E+00	2.83E-01	5.67E-01	2.7500	1.502E+08
H-3	1.0599E-02	42.040	84.080	84.080	0.00E+00	4.46E-01	8.91E-01	3.5000	1.666E+07
I-129	7.5300E-07	42.040	84.080	84.080	0.00E+00	3.17E-05	6.33E-05	5.0000	4.999E+01
Kr-85	2.8595E-01	42.040	84.080	84.080	0.00E+00	1.20E+01	2.40E+01	7.0000	5.574E+00
Np-237	9.5479E-06	42.040	84.080	84.080	0.00E+00	4.01E-04	8.03E-04	11.0000	6.282E-01
Pa-231	8.9297E-10	42.040	84.080	84.080	0.00E+00	3.75E-08	7.51E-08		
Pb-210	3.7609E-12	42.040	84.080	84.080	0.00E+00	1.58E-10	3.16E-10		
Pm-147	2.5452E+00	42.040	84.080	84.080	0.00E+00	1.07E+02	2.14E+02		
Pu-238	2.0550E-02	42.040	84.080	84.080	0.00E+00	8.64E-01	1.73E+00		
Pu-239	4.2838E-04	42.040	84.080	84.080	0.00E+00	1.80E-02	3.60E-02		
Pu-240	2.4401E-04	42.040	84.080	84.080	0.00E+00	1.03E-02	2.05E-02		
Pu-241	6.8764E-02	42.040	84.080	84.080	0.00E+00	2.89E+00	5.78E+00		
Pu-242	3.6329E-07	42.040	84.080	84.080	0.00E+00	1.53E-05	3.05E-05		
Ra-226	3.8045E-11	42.040	84.080	84.080	0.00E+00	1.60E-09	3.20E-09		
Ra-228	2.9902E-15	42.040	84.080	84.080	0.00E+00	1.26E-13	2.51E-13		
Ru-106	1.9055E-01	42.040	84.080	84.080	0.00E+00	8.01E+00	1.60E+01		
Se-79	1.2936E-05	42.040	84.080	84.080	0.00E+00	5.44E-04	1.09E-03		
Sn-126	1.1574E-05	42.040	84.080	84.080	0.00E+00	4.87E-04	9.73E-04		
Sr-90	2.7505E+00	42.040	84.080	84.080	0.00E+00	1.16E+02	2.31E+02		
Tc-99	4.2239E-04	42.040	84.080	84.080	0.00E+00	1.78E-02	3.55E-02		
Th-229	1.8848E-12	42.040	84.080	84.080	0.00E+00	7.92E-11	1.58E-10		
Th-230	1.7042E-08	42.040	84.080	84.080	0.00E+00	7.16E-07	1.43E-06		
Th-232	7.8132E-15	42.040	84.080	84.080	0.00E+00	3.28E-13	6.57E-13		
Ti-208	4.4063E-08	42.040	84.080	84.080	0.00E+00	1.85E-06	3.70E-06		
U-232	1.3151E-07	42.040	84.080	84.080	0.00E+00	5.53E-06	1.11E-05		
U-233	1.9564E-09	42.040	84.080	84.080	0.00E+00	8.22E-08	1.64E-07		
U-234	1.8371E-04	42.040	84.080	84.080	0.00E+00	7.72E-03	1.54E-02		
U-235	-2.7235E-06	42.040	0.000	0.000	4.41E-03	4.30E-03	4.41E-03		
U-236	1.5493E-05	42.040	84.080	84.080	0.00E+00	6.51E-04	1.30E-03		
U-238	-4.2851E-09	42.040	0.000	0.000	5.97E-05	5.95E-05	5.97E-05		
Y-90	2.7505E+00	42.040	84.080	84.080	0.00E+00	1.16E+02	2.31E+02		
Other Radionuclides						2.16E+02	4.32E+02		
								Thermal Power	
								Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
								2.13E+00	4.26E+00
								Total	Total

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 (1100)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	92.00045093	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		42.040	
Bounding:		84.080	

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

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 (MW/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: R-2 SVTR (SWEDEN)
 SNF ID #: 942
 Fuel Units & Descr: 183 - MTR TYPE
 Heavy Metal Mass: BOL=351.47kg ; EOL=308.98kg
 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"
 5.08

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	2.8404E-10	40,241.317	80,482.633	0.00E+00	1.14E-05	2.29E-05		
Am-241	1.4935E-03	40,241.317	80,482.633	0.00E+00	6.01E+01	1.20E+02	0.0150	1.095E+16
Am-242m	4.4390E-07	40,241.317	80,482.633	0.00E+00	1.79E-02	3.57E-02	0.0250	2.304E+15
Am-243	1.4913E-06	40,241.317	80,482.633	0.00E+00	6.00E-02	1.20E-01	0.0375	2.008E+15
C-14	5.7217E-09	40,241.317	80,482.633	0.00E+00	2.30E-04	4.60E-04	0.0575	2.122E+15
Cl-36	1.3124E-32	40,241.317	80,482.633	0.00E+00	5.28E-28	1.06E-27	0.0850	1.291E+14
Cm-243	2.0967E-07	40,241.317	80,482.633	0.00E+00	8.44E-03	1.69E-02	0.1250	9.029E+14
Cm-244	4.3001E-05	40,241.317	80,482.633	0.00E+00	1.73E+00	3.46E+00	0.2250	1.108E+15
Co-60	1.9798E-05	40,241.317	80,482.633	0.00E+00	7.97E-01	1.59E+00	0.3750	4.968E+14
Cs-134	9.0795E-02	40,241.317	80,482.633	0.00E+00	3.65E+03	7.31E+03	0.5750	8.066E+15
Cs-135	3.4477E-06	40,241.317	80,482.633	0.00E+00	1.39E-01	2.77E-01	0.8500	3.934E+14
Cs-137	2.5588E+00	40,241.317	80,482.633	0.00E+00	1.03E+05	2.06E+05	1.2500	1.281E+14
Eu-154	5.4847E-02	40,241.317	80,482.633	0.00E+00	2.21E+03	4.41E+03	1.7500	4.676E+14
Eu-155	1.9469E-02	40,241.317	80,482.633	0.00E+00	7.83E+02	1.57E+03	2.2500	3.091E+12
Fe-55	1.7797E-03	40,241.317	80,482.633	0.00E+00	7.16E+01	1.43E+02	2.7500	4.313E+09
H-3	8.0065E-03	40,241.317	80,482.633	0.00E+00	3.22E+02	6.44E+02	3.5000	5.137E+08
I-129	7.5300E-07	40,241.317	80,482.633	0.00E+00	3.03E-02	6.06E-02	5.0000	4.287E+04
Kr-85	2.0705E-01	40,241.317	80,482.633	0.00E+00	8.33E+03	1.67E+04	7.0000	4.765E+03
Np-237	9.5507E-06	40,241.317	80,482.633	0.00E+00	3.84E-01	7.69E-01	11.0000	5.361E+02
Pa-231	1.2740E-09	40,241.317	80,482.633	0.00E+00	5.13E-05	1.03E-04		
Pb-210	1.1838E-11	40,241.317	80,482.633	0.00E+00	4.76E-07	9.53E-07		
Pm-147	6.7974E-01	40,241.317	80,482.633	0.00E+00	2.74E+04	5.47E+04		
Pu-238	1.9755E-02	40,241.317	80,482.633	0.00E+00	7.95E+02	1.59E+03		
Pu-239	4.2838E-04	40,241.317	80,482.633	0.00E+00	1.72E+01	3.45E+01		
Pu-240	2.4390E-04	40,241.317	80,482.633	0.00E+00	9.81E+00	1.96E+01		
Pu-241	5.4058E-02	40,241.317	80,482.633	0.00E+00	2.18E+03	4.35E+03		
Pu-242	3.6329E-07	40,241.317	80,482.633	0.00E+00	1.46E-02	2.92E-02		
Ra-226	8.3742E-11	40,241.317	80,482.633	0.00E+00	3.37E-06	6.74E-06		
Ra-228	5.7734E-15	40,241.317	80,482.633	0.00E+00	2.32E-10	4.65E-10		
Ru-106	6.1356E-03	40,241.317	80,482.633	0.00E+00	2.47E+02	4.94E+02		
Se-79	1.2936E-05	40,241.317	80,482.633	0.00E+00	5.21E-01	1.04E+00		
Sn-126	1.1574E-05	40,241.317	80,482.633	0.00E+00	4.66E-01	9.32E-01		
Sr-90	2.4417E+00	40,241.317	80,482.633	0.00E+00	9.83E+04	1.97E+05		
Tc-99	4.2239E-04	40,241.317	80,482.633	0.00E+00	1.70E+01	3.40E+01		
Th-229	2.8568E-12	40,241.317	80,482.633	0.00E+00	1.15E-07	2.30E-07		
Th-230	2.5310E-08	40,241.317	80,482.633	0.00E+00	1.02E-03	2.04E-03		
Th-232	1.1631E-14	40,241.317	80,482.633	0.00E+00	4.68E-10	9.36E-10		
Tl-208	4.6705E-08	40,241.317	80,482.633	0.00E+00	1.88E-03	3.76E-03		
U-232	1.3151E-07	40,241.317	80,482.633	0.00E+00	5.29E-03	1.06E-02		
U-233	2.1650E-09	40,241.317	80,482.633	0.00E+00	8.71E-05	1.74E-04		
U-234	1.8399E-04	40,241.317	80,482.633	0.00E+00	7.40E+00	1.48E+01		
U-235	-2.7235E-06	40,241.317	0.000	1.51E-01	4.11E-02	1.51E-01		
U-236	1.5493E-05	40,241.317	80,482.633	0.00E+00	6.23E-01	1.25E+00		
U-238	-4.2851E-09	40,241.317	0.000	9.47E-02	9.45E-02	9.47E-02		
Y-90	2.4423E+00	40,241.317	80,482.633	0.00E+00	9.83E+04	1.97E+05		
Other Radionuclides					1.00E+05	2.00E+05		

Thermal Power		
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
1.27E+03	2.55E+03	
Total	Total	

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 %:	U3Si2	U	
	19.84262055	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:		40,241.317	
Bounding:		80,482.633	

Checks			Estimated EOL HM/Given EOL HM 1.01
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.36		
Bounding:	0.73		

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: RA-3 (ARGENTINA)
 SNF ID #: 634
 Fuel Units & Descr: 32 - 19 CURVED PLATES
 Heavy Metal Mass: BOL=5.72kg ; EOL=4.60kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1987
 Estimates as of: 2010
 Template: ATR (Light Water, Akum., 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"
 1.33

Radionuclide	II. Estimates		x _b	b	y _n	y _b	Gamma Sources	
	m	x _n					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	6.6313E-10	1,066.723	2,133.445	0.00E+00	7.07E-07	1.41E-06		
Am-241	2.0060E-03	1,066.723	2,133.445	0.00E+00	2.14E+00	4.28E+00	0.0150	2.252E+14
Am-242m	4.2429E-07	1,066.723	2,133.445	0.00E+00	4.53E-04	9.05E-04	0.0250	4.683E+13
Am-243	1.4899E-06	1,066.723	2,133.445	0.00E+00	1.59E-03	3.18E-03	0.0375	4.085E+13
C-14	5.7135E-09	1,066.723	2,133.445	0.00E+00	6.09E-06	1.22E-05	0.0575	4.375E+13
Cl-36	1.3124E-32	1,066.723	2,133.445	0.00E+00	1.40E-29	2.80E-29	0.0850	2.644E+13
Cm-243	1.6443E-07	1,066.723	2,133.445	0.00E+00	1.75E-04	3.51E-04	0.1250	1.789E+13
Cm-244	2.9330E-05	1,066.723	2,133.445	0.00E+00	3.13E-02	6.26E-02	0.2250	2.281E+13
Co-60	5.3186E-06	1,066.723	2,133.445	0.00E+00	5.67E-03	1.13E-02	0.3750	9.929E+12
Cs-134	3.1563E-03	1,066.723	2,133.445	0.00E+00	3.37E+00	6.73E+00	0.5750	1.620E+14
Cs-135	3.4477E-06	1,066.723	2,133.445	0.00E+00	3.68E-03	7.36E-03	0.8500	2.738E+12
Cs-137	2.0313E-04	1,066.723	2,133.445	0.00E+00	2.17E+03	4.33E+03	1.2500	1.564E+12
Eu-154	2.4513E-02	1,066.723	2,133.445	0.00E+00	2.61E+01	5.23E+01	1.7500	7.178E+10
Eu-155	4.8175E-03	1,066.723	2,133.445	0.00E+00	5.14E+00	1.03E+01	2.2500	6.297E+06
Fe-55	1.2397E-04	1,066.723	2,133.445	0.00E+00	1.32E-01	2.64E-01	2.7500	3.559E+06
H-3	4.5697E-03	1,066.723	2,133.445	0.00E+00	4.87E+00	9.75E+00	3.5000	1.635E+04
I-129	7.5300E-07	1,066.723	2,133.445	0.00E+00	8.03E-04	1.61E-03	5.0000	9.246E+02
Kr-85	1.0850E-01	1,066.723	2,133.445	0.00E+00	1.16E+02	2.31E+02	7.0000	1.021E+02
Np-237	9.5561E-06	1,066.723	2,133.445	0.00E+00	1.02E-02	2.04E-02	11.0000	1.144E+01
Pa-231	2.0359E-09	1,066.723	2,133.445	0.00E+00	2.17E-06	4.34E-06		
Pb-210	4.9728E-11	1,066.723	2,133.445	0.00E+00	5.30E-08	1.06E-07		
Pm-147	4.8502E-02	1,066.723	2,133.445	0.00E+00	5.17E+01	1.03E+02		
Pu-238	1.8254E-02	1,066.723	2,133.445	0.00E+00	1.95E+01	3.89E+01		
Pu-239	4.2810E-04	1,066.723	2,133.445	0.00E+00	4.57E-01	9.13E-01		
Pu-240	2.4368E-04	1,066.723	2,133.445	0.00E+00	2.60E-01	5.20E-01		
Pu-241	3.3415E-02	1,066.723	2,133.445	0.00E+00	3.56E+01	7.13E+01		
Pu-242	3.6329E-07	1,066.723	2,133.445	0.00E+00	3.88E-04	7.75E-04		
Ra-226	2.2854E-10	1,066.723	2,133.445	0.00E+00	2.44E-07	4.88E-07		
Ra-228	1.2426E-14	1,066.723	2,133.445	0.00E+00	1.33E-11	2.65E-11		
Ru-106	6.3589E-06	1,066.723	2,133.445	0.00E+00	6.78E-03	1.36E-02		
Se-79	1.2933E-05	1,066.723	2,133.445	0.00E+00	1.38E-02	2.76E-02		
Sn-126	1.1574E-05	1,066.723	2,133.445	0.00E+00	1.23E-02	2.47E-02		
Sr-90	1.9248E+00	1,066.723	2,133.445	0.00E+00	2.05E+03	4.11E+03		
Tc-99	4.2239E-04	1,066.723	2,133.445	0.00E+00	4.51E-01	9.01E-01		
Th-229	5.0953E-12	1,066.723	2,133.445	0.00E+00	5.44E-09	1.09E-08		
Th-230	4.1885E-08	1,066.723	2,133.445	0.00E+00	4.47E-05	8.94E-05		
Th-232	1.9270E-14	1,066.723	2,133.445	0.00E+00	2.06E-11	4.11E-11		
Ti-208	4.6024E-08	1,066.723	2,133.445	0.00E+00	4.91E-05	9.82E-05		
U-232	1.2582E-07	1,066.723	2,133.445	0.00E+00	1.34E-04	2.68E-04		
U-233	2.5825E-09	1,066.723	2,133.445	0.00E+00	2.75E-06	5.51E-06		
U-234	1.8450E-04	1,066.723	2,133.445	0.00E+00	1.97E-01	3.94E-01		
U-235	-2.7235E-06	1,066.723	0.000	1.11E-02	8.22E-03	1.11E-02		
U-236	1.5493E-05	1,066.723	2,133.445	0.00E+00	1.65E-02	3.31E-02		
U-238	-4.2851E-09	1,066.723	0.000	1.93E-04	1.88E-04	1.93E-04		
Y-90	1.9254E+00	1,066.723	2,133.445	0.00E+00	2.05E+03	4.11E+03		
Other Radionuclides					2.06E+03	4.13E+03		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							2.54E+01	5.09E+01
							Total	Total

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 Constituent:	U-ALX	U	
BOL Enrichment %:	89.96321383	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		1,066.723	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,133.445	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.59		1.01
Bounding:	1.18		

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: RA-3 (ARGENTINA)
 SNF ID #: 636
 Fuel Units & Descr: 207 - 19 CURVED PLATES
 Heavy Metal Mass: BOL=37.84kg ; EOL=30.14kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1987
 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"
 8.63

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	7,292.428	14,584.856	0.00E+00	4.84E-06	9.67E-06	0.0150	1.540E+15
Am-241	2.0060E-03	7,292.428	14,584.856	0.00E+00	1.46E+01	2.93E+01	0.0250	3.201E+14
Am-242m	4.2429E-07	7,292.428	14,584.856	0.00E+00	3.09E-03	6.19E-03	0.0375	2.792E+14
Am-243	1.4899E-06	7,292.428	14,584.856	0.00E+00	1.09E-02	2.17E-02	0.0575	2.991E+14
C-14	5.7135E-09	7,292.428	14,584.856	0.00E+00	4.17E-05	8.33E-05	0.0850	1.807E+14
Ci-36	1.3124E-32	7,292.428	14,584.856	0.00E+00	9.57E-29	1.91E-28	0.1250	1.223E+14
Cm-243	1.6443E-07	7,292.428	14,584.856	0.00E+00	1.20E-03	2.40E-03	0.2250	1.559E+14
Cm-244	2.9330E-05	7,292.428	14,584.856	0.00E+00	2.14E-01	4.28E-01	0.3750	6.788E+13
Co-60	5.3186E-06	7,292.428	14,584.856	0.00E+00	3.88E-02	7.76E-02	0.5750	1.107E+15
Cs-134	3.1563E-03	7,292.428	14,584.856	0.00E+00	2.30E+01	4.60E+01	0.8500	1.872E+13
Cs-135	3.4477E-06	7,292.428	14,584.856	0.00E+00	2.51E-02	5.03E-02	1.2500	1.069E+13
Cs-137	2.0313E-00	7,292.428	14,584.856	0.00E+00	1.48E+04	2.96E+04	1.7500	4.907E+11
Eu-154	2.4513E-02	7,292.428	14,584.856	0.00E+00	1.79E+02	3.58E+02	2.2500	4.305E+07
Eu-155	4.8175E-03	7,292.428	14,584.856	0.00E+00	3.51E+01	7.03E+01	2.7500	2.433E+07
Fe-55	1.2397E-04	7,292.428	14,584.856	0.00E+00	9.04E-01	1.81E+00	3.5000	1.118E+05
H-3	4.5697E-03	7,292.428	14,584.856	0.00E+00	3.33E+01	6.66E+01	5.0000	6.321E+03
I-129	7.5300E-07	7,292.428	14,584.856	0.00E+00	5.49E-03	1.10E-02	7.0000	6.979E+02
Kr-85	1.0850E-01	7,292.428	14,584.856	0.00E+00	7.91E+02	1.58E+03	11.0000	7.822E+01
Np-237	9.5561E-06	7,292.428	14,584.856	0.00E+00	6.97E-02	1.39E-01		
Pa-231	2.0359E-09	7,292.428	14,584.856	0.00E+00	1.48E-05	2.97E-05		
Pb-210	4.9728E-11	7,292.428	14,584.856	0.00E+00	3.63E-07	7.25E-07		
Pm-147	4.8502E-02	7,292.428	14,584.856	0.00E+00	3.54E+02	7.07E+02		
Pu-238	1.8254E-02	7,292.428	14,584.856	0.00E+00	1.33E+02	2.66E+02		
Pu-239	4.2810E-04	7,292.428	14,584.856	0.00E+00	3.12E+00	6.24E+00		
Pu-240	2.4368E-04	7,292.428	14,584.856	0.00E+00	1.78E+00	3.55E+00		
Pu-241	3.3415E-02	7,292.428	14,584.856	0.00E+00	2.44E+02	4.87E+02		
Pu-242	3.6329E-07	7,292.428	14,584.856	0.00E+00	2.65E-03	5.30E-03		
Ra-226	2.2854E-10	7,292.428	14,584.856	0.00E+00	1.67E-06	3.33E-06		
Ra-228	1.2426E-14	7,292.428	14,584.856	0.00E+00	9.06E-11	1.81E-10		
Ru-106	6.3589E-06	7,292.428	14,584.856	0.00E+00	4.64E-02	9.27E-02		
Se-79	1.2933E-05	7,292.428	14,584.856	0.00E+00	9.43E-02	1.89E-01		
Sn-126	1.1574E-05	7,292.428	14,584.856	0.00E+00	8.44E-02	1.69E-01		
Sr-90	1.9248E+00	7,292.428	14,584.856	0.00E+00	1.40E+04	2.81E+04		
Tc-99	4.2239E-04	7,292.428	14,584.856	0.00E+00	3.08E+00	6.16E+00		
Th-229	5.0953E-12	7,292.428	14,584.856	0.00E+00	3.72E-08	7.43E-08		
Th-230	4.1885E-08	7,292.428	14,584.856	0.00E+00	3.05E-04	6.11E-04		
Th-232	1.9270E-14	7,292.428	14,584.856	0.00E+00	1.41E-10	2.81E-10		
Ti-208	4.6024E-08	7,292.428	14,584.856	0.00E+00	3.36E-04	6.71E-04		
U-232	1.2582E-07	7,292.428	14,584.856	0.00E+00	9.18E-04	1.84E-03		
U-233	2.5825E-09	7,292.428	14,584.856	0.00E+00	1.88E-05	3.77E-05		
U-234	1.8450E-04	7,292.428	14,584.856	0.00E+00	1.35E+00	2.69E+00		
U-235	-2.7235E-06	7,292.428	0.000	7.36E-02	5.37E-02	7.36E-02		
U-236	1.5493E-05	7,292.428	14,584.856	0.00E+00	1.13E-01	2.26E-01		
U-238	-4.2851E-09	7,292.428	0.000	1.27E-03	1.24E-03	1.27E-03		
Y-90	1.9254E+00	7,292.428	14,584.856	0.00E+00	1.40E+04	2.81E+04		
Other Radionuclides					1.41E+04	2.82E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.74E+02	3.48E+02
Total	Total

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-ALX	U	
BOL Enrichment %:	89.97773401	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		7,292.428	
Bounding:		14,584.856	

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:	0.61	
Bounding:	1.22	

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: RECH-1 (CHILE) ¹Fuel decay start date: 1999
 SNF ID #: 708 Estimates as of: 2010
 Fuel Units & Descr: 58 - MTR TYPE Template: ATR (Light Water, Alum., 60 to 100%, U)
 Heavy Metal Mass: BOL=11.87kg ; EOL=8.00kg ²Template Burnup(MWd): 367.2
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 10 years

Estimated
 Canister usage:
 18"x10"
 2.42

Radionuclide	m Ci/MWd From Template	x _n Nominal Fuel Burnup (MWd) ²	x _b Bounding Fuel Burnup (MWd) ²	b Initial Activity (Ci)	y _n Nominal Fuel Inventories(Ci)	y _b Bounding Fuel Inventories(Ci)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8404E-10	3,669.132	7,338.264	0.00E+00	1.04E-06	2.08E-06	Avg. MeV	
Am-241	1.4935E-03	3,669.132	7,338.264	0.00E+00	5.48E+00	1.10E+01	0.0150	9.980E+14
Am-242m	4.4390E-07	3,669.132	7,338.264	0.00E+00	1.63E-03	3.26E-03	0.0250	2.100E+14
Am-243	1.4913E-06	3,669.132	7,338.264	0.00E+00	5.47E-03	1.09E-02	0.0375	1.831E+14
C-14	5.7217E-09	3,669.132	7,338.264	0.00E+00	2.10E-05	4.20E-05	0.0575	1.934E+14
Cl-36	1.3124E-32	3,669.132	7,338.264	0.00E+00	4.82E-29	9.63E-29	0.0850	1.177E+14
Cm-243	2.0967E-07	3,669.132	7,338.264	0.00E+00	7.69E-04	1.54E-03	0.1250	8.233E+13
Cm-244	4.3001E-05	3,669.132	7,338.264	0.00E+00	1.58E-01	3.16E-01	0.2250	1.011E+14
Co-60	1.9798E-05	3,669.132	7,338.264	0.00E+00	7.26E-02	1.45E-01	0.3750	4.530E+13
Cs-134	9.0795E-02	3,669.132	7,338.264	0.00E+00	3.33E+02	6.66E+02	0.5750	7.354E+14
Cs-135	3.4477E-06	3,669.132	7,338.264	0.00E+00	1.27E-02	2.53E-02	0.8500	3.587E+13
Cs-137	2.5588E+00	3,669.132	7,338.264	0.00E+00	9.39E+03	1.88E+04	1.2500	1.168E+13
Eu-154	5.4847E-02	3,669.132	7,338.264	0.00E+00	2.01E+02	4.02E+02	1.7500	4.263E+11
Eu-155	1.9469E-02	3,669.132	7,338.264	0.00E+00	7.14E+01	1.43E+02	2.2500	2.819E+10
Fe-55	1.7797E-03	3,669.132	7,338.264	0.00E+00	6.53E+00	1.31E+01	2.7500	3.933E+08
H-3	8.0065E-03	3,669.132	7,338.264	0.00E+00	2.94E+01	5.88E+01	3.5000	4.684E+07
I-129	7.5300E-07	3,669.132	7,338.264	0.00E+00	2.76E-03	5.53E-03	5.0000	3.891E+03
Kr-85	2.0705E-01	3,669.132	7,338.264	0.00E+00	7.60E+02	1.52E+03	7.0000	4.324E+02
Np-237	9.5507E-06	3,669.132	7,338.264	0.00E+00	3.50E-02	7.01E-02	11.0000	4.864E+01
Pa-231	1.2740E-09	3,669.132	7,338.264	0.00E+00	4.67E-06	9.35E-06		
Pb-210	1.1838E-11	3,669.132	7,338.264	0.00E+00	4.34E-08	8.69E-08		
Pm-147	6.7974E-01	3,669.132	7,338.264	0.00E+00	2.49E+03	4.99E+03		
Pu-238	1.9755E-02	3,669.132	7,338.264	0.00E+00	7.25E+01	1.45E+02		
Pu-239	4.2838E-04	3,669.132	7,338.264	0.00E+00	1.57E+00	3.14E+00		
Pu-240	2.4390E-04	3,669.132	7,338.264	0.00E+00	8.95E-01	1.79E+00		
Pu-241	5.4058E-02	3,669.132	7,338.264	0.00E+00	1.98E+02	3.97E+02		
Pu-242	3.6329E-07	3,669.132	7,338.264	0.00E+00	1.33E-03	2.67E-03		
Ra-226	8.3742E-11	3,669.132	7,338.264	0.00E+00	3.07E-07	6.15E-07		
Ra-228	5.7734E-15	3,669.132	7,338.264	0.00E+00	2.12E-11	4.24E-11		
Ru-106	6.1356E-03	3,669.132	7,338.264	0.00E+00	2.25E+01	4.50E+01		
Se-79	1.2936E-05	3,669.132	7,338.264	0.00E+00	4.75E-02	9.49E-02		
Sn-126	1.1574E-05	3,669.132	7,338.264	0.00E+00	4.25E-02	8.49E-02		
Sr-90	2.4417E+00	3,669.132	7,338.264	0.00E+00	8.96E+03	1.79E+04		
Tc-99	4.2239E-04	3,669.132	7,338.264	0.00E+00	1.55E+00	3.10E+00		
Th-229	2.8568E-12	3,669.132	7,338.264	0.00E+00	1.05E-08	2.10E-08		
Th-230	2.5310E-08	3,669.132	7,338.264	0.00E+00	9.29E-05	1.86E-04		
Th-232	1.1631E-14	3,669.132	7,338.264	0.00E+00	4.27E-11	8.54E-11		
Tl-208	4.6705E-08	3,669.132	7,338.264	0.00E+00	1.71E-04	3.43E-04		
U-232	1.3151E-07	3,669.132	7,338.264	0.00E+00	4.83E-04	9.65E-04		
U-233	2.1650E-09	3,669.132	7,338.264	0.00E+00	7.94E-06	1.59E-05		
U-234	1.8399E-04	3,669.132	7,338.264	0.00E+00	6.75E-01	1.35E+00		
U-235	-2.7235E-06	3,669.132	0.000	2.05E-02	1.05E-02	2.05E-02		
U-236	1.5493E-05	3,669.132	7,338.264	0.00E+00	5.68E-02	1.14E-01		
U-238	-4.2851E-09	3,669.132	0.000	7.98E-04	7.83E-04	7.98E-04		
Y-90	2.4423E+00	3,669.132	7,338.264	0.00E+00	8.96E+03	1.79E+04		
Other Radionuclides					9.12E+03	1.82E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.16E+02	2.32E+02
Total	Total

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-ALX	U	
BOL Enrichment %:	79.9939132	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		3,669.132	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		7,338.264	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.98		1.03
Bounding:	1.96		

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: RERTR MINIPLATES
 SNF ID #: 1090
 Fuel Units & Descr: 50 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL= ; EOL=35kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1980
 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:
 HIC
 1.00

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	1.1465E-09	77.785	155.569	0.00E+00	8.92E-08	1.78E-07	0.0150	1.456E+13
Am-241	2.3056E-03	77.785	155.569	0.00E+00	1.79E-01	3.59E-01	0.0250	3.024E+12
Am-242m	4.1476E-07	77.785	155.569	0.00E+00	3.23E-05	6.45E-05	0.0375	2.634E+12
Am-243	1.4894E-06	77.785	155.569	0.00E+00	1.16E-04	2.32E-04	0.0575	2.828E+12
C-14	5.7108E-09	77.785	155.569	0.00E+00	4.44E-07	8.88E-07	0.0850	1.706E+12
Cl-36	1.3124E-32	77.785	155.569	0.00E+00	1.02E-30	2.04E-30	0.1250	1.143E+12
Cm-243	1.4562E-07	77.785	155.569	0.00E+00	1.13E-05	2.27E-05	0.2250	1.473E+12
Cm-244	2.4221E-05	77.785	155.569	0.00E+00	1.88E-03	3.77E-03	0.3750	6.404E+11
Co-60	2.7560E-06	77.785	155.569	0.00E+00	2.14E-04	4.29E-04	0.5750	1.050E+13
Cs-134	5.8851E-04	77.785	155.569	0.00E+00	4.58E-02	9.16E-02	0.8500	1.513E+11
Cs-135	3.4477E-06	77.785	155.569	0.00E+00	2.68E-04	5.36E-04	1.2500	8.415E+10
Cs-137	1.8099E+00	77.785	155.569	0.00E+00	1.41E+02	2.82E+02	1.7500	4.158E+09
Eu-154	1.6386E-02	77.785	155.569	0.00E+00	1.27E+00	2.55E+00	2.2500	2.964E+05
Eu-155	2.3957E-03	77.785	155.569	0.00E+00	1.86E-01	3.73E-01	2.7500	2.426E+05
Fe-55	3.2707E-05	77.785	155.569	0.00E+00	2.54E-03	5.09E-03	3.5000	1.831E+02
H-3	3.4504E-03	77.785	155.569	0.00E+00	2.68E-01	5.37E-01	5.0000	6.158E+01
I-129	7.5300E-07	77.785	155.569	0.00E+00	5.86E-05	1.17E-04	7.0000	6.778E+00
Kr-85	7.8540E-02	77.785	155.569	0.00E+00	6.11E+00	1.22E+01	11.0000	7.581E-01
Np-237	9.5615E-06	77.785	155.569	0.00E+00	7.44E-04	1.49E-03		
Pa-231	2.7968E-09	77.785	155.569	0.00E+00	2.18E-07	4.35E-07		
Pb-210	1.2612E-10	77.785	155.569	0.00E+00	9.81E-09	1.96E-08		
Pm-147	1.2952E-02	77.785	155.569	0.00E+00	1.01E+00	2.01E+00		
Pu-238	1.7549E-02	77.785	155.569	0.00E+00	1.37E+00	2.73E+00		
Pu-239	4.2810E-04	77.785	155.569	0.00E+00	3.33E-02	6.66E-02		
Pu-240	2.4357E-04	77.785	155.569	0.00E+00	1.89E-02	3.79E-02		
Pu-241	2.6277E-02	77.785	155.569	0.00E+00	2.04E+00	4.09E+00		
Pu-242	3.6329E-07	77.785	155.569	0.00E+00	2.83E-05	5.65E-05		
Ra-226	4.4444E-10	77.785	155.569	0.00E+00	3.46E-08	6.91E-08		
Ra-228	1.9714E-14	77.785	155.569	0.00E+00	1.53E-12	3.07E-12		
Ru-106	2.0477E-07	77.785	155.569	0.00E+00	1.59E-05	3.19E-05		
Se-79	1.2933E-05	77.785	155.569	0.00E+00	1.01E-03	2.01E-03		
Sn-126	1.1574E-05	77.785	155.569	0.00E+00	9.00E-04	1.80E-03		
Sr-90	1.7092E+00	77.785	155.569	0.00E+00	1.33E+02	2.66E+02		
Tc-99	4.2239E-04	77.785	155.569	0.00E+00	3.29E-02	6.57E-02		
Th-229	7.7260E-12	77.785	155.569	0.00E+00	6.01E-10	1.20E-09		
Th-230	5.8497E-08	77.785	155.569	0.00E+00	4.55E-06	9.10E-06		
Th-232	2.6906E-14	77.785	155.569	0.00E+00	2.09E-12	4.19E-12		
Ti-208	4.4336E-08	77.785	155.569	0.00E+00	3.45E-06	6.90E-06		
U-232	1.2037E-07	77.785	155.569	0.00E+00	9.36E-06	1.87E-05		
U-233	3.0011E-09	77.785	155.569	0.00E+00	2.33E-07	4.67E-07		
U-234	1.8497E-04	77.785	155.569	0.00E+00	1.44E-02	2.88E-02		
U-235	-2.7235E-06	77.785	0.000	8.60E-04	6.48E-04	8.60E-04		
U-236	1.5493E-05	77.785	155.569	0.00E+00	1.21E-03	2.41E-03		
U-238	-4.2851E-09	77.785	0.000	8.70E-06	8.37E-06	8.70E-06		
Y-90	1.7094E+00	77.785	155.569	0.00E+00	1.33E+02	2.66E+02		
Other Radionuclides					1.34E+02	2.68E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.65E+00	3.29E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: LIGHT WATER	Used: LIGHT WATER	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U METAL	U	
BOL Enrichment %:		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD: 77.785	Estimated: 77.785	Nominal burnup taken from SFD and converted to MWd using BOL=432kg Bounding burnup assumed to be twice nominal burnup.
Bounding:		155.569	

Checks		
Nominal:	Burnup Multiplier: 0.57	Estimated Burnup/ Given Burnup: 0.99
Bounding:	1.14	

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: RESIDUE FAILED PBF RODS
 SNF ID #: 381
 Fuel Units & Descr: 1 - DEBRIS
 Heavy Metal Mass: BOL= ; EOL=1.11kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1985
 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: 25 years

Estimated
 Canister usage:
 HIC
 1.00

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	1.3562E-08	1,047.614	1,047.614	0.00E+00	1.42E-05	1.42E-05	0.0150	9.968E+13
Am-241	1.0168E-04	1,047.614	1,047.614	0.00E+00	1.07E-01	1.07E-01	0.0250	2.071E+13
Am-242m	8.9052E-09	1,047.614	1,047.614	0.00E+00	9.33E-06	9.33E-06	0.0375	1.788E+13
Am-243	9.8602E-10	1,047.614	1,047.614	0.00E+00	1.03E-06	1.03E-06	0.0575	1.929E+13
C-14	2.3045E-04	1,047.614	1,047.614	0.00E+00	2.41E-01	2.41E-01	0.0850	1.166E+13
Cl-36	1.2261E-06	1,047.614	1,047.614	0.00E+00	1.28E-03	1.28E-03	0.1250	7.576E+12
Cm-243	3.1730E-10	1,047.614	1,047.614	0.00E+00	3.32E-07	3.32E-07	0.2250	1.001E+13
Cm-244	3.3977E-09	1,047.614	1,047.614	0.00E+00	3.56E-06	3.56E-06	0.3750	4.368E+12
Co-60	2.6373E-01	1,047.614	1,047.614	0.00E+00	2.76E+02	2.76E+02	0.5750	7.133E+13
Cs-134	8.7072E-05	1,047.614	1,047.614	0.00E+00	9.12E-02	9.12E-02	0.8500	7.438E+11
Cs-135	3.0316E-05	1,047.614	1,047.614	0.00E+00	3.18E-02	3.18E-02	1.2500	2.072E+13
Cs-137	1.8286E+00	1,047.614	1,047.614	0.00E+00	1.92E+03	1.92E+03	1.7500	1.917E+10
Eu-154	1.4982E-03	1,047.614	1,047.614	0.00E+00	1.57E+00	1.57E+00	2.2500	1.104E+08
Eu-155	2.8236E-03	1,047.614	1,047.614	0.00E+00	2.96E+00	2.96E+00	2.7500	1.215E+06
Fe-55	1.7687E-02	1,047.614	1,047.614	0.00E+00	1.85E+01	1.85E+01	3.5000	2.566E+02
H-3	4.4043E-03	1,047.614	1,047.614	0.00E+00	4.61E+00	4.61E+00	5.0000	2.599E+01
I-129	7.3195E-07	1,047.614	1,047.614	0.00E+00	7.67E-04	7.67E-04	7.0000	2.869E-00
Kr-85	7.8769E-02	1,047.614	1,047.614	0.00E+00	8.25E+01	8.25E+01	11.0000	3.220E-01
Np-237	1.1484E-06	1,047.614	1,047.614	0.00E+00	1.20E-03	1.20E-03		
Pa-231	3.2396E-08	1,047.614	1,047.614	0.00E+00	3.39E-05	3.39E-05		
Pb-210	2.4409E-13	1,047.614	1,047.614	0.00E+00	2.56E-10	2.56E-10		
Pm-147	1.6331E-02	1,047.614	1,047.614	0.00E+00	1.71E+01	1.71E+01		
Pu-238	3.1947E-04	1,047.614	1,047.614	0.00E+00	3.35E-01	3.35E-01		
Pu-239	6.6789E-04	1,047.614	1,047.614	0.00E+00	7.00E-01	7.00E-01		
Pu-240	8.6922E-05	1,047.614	1,047.614	0.00E+00	9.11E-02	9.11E-02		
Pu-241	1.1567E-03	1,047.614	1,047.614	0.00E+00	1.21E+00	1.21E+00		
Pu-242	1.9717E-09	1,047.614	1,047.614	0.00E+00	2.07E-06	2.07E-06		
Ra-226	8.6190E-13	1,047.614	1,047.614	0.00E+00	9.03E-10	9.03E-10		
Ra-228	8.1498E-12	1,047.614	1,047.614	0.00E+00	8.54E-09	8.54E-09		
Ru-106	1.7770E-07	1,047.614	1,047.614	0.00E+00	1.86E-04	1.86E-04		
Se-79	1.3225E-05	1,047.614	1,047.614	0.00E+00	1.39E-02	1.39E-02		
Sn-126	1.1493E-05	1,047.614	1,047.614	0.00E+00	1.20E-02	1.20E-02		
Sr-90	1.7321E+00	1,047.614	1,047.614	0.00E+00	1.81E+03	1.81E+03		
Tc-99	4.6656E-04	1,047.614	1,047.614	0.00E+00	4.89E-01	4.89E-01		
Th-229	1.0110E-11	1,047.614	1,047.614	0.00E+00	1.06E-08	1.06E-08		
Th-230	1.1466E-10	1,047.614	1,047.614	0.00E+00	1.20E-07	1.20E-07		
Th-232	8.3245E-12	1,047.614	1,047.614	0.00E+00	8.72E-09	8.72E-09		
Tl-208	2.3860E-08	1,047.614	1,047.614	0.00E+00	2.50E-05	2.50E-05		
U-232	6.4576E-08	1,047.614	1,047.614	0.00E+00	6.77E-05	6.77E-05		
U-233	3.1082E-09	1,047.614	1,047.614	0.00E+00	3.26E-06	3.26E-06		
U-234	3.7587E-07	1,047.614	1,047.614	0.00E+00	3.94E-04	3.94E-04		
U-235	-2.7761E-06	1,047.614	0.000	4.48E-03	1.57E-03	4.48E-03		
U-236	1.6190E-05	1,047.614	1,047.614	0.00E+00	1.70E-02	1.70E-02		
U-238	-2.8547E-09	1,047.614	0.000	4.84E-05	4.54E-05	4.84E-05		
Y-90	1.7321E+00	1,047.614	1,047.614	0.00E+00	1.81E+03	1.81E+03		
Other Radionuclides					2.13E+03	2.13E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.60E+01	2.60E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: LIGHT WATER	Used: LIGHT WATER	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	SST	SST	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Nominal:		1,047.614	
Bounding:		1,047.614	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	10.12		
Bounding:	10.12		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: RHF (FRANCE) 1 Fuel decay start date: 1989
 SNF ID #: 179 Estimates as of: 2010
 Fuel Units & Descr: 4 - 2 CONCENTRIC TUBES Template: ATR (Light Water, Alum., 60 to 100% U)
 Heavy Metal Mass: BOL=36.90kg ; EOL=25.51kg 2 Template Burnup(MWd): 367.2
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated
 Canister usage:
 18" x 10"
 0.67

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	6.6313E-10	10,786.551	21,573.102	0.00E+00	7.15E-06	1.43E-05	0.0150	2.277E+15
Am-241	2.0060E-03	10,786.551	21,573.102	0.00E+00	2.16E+01	4.33E+01	0.0250	4.735E+14
Am-242m	4.2429E-07	10,786.551	21,573.102	0.00E+00	4.58E-03	9.15E-03	0.0375	4.130E+14
Am-243	1.4899E-06	10,786.551	21,573.102	0.00E+00	1.61E-02	3.21E-02	0.0575	4.424E+14
C-14	5.7135E-09	10,786.551	21,573.102	0.00E+00	6.16E-05	1.23E-04	0.0850	2.673E+14
Cl-36	1.3124E-32	10,786.551	21,573.102	0.00E+00	1.42E-28	2.83E-28	0.1250	1.809E+14
Cm-243	1.6443E-07	10,786.551	21,573.102	0.00E+00	1.77E-03	3.55E-03	0.2250	2.307E+14
Cm-244	2.9330E-05	10,786.551	21,573.102	0.00E+00	3.16E-01	6.33E-01	0.3750	1.004E+14
Co-60	5.3186E-06	10,786.551	21,573.102	0.00E+00	5.74E-02	1.15E-01	0.5750	1.638E+15
Cs-134	3.1563E-03	10,786.551	21,573.102	0.00E+00	3.40E+01	6.81E+01	0.8500	2.769E+13
Cs-135	3.4477E-06	10,786.551	21,573.102	0.00E+00	3.72E-02	7.44E-02	1.2500	1.581E+13
Cs-137	2.0313E+00	10,786.551	21,573.102	0.00E+00	2.19E+04	4.38E+04	1.7500	7.258E+11
Eu-154	2.4513E-02	10,786.551	21,573.102	0.00E+00	2.64E+02	5.29E+02	2.2500	6.368E+07
Eu-155	4.8175E-03	10,786.551	21,573.102	0.00E+00	5.20E+01	1.04E+02	2.7500	3.599E+07
Fe-55	1.2397E-04	10,786.551	21,573.102	0.00E+00	1.34E+00	2.67E+00	3.5000	1.654E+05
H-3	4.5697E-03	10,786.551	21,573.102	0.00E+00	4.93E+01	9.86E+01	5.0000	9.346E+03
I-129	7.5300E-07	10,786.551	21,573.102	0.00E+00	8.12E-03	1.62E-02	7.0000	1.032E+03
Kr-85	1.0850E-01	10,786.551	21,573.102	0.00E+00	1.17E+03	2.34E+03	11.0000	1.157E+02
Np-237	9.5561E-06	10,786.551	21,573.102	0.00E+00	1.03E-01	2.06E-01		
Pa-231	2.0359E-09	10,786.551	21,573.102	0.00E+00	2.20E-05	4.39E-05		
Pb-210	4.9728E-11	10,786.551	21,573.102	0.00E+00	5.36E-07	1.07E-06		
Pm-147	4.8502E-02	10,786.551	21,573.102	0.00E+00	5.23E+02	1.05E+03		
Pu-238	1.8254E-02	10,786.551	21,573.102	0.00E+00	1.97E+02	3.94E+02		
Pu-239	4.2810E-04	10,786.551	21,573.102	0.00E+00	4.62E+00	9.24E+00		
Pu-240	2.4368E-04	10,786.551	21,573.102	0.00E+00	2.63E+00	5.26E+00		
Pu-241	3.3415E-02	10,786.551	21,573.102	0.00E+00	3.60E+02	7.21E+02		
Pu-242	3.6329E-07	10,786.551	21,573.102	0.00E+00	3.92E-03	7.84E-03		
Ra-226	2.2854E-10	10,786.551	21,573.102	0.00E+00	2.47E-06	4.93E-06		
Ra-228	1.2426E-14	10,786.551	21,573.102	0.00E+00	1.34E-10	2.68E-10		
Ru-106	6.3589E-06	10,786.551	21,573.102	0.00E+00	6.86E-02	1.37E-01		
Se-79	1.2933E-05	10,786.551	21,573.102	0.00E+00	1.40E-01	2.79E-01		
Sn-126	1.1574E-05	10,786.551	21,573.102	0.00E+00	1.25E-01	2.50E-01		
Sr-90	1.9248E+00	10,786.551	21,573.102	0.00E+00	2.08E+04	4.15E+04		
Tc-99	4.2239E-04	10,786.551	21,573.102	0.00E+00	4.56E+00	9.11E+00		
Th-229	5.0953E-12	10,786.551	21,573.102	0.00E+00	5.50E-08	1.10E-07		
Th-230	4.1885E-08	10,786.551	21,573.102	0.00E+00	4.52E-04	9.04E-04		
Th-232	1.9270E-14	10,786.551	21,573.102	0.00E+00	2.08E-10	4.16E-10		
Tl-208	4.6024E-08	10,786.551	21,573.102	0.00E+00	4.96E-04	9.93E-04		
U-232	1.2582E-07	10,786.551	21,573.102	0.00E+00	1.36E-03	2.71E-03		
U-233	2.5825E-09	10,786.551	21,573.102	0.00E+00	2.79E-05	5.57E-05		
U-234	1.8450E-04	10,786.551	21,573.102	0.00E+00	1.99E+00	3.98E+00		
U-235	-2.7235E-06	10,786.551	0.000	7.41E-02	4.48E-02	7.41E-02		
U-236	1.5493E-05	10,786.551	21,573.102	0.00E+00	1.67E-01	3.34E-01		
U-238	-4.2851E-09	10,786.551	0.000	8.72E-04	8.26E-04	8.72E-04		
Y-90	1.9254E+00	10,786.551	21,573.102	0.00E+00	2.08E+04	4.15E+04		
Other Radionuclides					2.09E+04	4.17E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.57E+02	5.14E+02
Total	Total

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-ALX	U	
BOL Enrichment %:	92.97018459	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		10,786.551	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		21,573.102	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.93		1.03
Bounding:	1.86		

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: RINSC	¹ Fuel decay start date: 2035	Estimated Canister usage: 18"x10" 1.83
SNF ID #: 181	Estimates as of: 2010	
Fuel Units & Descr: 44 - 18 FLAT PLATES	Template: ATR (Light Water, Alum., 60 to 100%, U)	
Heavy Metal Mass: BOL=61.12kg ; EOL=60.46kg	² Template Burnup(MWd): 367.2	
ROD Storage Site: SRS	Template BOL Heavy Metal Mass (MT): 0.00116689	
	Template Decay Time: 5 years	

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	620.866	1,241.732	0.00E+00	9.03E-08	1.81E-07	0.0150	2.396E+14
Am-241	1.1190E-03	620.866	1,241.732	0.00E+00	6.95E-01	1.39E+00	0.0250	5.161E+13
Am-242m	4.5425E-07	620.866	1,241.732	0.00E+00	2.82E-04	5.64E-04	0.0375	4.763E+13
Am-243	1.4921E-06	620.866	1,241.732	0.00E+00	9.26E-04	1.85E-03	0.0575	4.683E+13
C-14	5.7244E-09	620.866	1,241.732	0.00E+00	3.55E-06	7.11E-06	0.0850	2.985E+13
Cl-36	1.3124E-32	620.866	1,241.732	0.00E+00	8.15E-30	1.63E-29	0.1250	2.585E+13
Cm-243	2.3676E-07	620.866	1,241.732	0.00E+00	1.47E-04	2.94E-04	0.2250	2.530E+13
Cm-244	5.2042E-05	620.866	1,241.732	0.00E+00	3.23E-02	6.46E-02	0.3750	1.225E+14
Co-60	3.8208E-05	620.866	1,241.732	0.00E+00	2.37E-02	4.74E-02	0.5750	1.682E+14
Cs-134	4.8693E-01	620.866	1,241.732	0.00E+00	3.02E+02	6.05E+02	0.8500	2.356E+13
Cs-135	3.4477E-06	620.866	1,241.732	0.00E+00	2.14E-03	4.28E-03	1.2500	4.383E+12
Cs-137	2.8731E+00	620.866	1,241.732	0.00E+00	1.78E+03	3.57E+03	1.7500	1.838E+11
Eu-154	8.2053E-02	620.866	1,241.732	0.00E+00	5.09E+01	1.02E+02	2.2500	3.856E+11
Eu-155	3.9134E-02	620.866	1,241.732	0.00E+00	2.43E+01	4.86E+01	2.7500	2.218E+09
Fe-55	6.7429E-03	620.866	1,241.732	0.00E+00	4.19E+00	8.37E+00	3.5000	2.461E+08
H-3	1.0599E-02	620.866	1,241.732	0.00E+00	6.58E+00	1.32E+01	5.0000	7.734E+02
I-129	7.5300E-07	620.866	1,241.732	0.00E+00	4.68E-04	9.35E-04	7.0000	8.637E+01
Kr-85	2.8595E-01	620.866	1,241.732	0.00E+00	1.78E+02	3.55E+02	11.0000	9.745E+00
Np-237	9.5479E-06	620.866	1,241.732	0.00E+00	5.93E-03	1.19E-02		
Pa-231	8.9297E-10	620.866	1,241.732	0.00E+00	5.54E-07	1.11E-06		
Pb-210	3.7609E-12	620.866	1,241.732	0.00E+00	2.34E-09	4.67E-09		
Pm-147	2.5452E+00	620.866	1,241.732	0.00E+00	1.58E+03	3.16E+03		
Pu-238	2.0550E-02	620.866	1,241.732	0.00E+00	1.28E+01	2.55E+01		
Pu-239	4.2838E-04	620.866	1,241.732	0.00E+00	2.66E-01	5.32E-01		
Pu-240	2.4401E-04	620.866	1,241.732	0.00E+00	1.51E-01	3.03E-01		
Pu-241	6.8764E-02	620.866	1,241.732	0.00E+00	4.27E+01	8.54E+01		
Pu-242	3.6329E-07	620.866	1,241.732	0.00E+00	2.26E-04	4.51E-04		
Ra-226	3.8045E-11	620.866	1,241.732	0.00E+00	2.36E-08	4.72E-08		
Ra-228	2.9902E-15	620.866	1,241.732	0.00E+00	1.86E-12	3.71E-12		
Ru-106	1.9055E-01	620.866	1,241.732	0.00E+00	1.18E+02	2.37E+02		
Se-79	1.2936E-05	620.866	1,241.732	0.00E+00	8.03E-03	1.61E-02		
Sn-126	1.1574E-05	620.866	1,241.732	0.00E+00	7.19E-03	1.44E-02		
Sr-90	2.7505E+00	620.866	1,241.732	0.00E+00	1.71E+03	3.42E+03		
Tc-99	4.2239E-04	620.866	1,241.732	0.00E+00	2.62E-01	5.24E-01		
Th-229	1.8848E-12	620.866	1,241.732	0.00E+00	1.17E-09	2.34E-09		
Th-230	1.7042E-08	620.866	1,241.732	0.00E+00	1.06E-05	2.12E-05		
Th-232	7.8132E-15	620.866	1,241.732	0.00E+00	4.85E-12	9.70E-12		
Tl-208	4.4063E-08	620.866	1,241.732	0.00E+00	2.74E-05	5.47E-05		
U-232	1.3151E-07	620.866	1,241.732	0.00E+00	8.16E-05	1.63E-04		
U-233	1.9564E-09	620.866	1,241.732	0.00E+00	1.21E-06	2.43E-06		
U-234	1.8371E-04	620.866	1,241.732	0.00E+00	1.14E-01	2.28E-01		
U-235	-2.7235E-06	620.866	0.000	2.61E-02	2.44E-02	2.61E-02		
U-236	1.5493E-05	620.866	1,241.732	0.00E+00	9.62E-03	1.92E-02		
U-238	-4.2851E-09	620.866	0.000	1.65E-02	1.65E-02	1.65E-02		
Y-90	2.7505E+00	620.866	1,241.732	0.00E+00	1.71E+03	3.42E+03		
Other Radionuclides					3.19E+03	6.39E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.15E+01	6.30E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: LIGHT WATER	Used: 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 (6061)	ALUM	
BOL HM Constituents:	U3Si2	U	
BOL Enrichment %:	19.7728395	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Nominal:		620.866	
Bounding:		1,241.732	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.03		
Bounding:	0.06		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: RINSC	¹ Fuel decay start date: 1992	Estimated Canister usage: 18"x10" 1.94
SNF ID #: 180	Estimates as of: 2010	
Fuel Units & Descr: 70 - 18 FLAT PLATES	Template: ATR (Light Water, Alum., 60 to 100%, U)	
Heavy Metal Mass: BOL=9.37kg ; EOL=8.50kg	² Template Burnup(MWd): 367.2	
ROD Storage Site: SRS	Template BOL Heavy Metal Mass (MT): 0.00116689	
	Template Decay Time: 15 years	

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	822.013	1,644.026	0.00E+00	3.77E-07	7.54E-07	Avg. MeV	
Am-241	1.7832E-03	822.013	1,644.026	0.00E+00	1.47E+00	2.93E+00	0.0150	1.961E+14
Am-242m	4.3410E-07	822.013	1,644.026	0.00E+00	3.57E-04	7.14E-04	0.0250	4.090E+13
Am-243	1.4907E-06	822.013	1,644.026	0.00E+00	1.23E-03	2.45E-03	0.0375	3.572E+13
C-14	5.7162E-09	822.013	1,644.026	0.00E+00	4.70E-06	9.40E-06	0.0575	3.808E+13
Cl-36	1.3124E-32	822.013	1,644.026	0.00E+00	1.08E-29	2.16E-29	0.0850	2.307E+13
Cm-243	1.8568E-07	822.013	1,644.026	0.00E+00	1.53E-04	3.05E-04	0.1250	1.581E+13
Cm-244	3.5512E-05	822.013	1,644.026	0.00E+00	2.92E-02	5.84E-02	0.2250	1.987E+13
Co-60	1.0261E-05	822.013	1,644.026	0.00E+00	8.44E-03	1.69E-02	0.3750	8.705E+12
Cs-134	1.6931E-02	822.013	1,644.026	0.00E+00	1.39E+01	2.78E+01	0.5750	1.413E+14
Cs-135	3.4477E-06	822.013	1,644.026	0.00E+00	2.83E-03	5.67E-03	0.8500	3.357E+12
Cs-137	2.2800E+00	822.013	1,644.026	0.00E+00	1.87E+03	3.75E+03	1.2500	1.696E+12
Eu-154	3.6656E-02	822.013	1,644.026	0.00E+00	3.01E+01	6.03E+01	1.7500	7.106E+10
Eu-155	9.6841E-03	822.013	1,644.026	0.00E+00	7.96E+00	1.59E+01	2.2500	8.889E+07
Fe-55	4.6977E-04	822.013	1,644.026	0.00E+00	3.86E-01	7.72E-01	2.7500	5.342E+06
H-3	6.0485E-03	822.013	1,644.026	0.00E+00	4.97E+00	9.94E+00	3.5000	3.396E+05
I-129	7.5300E-07	822.013	1,644.026	0.00E+00	6.19E-04	1.24E-03	5.0000	7.858E+02
Kr-85	1.4989E-01	822.013	1,644.026	0.00E+00	1.23E+02	2.46E+02	7.0000	8.703E+01
Np-237	9.5534E-06	822.013	1,644.026	0.00E+00	7.85E-03	1.57E-02	11.0000	9.772E+00
Pa-231	1.6550E-09	822.013	1,644.026	0.00E+00	1.36E-06	2.72E-06		
Pb-210	2.6631E-11	822.013	1,644.026	0.00E+00	2.19E-08	4.38E-08		
Pm-147	1.8156E-01	822.013	1,644.026	0.00E+00	1.49E+02	2.98E+02		
Pu-238	1.8990E-02	822.013	1,644.026	0.00E+00	1.56E+01	3.12E+01		
Pu-239	4.2838E-04	822.013	1,644.026	0.00E+00	3.52E-01	7.04E-01		
Pu-240	2.4379E-04	822.013	1,644.026	0.00E+00	2.00E-01	4.01E-01		
Pu-241	4.2511E-02	822.013	1,644.026	0.00E+00	3.49E+01	6.99E+01		
Pu-242	3.6329E-07	822.013	1,644.026	0.00E+00	2.99E-04	5.97E-04		
Ra-226	1.4725E-10	822.013	1,644.026	0.00E+00	1.21E-07	2.42E-07		
Ra-228	8.9760E-15	822.013	1,644.026	0.00E+00	7.38E-12	1.48E-11		
Ru-106	1.9752E-04	822.013	1,644.026	0.00E+00	1.62E-01	3.25E-01		
Se-79	1.2933E-05	822.013	1,644.026	0.00E+00	1.06E-02	2.13E-02		
Sn-126	1.1574E-05	822.013	1,644.026	0.00E+00	9.51E-03	1.90E-02		
Sr-90	2.1680E+00	822.013	1,644.026	0.00E+00	1.78E+03	3.56E+03		
Tc-99	4.2239E-04	822.013	1,644.026	0.00E+00	3.47E-01	6.94E-01		
Th-229	3.9270E-12	822.013	1,644.026	0.00E+00	3.23E-09	6.46E-09		
Th-230	3.3578E-08	822.013	1,644.026	0.00E+00	2.76E-05	5.52E-05		
Th-232	1.5452E-14	822.013	1,644.026	0.00E+00	1.27E-11	2.54E-11		
Tl-208	4.6705E-08	822.013	1,644.026	0.00E+00	3.84E-05	7.68E-05		
U-232	1.3045E-07	822.013	1,644.026	0.00E+00	1.07E-04	2.14E-04		
U-233	2.3739E-09	822.013	1,644.026	0.00E+00	1.95E-06	3.90E-06		
U-234	1.8423E-04	822.013	1,644.026	0.00E+00	1.51E-01	3.03E-01		
U-235	-2.7235E-06	822.013	0.000	1.89E-02	1.66E-02	1.89E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.5493E-05	822.013	1,644.026	0.00E+00	1.27E-02	2.55E-02	2.22E+01	4.45E+01
U-238	-4.2851E-09	822.013	0.000	2.16E-04	2.13E-04	2.16E-04	Total	Total
Y-90	2.1686E+00	822.013	1,644.026	0.00E+00	1.78E+03	3.57E+03		
Other Radionuclides					1.79E+03	3.58E+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	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	93.13598185	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		822.013	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	37.464	1,644.026	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.28		1.01
Bounding:	0.56	43.88	

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: ROBERT E. GINNA
 SNF ID #: 182
 Fuel Units & Descr: 40 - 14 X 14 ROD ARRAY
 Heavy Metal Mass: BOL=15287.20kg ; EOL=15126.93kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1972
 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:
 PWR
 1.00

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	8.7758E-10	154,660.602	304,822.182	0.00E+00	1.36E-04	2.68E-04	0.0150	1.640E+16
Am-241	1.4352E-01	154,660.602	304,822.182	0.00E+00	2.22E+04	4.37E+04	0.0250	3.307E+15
Am-242m	2.8698E-04	154,660.602	304,822.182	0.00E+00	4.44E+01	8.75E+01	0.0375	3.154E+15
Am-243	6.2565E-04	154,660.602	304,822.182	0.00E+00	9.68E+01	1.91E+02	0.0575	3.645E+15
C-14	4.7901E-05	154,660.602	304,822.182	0.00E+00	7.41E+00	1.46E+01	0.0850	1.835E+15
Cf-252	8.0297E-07	154,660.602	304,822.182	0.00E+00	1.24E-01	2.45E-01	0.1250	1.273E+15
Cm-243	2.5081E-04	154,660.602	304,822.182	0.00E+00	3.88E+01	7.65E+01	0.2250	1.574E+15
Cm-244	4.9015E-02	154,660.602	304,822.182	0.00E+00	7.58E+03	1.49E+04	0.3750	6.767E+14
Co-60	2.5581E-03	154,660.602	304,822.182	0.00E+00	3.96E+02	7.80E+02	0.5750	1.574E+16
Cs-134	4.0536E-05	154,660.602	304,822.182	0.00E+00	6.27E+00	1.24E+01	0.8500	2.177E+14
Cs-135	1.4433E-05	154,660.602	304,822.182	0.00E+00	2.23E+00	4.40E+00	1.2500	2.139E+14
Cs-137	1.3979E-05	154,660.602	304,822.182	0.00E+00	2.16E+05	4.26E+05	1.7500	6.406E+12
Eu-154	2.0203E-02	154,660.602	304,822.182	0.00E+00	3.12E+03	6.16E+03	2.2500	1.031E+09
Eu-155	1.7684E-03	154,660.602	304,822.182	0.00E+00	2.74E+02	5.39E+02	2.7500	2.113E+09
Fe-55	4.3136E-05	154,660.602	304,822.182	0.00E+00	6.67E+00	1.31E+01	3.5000	2.176E+08
H-3	2.0769E-02	154,660.602	304,822.182	0.00E+00	3.21E+03	6.33E+03	5.0000	9.303E+07
I-129	9.8288E-07	154,660.602	304,822.182	0.00E+00	1.52E-01	3.00E-01	7.0000	1.072E+07
Kr-85	2.8214E-02	154,660.602	304,822.182	0.00E+00	4.36E+03	8.60E+03	11.0000	1.231E+06
Np-237	1.1218E-05	154,660.602	304,822.182	0.00E+00	1.73E+00	3.42E+00		
Pa-231	1.3036E-09	154,660.602	304,822.182	0.00E+00	2.02E-04	3.97E-04		
Pb-210	8.5078E-11	154,660.602	304,822.182	0.00E+00	1.32E-05	2.59E-05		
Pm-147	3.6531E-04	154,660.602	304,822.182	0.00E+00	5.65E+01	1.11E+02		
Pu-238	7.4564E-02	154,660.602	304,822.182	0.00E+00	1.15E+04	2.27E+04		
Pu-239	1.1623E-02	154,660.602	304,822.182	0.00E+00	1.80E+03	3.54E+03		
Pu-240	1.5132E-02	154,660.602	304,822.182	0.00E+00	2.34E+03	4.61E+03		
Pu-241	9.0036E-01	154,660.602	304,822.182	0.00E+00	1.39E+05	2.74E+05		
Pu-242	6.4260E-05	154,660.602	304,822.182	0.00E+00	9.94E+00	1.96E+01		
Ra-226	2.2804E-10	154,660.602	304,822.182	0.00E+00	3.53E-05	6.95E-05		
Ra-228	5.2713E-12	154,660.602	304,822.182	0.00E+00	8.15E-07	1.61E-06		
Ru-106	6.1160E-10	154,660.602	304,822.182	0.00E+00	9.46E-05	1.86E-04		
Se-79	1.2377E-05	154,660.602	304,822.182	0.00E+00	1.91E+00	3.77E+00		
Sn-126	2.5210E-05	154,660.602	304,822.182	0.00E+00	3.90E+00	7.68E+00		
Sr-90	9.1667E-01	154,660.602	304,822.182	0.00E+00	1.42E+05	2.79E+05		
Tc-99	3.9357E-04	154,660.602	304,822.182	0.00E+00	6.09E+01	1.20E+02		
Th-229	1.2057E-10	154,660.602	304,822.182	0.00E+00	1.86E-05	3.68E-05		
Th-230	2.1043E-08	154,660.602	304,822.182	0.00E+00	3.25E-03	6.41E-03		
Th-232	5.2972E-12	154,660.602	304,822.182	0.00E+00	8.19E-07	1.61E-06		
Tl-208	1.7474E-07	154,660.602	304,822.182	0.00E+00	2.70E-02	5.33E-02		
U-232	4.7368E-07	154,660.602	304,822.182	0.00E+00	7.33E-02	1.44E-01		
U-233	2.5097E-08	154,660.602	304,822.182	0.00E+00	3.88E-03	7.65E-03		
U-234	5.0000E-05	154,660.602	304,822.182	0.00E+00	7.73E+00	1.52E+01		
U-235	-1.4489E-06	154,660.602	0.000	1.15E+00	9.26E-01	1.15E+00		
U-236	7.5824E-06	154,660.602	304,822.182	0.00E+00	1.17E+00	2.31E+00		
U-238	-2.6129E-07	154,660.602	0.000	4.96E+00	4.92E+00	4.96E+00		
Y-90	9.1699E-01	154,660.602	304,822.182	0.00E+00	1.42E+05	2.80E+05		
Other Radionuclides					2.08E+05	4.09E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.56E+03	7.01E+03
Total	Total

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-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	3.480035585	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	154,660.602	152,411.091	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	218,499.950	304,822.182	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.29	0.99	1.00
Bounding:	0.57	1.40	

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: ROVER (UBM)
 SNF ID #: 840
 Fuel Units & Descr: 65 - PARTICULATE
 Heavy Metal Mass: BOL=119.78kg ; EOL=119.78kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1964
 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"x15"
 5.91

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	2.3072E-06	2,276.579	4,553.158	0.00E+00	5.25E-03	1.05E-02	0.0150	5.666E+15
Am-241	8.4448E+00	2,276.579	4,553.158	0.00E+00	1.92E+04	3.85E+04	0.0250	1.110E+15
Am-242m	1.6848E-02	2,276.579	4,553.158	0.00E+00	3.84E+01	7.67E+01	0.0375	9.701E+14
Am-243	1.6320E-02	2,276.579	4,553.158	0.00E+00	3.72E+01	7.43E+01	0.0575	1.526E+15
C-14	1.2090E-01	2,276.579	4,553.158	0.00E+00	2.75E+02	5.50E+02	0.0850	5.957E+14
Cf-254	2.2849E-03	2,276.579	4,553.158	0.00E+00	5.20E+00	1.04E+01	0.1250	4.669E+14
Cm-243	8.6624E-04	2,276.579	4,553.158	0.00E+00	1.97E+00	3.94E+00	0.2250	5.160E+14
Cm-244	1.6848E-01	2,276.579	4,553.158	0.00E+00	3.84E+02	7.67E+02	0.3750	2.207E+14
Co-60	2.8086E+01	2,276.579	4,553.158	0.00E+00	6.39E+04	1.28E+05	0.5750	3.589E+15
Cs-134	3.4148E-04	2,276.579	4,553.158	0.00E+00	7.77E-01	1.55E+00	3.5000	1.288E+07
Cs-135	4.3976E-04	2,276.579	4,553.158	0.00E+00	1.00E+00	2.00E+00	5.0000	5.461E+06
Cs-137	2.1049E+01	2,276.579	4,553.158	0.00E+00	4.79E+04	9.58E+04	7.0000	6.243E+05
Eu-154	1.2500E+00	2,276.579	4,553.158	0.00E+00	2.85E+03	5.69E+03	11.0000	7.139E+04
Eu-155	6.8986E-02	2,276.579	4,553.158	0.00E+00	1.57E+02	3.14E+02		
Fe-55	2.9308E-01	2,276.579	4,553.158	0.00E+00	6.67E+02	1.33E+03		
H-3	2.4311E-01	2,276.579	4,553.158	0.00E+00	5.53E+02	1.11E+03		
I-129	1.0618E-05	2,276.579	4,553.158	0.00E+00	2.42E-02	4.83E-02		
Kr-85	5.9882E-01	2,276.579	4,553.158	0.00E+00	1.36E+03	2.73E+03		
Np-237	1.5668E-04	2,276.579	4,553.158	0.00E+00	3.57E-01	7.13E-01		
Pa-231	2.8656E-06	2,276.579	4,553.158	0.00E+00	6.52E-03	1.30E-02		
Pb-210	2.3918E-08	2,276.579	4,553.158	0.00E+00	5.45E-05	1.09E-04		
Pm-147	1.6900E-02	2,276.579	4,553.158	0.00E+00	3.85E+01	7.69E+01		
Pu-238	2.9808E+00	2,276.579	4,553.158	0.00E+00	6.79E+03	1.36E+04		
Pu-239	4.1648E-01	2,276.579	4,553.158	0.00E+00	9.48E+02	1.90E+03		
Pu-240	2.9264E-01	2,276.579	4,553.158	0.00E+00	6.66E+02	1.33E+03		
Pu-241	4.8704E+01	2,276.579	4,553.158	0.00E+00	1.11E+05	2.22E+05		
Pu-242	2.4560E-03	2,276.579	4,553.158	0.00E+00	5.59E+00	1.12E+01		
Ra-226	6.4400E-08	2,276.579	4,553.158	0.00E+00	1.47E-04	2.93E-04		
Ra-228	5.9952E-07	2,276.579	4,553.158	0.00E+00	1.36E-03	2.73E-03		
Ru-106	8.5526E-07	2,276.579	4,553.158	0.00E+00	1.95E-03	3.89E-03		
Se-79	1.9181E-04	2,276.579	4,553.158	0.00E+00	4.37E-01	8.73E-01		
Sn-126	1.6671E-04	2,276.579	4,553.158	0.00E+00	3.80E-01	7.59E-01		
Sr-90	1.9799E+01	2,276.579	4,553.158	0.00E+00	4.51E+04	9.01E+04		
Tc-99	6.7678E-03	2,276.579	4,553.158	0.00E+00	1.54E+01	3.08E+01		
Th-229	1.7488E-06	2,276.579	4,553.158	0.00E+00	3.98E-03	7.96E-03		
Th-230	5.8704E-06	2,276.579	4,553.158	0.00E+00	1.34E-02	2.67E-02		
Th-232	6.0208E-07	2,276.579	4,553.158	0.00E+00	1.37E-03	2.74E-03		
Ti-208	8.7573E-05	2,276.579	4,553.158	0.00E+00	1.99E-01	3.99E-01		
U-232	2.3706E-04	2,276.579	4,553.158	0.00E+00	5.40E-01	1.08E+00		
U-233	3.6128E-04	2,276.579	4,553.158	0.00E+00	8.22E-01	1.64E+00		
U-234	1.2788E-02	2,276.579	4,553.158	0.00E+00	2.91E+01	5.82E+01		
U-235	5.7486E-04	2,276.579	4,553.158	2.41E-01	1.55E+00	2.86E+00		
U-236	2.3485E-04	2,276.579	4,553.158	0.00E+00	5.35E-01	1.07E+00		
U-238	1.1581E-04	2,276.579	4,553.158	2.81E-03	2.66E-01	5.30E-01		
Y-90	1.9804E+01	2,276.579	4,553.158	0.00E+00	4.51E+04	9.02E+04		
Other Radionuclides					1.40E+05	2.81E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: GRAPHITE	Used: (Worst Case)	This Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	NONE	SST/Inconel	
BOL HM Constituents:	U3O8	U, Th, & Pu	
BOL Enrichment %:	93.02375305	0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD: 2,276.579	Estimated: 2,276.579	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup assumed to be twice nominal burnup.
Bounding:		4,553.158	

Checks		
Nominal:	Burnup Multiplier: 0.57	Estimated Burnup/Given Burnup: 12.99
Bounding:	1.14	

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: RPI (PORTUGAL) 1Fuel decay start date: 1998
 SNF ID #: 943 Estimates as of: 2010
 Fuel Units & Descr: 39 - ASSEMBLY Template: ATR (Light Water, Alum., 60 to 100%, U)
 Heavy Metal Mass: BOL=30.38kg ; EOL=29.23kg 2Template Burnup(MWd): 367.2
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 10 years

Estimated
Canister usage:
18"x10"
1.08

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8404E-10	1,089.546	2,179.092	0.00E+00	3.09E-07	6.19E-07	Avg. MeV	
Am-241	1.4935E-03	1,089.546	2,179.092	0.00E+00	1.63E+00	3.25E+00	0.0150	2.964E+14
Am-242m	4.4390E-07	1,089.546	2,179.092	0.00E+00	4.84E-04	9.67E-04	0.0250	6.237E+13
Am-243	1.4913E-06	1,089.546	2,179.092	0.00E+00	1.62E-03	3.25E-03	0.0375	5.438E+13
C-14	5.7217E-09	1,089.546	2,179.092	0.00E+00	6.23E-06	1.25E-05	0.0575	5.744E+13
Ci-36	1.3124E-32	1,089.546	2,179.092	0.00E+00	1.43E-29	2.86E-29	0.0850	3.495E+13
Cm-243	2.0967E-07	1,089.546	2,179.092	0.00E+00	2.28E-04	4.57E-04	0.1250	2.445E+13
Cm-244	4.3001E-05	1,089.546	2,179.092	0.00E+00	4.69E-02	9.37E-02	0.2250	3.001E+13
Co-60	1.9798E-05	1,089.546	2,179.092	0.00E+00	2.16E-02	4.31E-02	0.3750	1.345E+13
Cs-134	9.0795E-02	1,089.546	2,179.092	0.00E+00	9.89E+01	1.98E+02	0.5750	2.184E+14
Cs-135	3.4477E-06	1,089.546	2,179.092	0.00E+00	3.76E-03	7.51E-03	0.8500	1.065E+13
Cs-137	2.5588E+00	1,089.546	2,179.092	0.00E+00	2.79E+03	5.58E+03	1.2500	3.467E+12
Eu-154	5.4847E-02	1,089.546	2,179.092	0.00E+00	5.98E+01	1.20E+02	1.7500	1.266E+11
Eu-155	1.9469E-02	1,089.546	2,179.092	0.00E+00	2.12E+01	4.24E+01	2.2500	8.370E+09
Fe-55	1.7797E-03	1,089.546	2,179.092	0.00E+00	1.94E+00	3.88E+00	2.7500	1.168E+08
H-3	8.0065E-03	1,089.546	2,179.092	0.00E+00	8.72E+00	1.74E+01	3.5000	1.391E+07
I-129	7.5300E-07	1,089.546	2,179.092	0.00E+00	8.20E-04	1.64E-03	5.0000	1.174E+03
Kr-85	2.0705E-01	1,089.546	2,179.092	0.00E+00	2.26E+02	4.51E+02	7.0000	1.305E+02
Np-237	9.5507E-06	1,089.546	2,179.092	0.00E+00	1.04E-02	2.08E-02	11.0000	1.469E+01
Pa-231	1.2740E-09	1,089.546	2,179.092	0.00E+00	1.39E-06	2.78E-06		
Pb-210	1.1838E-11	1,089.546	2,179.092	0.00E+00	1.29E-08	2.58E-08		
Pm-147	6.7974E-01	1,089.546	2,179.092	0.00E+00	7.41E+02	1.48E+03		
Pu-238	1.9755E-02	1,089.546	2,179.092	0.00E+00	2.15E+01	4.30E+01		
Pu-239	4.2838E-04	1,089.546	2,179.092	0.00E+00	4.67E-01	9.33E-01		
Pu-240	2.4390E-04	1,089.546	2,179.092	0.00E+00	2.66E-01	5.31E-01		
Pu-241	5.4058E-02	1,089.546	2,179.092	0.00E+00	5.89E+01	1.18E+02		
Pu-242	3.6329E-07	1,089.546	2,179.092	0.00E+00	3.96E-04	7.92E-04		
Ra-226	8.3742E-11	1,089.546	2,179.092	0.00E+00	9.12E-08	1.82E-07		
Ra-228	5.7734E-15	1,089.546	2,179.092	0.00E+00	6.29E-12	1.26E-11		
Ru-106	6.1356E-03	1,089.546	2,179.092	0.00E+00	6.69E+00	1.34E+01		
Se-79	1.2936E-05	1,089.546	2,179.092	0.00E+00	1.41E-02	2.82E-02		
Sn-126	1.1574E-05	1,089.546	2,179.092	0.00E+00	1.26E-02	2.52E-02		
Sr-90	2.4417E+00	1,089.546	2,179.092	0.00E+00	2.66E+03	5.32E+03		
Tc-99	4.2239E-04	1,089.546	2,179.092	0.00E+00	4.60E-01	9.20E-01		
Th-229	2.8568E-12	1,089.546	2,179.092	0.00E+00	3.11E-09	6.23E-09		
Th-230	2.5310E-08	1,089.546	2,179.092	0.00E+00	2.76E-05	5.52E-05		
Th-232	1.1631E-14	1,089.546	2,179.092	0.00E+00	1.27E-11	2.53E-11		
Ti-208	4.6705E-08	1,089.546	2,179.092	0.00E+00	5.09E-05	1.02E-04		
U-232	1.3151E-07	1,089.546	2,179.092	0.00E+00	1.43E-04	2.87E-04		
U-233	2.1650E-09	1,089.546	2,179.092	0.00E+00	2.36E-06	4.72E-06		
U-234	1.8399E-04	1,089.546	2,179.092	0.00E+00	2.00E-01	4.01E-01		
U-235	-2.7235E-06	1,089.546	0.000	1.30E-02	1.01E-02	1.30E-02		
U-236	1.5493E-05	1,089.546	2,179.092	0.00E+00	1.69E-02	3.38E-02		
U-238	-4.2851E-09	1,089.546	0.000	8.19E-03	8.18E-03	8.19E-03		
Y-90	2.4423E+00	1,089.546	2,179.092	0.00E+00	2.66E+03	5.32E+03		
Other Radionuclides					2.71E+03	5.42E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.45E+01	6.90E+01
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	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-ALX	U	
BOL Enrichment %:	19.83094182	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		1,089.546	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		2,179.092	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.11		
Bounding:	0.23		

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: RSG-GAS (INDONESIA)
 SNF ID #: 288
 Fuel Units & Descr: 47 - ASSEMBLY
 Heavy Metal Mass: BOL=56.19kg ; EOL=51.48kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1999
 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"
 1.31

II. Estimates

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	2.840E-10	4,459.893	8,919.786	0.00E+00	1.27E-06	2.53E-06	0.0150	1.213E+15
Am-241	1.4935E-03	4,459.893	8,919.786	0.00E+00	6.66E+00	1.33E+01	0.0250	2.553E+14
Am-242m	4.4390E-07	4,459.893	8,919.786	0.00E+00	1.98E-03	3.96E-03	0.0375	2.226E+14
Am-243	1.4913E-06	4,459.893	8,919.786	0.00E+00	6.65E-03	1.33E-02	0.0575	2.351E+14
C-14	5.7217E-09	4,459.893	8,919.786	0.00E+00	2.55E-05	5.10E-05	0.0850	1.431E+14
Cf-252	1.3124E-32	4,459.893	8,919.786	0.00E+00	5.85E-29	1.17E-28	0.1250	1.001E+14
Cm-243	2.0967E-07	4,459.893	8,919.786	0.00E+00	9.35E-04	1.87E-03	0.2250	1.229E+14
Cm-244	4.3001E-05	4,459.893	8,919.786	0.00E+00	1.92E-01	3.84E-01	0.3750	5.506E+13
Co-60	1.9798E-05	4,459.893	8,919.786	0.00E+00	8.83E-02	1.77E-01	0.5750	8.939E+14
Cs-134	9.0795E-02	4,459.893	8,919.786	0.00E+00	4.05E+02	8.10E+02	0.8500	4.360E+13
Cs-135	3.4477E-06	4,459.893	8,919.786	0.00E+00	1.54E-02	3.08E-02	1.2500	1.419E+13
Cs-137	2.5588E+00	4,459.893	8,919.786	0.00E+00	1.14E+04	2.28E+04	1.7500	5.182E+11
Eu-154	5.4847E-02	4,459.893	8,919.786	0.00E+00	2.45E+02	4.89E+02	2.2500	3.426E+10
Eu-155	1.9469E-02	4,459.893	8,919.786	0.00E+00	8.68E+01	1.74E+02	2.7500	4.780E+08
Fe-55	1.7797E-03	4,459.893	8,919.786	0.00E+00	7.94E+00	1.59E+01	3.5000	5.693E+07
H-3	8.0065E-03	4,459.893	8,919.786	0.00E+00	3.57E+01	7.14E+01	5.0000	4.762E+03
I-129	7.5300E-07	4,459.893	8,919.786	0.00E+00	3.36E-03	6.72E-03	7.0000	5.293E+02
Kr-85	2.0705E-01	4,459.893	8,919.786	0.00E+00	9.23E+02	1.85E+03	11.0000	5.955E+01
Np-237	9.5507E-06	4,459.893	8,919.786	0.00E+00	4.26E-02	8.52E-02		
Pa-231	1.2740E-09	4,459.893	8,919.786	0.00E+00	5.68E-06	1.14E-05		
Pb-210	1.1838E-11	4,459.893	8,919.786	0.00E+00	5.28E-08	1.06E-07		
Pm-147	6.7974E-01	4,459.893	8,919.786	0.00E+00	3.03E+03	6.06E+03		
Pu-238	1.9755E-02	4,459.893	8,919.786	0.00E+00	8.81E+01	1.76E+02		
Pu-239	4.2838E-04	4,459.893	8,919.786	0.00E+00	1.91E+00	3.82E+00		
Pu-240	2.4390E-04	4,459.893	8,919.786	0.00E+00	1.09E+00	2.18E+00		
Pu-241	5.4058E-02	4,459.893	8,919.786	0.00E+00	2.41E+02	4.82E+02		
Pu-242	3.6329E-07	4,459.893	8,919.786	0.00E+00	1.62E-03	3.24E-03		
Ra-226	8.3742E-11	4,459.893	8,919.786	0.00E+00	3.73E-07	7.47E-07		
Ra-228	5.7734E-15	4,459.893	8,919.786	0.00E+00	2.57E-11	5.15E-11		
Ru-106	6.1356E-03	4,459.893	8,919.786	0.00E+00	2.74E+01	5.47E+01		
Se-79	1.2936E-05	4,459.893	8,919.786	0.00E+00	5.77E-02	1.15E-01		
Sn-126	1.1574E-05	4,459.893	8,919.786	0.00E+00	5.16E-02	1.03E-01		
Sr-90	2.4417E+00	4,459.893	8,919.786	0.00E+00	1.09E+04	2.18E+04		
Tc-99	4.2239E-04	4,459.893	8,919.786	0.00E+00	1.88E+00	3.77E+00		
Th-229	2.8568E-12	4,459.893	8,919.786	0.00E+00	1.27E-08	2.55E-08		
Th-230	2.5310E-08	4,459.893	8,919.786	0.00E+00	1.13E-04	2.26E-04		
Th-232	1.1631E-14	4,459.893	8,919.786	0.00E+00	5.19E-11	1.04E-10		
Tl-208	4.6705E-08	4,459.893	8,919.786	0.00E+00	2.08E-04	4.17E-04		
U-232	1.3151E-07	4,459.893	8,919.786	0.00E+00	5.87E-04	1.17E-03		
U-233	2.1650E-09	4,459.893	8,919.786	0.00E+00	9.66E-06	1.93E-05		
U-234	1.8399E-04	4,459.893	8,919.786	0.00E+00	8.21E-01	1.64E+00		
U-235	-2.7235E-06	4,459.893	0.000	2.39E-02	1.18E-02	2.39E-02		
U-236	1.5493E-05	4,459.893	8,919.786	0.00E+00	6.91E-02	1.38E-01		
U-238	-4.2851E-09	4,459.893	0.000	1.52E-02	1.51E-02	1.52E-02		
Y-90	2.4423E+00	4,459.893	8,919.786	0.00E+00	1.09E+04	2.18E+04		
Other Radionuclides					1.11E+04	2.22E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.41E+02	2.82E+02
Total	Total

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.
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U3O8	U	
BOL Enrichment %:	19.68299334	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:		4,459.893	
Bounding:		8,919.786	

Checks			Estimated EOL HM/Given EOL HM 1.01
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.25		
Bounding:	0.50		

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: RU-1 (URAGUAY)
 SNF ID #: 557
 Fuel Units & Descr: 4 - ASSEMBLY
 Heavy Metal Mass: BOL=2.11kg : EOL=2.11kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1998
 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"
 0.11

II. Estimates	m	x _n	x _b	b			y _n	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)
Ac-227	2.8404E-10	1.894	3.788	0.00E+00	5.38E-10	1.08E-09			Avg. MeV	
Am-241	1.4935E-03	1.894	3.788	0.00E+00	2.83E-03	5.66E-03			0.0150	5.152E+11
Am-242m	4.4390E-07	1.894	3.788	0.00E+00	8.41E-07	1.68E-06			0.0250	1.084E+11
Am-243	1.4913E-06	1.894	3.788	0.00E+00	2.82E-06	5.65E-06			0.0375	9.453E+10
C-14	5.7217E-09	1.894	3.788	0.00E+00	1.08E-08	2.17E-08			0.0575	9.986E+10
Cl-36	1.3124E-32	1.894	3.788	0.00E+00	2.49E-32	4.97E-32			0.0850	6.076E+10
Cm-243	2.0967E-07	1.894	3.788	0.00E+00	3.97E-07	7.94E-07			0.1250	4.250E+10
Cm-244	4.3001E-05	1.894	3.788	0.00E+00	8.14E-05	1.63E-04			0.2250	5.219E+10
Co-60	1.9798E-05	1.894	3.788	0.00E+00	3.75E-05	7.50E-05			0.3750	2.338E+10
Cs-134	9.0795E-02	1.894	3.788	0.00E+00	1.72E-01	3.44E-01			0.5750	3.796E+11
Cs-135	3.4477E-06	1.894	3.788	0.00E+00	6.53E-06	1.31E-05			0.8500	1.852E+10
Cs-137	2.5588E+00	1.894	3.788	0.00E+00	4.85E+00	9.69E+00			1.2500	6.027E+09
Eu-154	5.4847E-02	1.894	3.788	0.00E+00	1.04E-01	2.08E-01			1.7500	2.201E+08
Eu-155	1.9469E-02	1.894	3.788	0.00E+00	3.69E-02	7.37E-02			2.2500	1.455E+07
Fe-55	1.7797E-03	1.894	3.788	0.00E+00	3.37E-03	6.74E-03			2.7500	2.030E+05
H-3	8.0065E-03	1.894	3.788	0.00E+00	1.52E-02	3.03E-02			3.5000	2.418E+04
I-129	7.5300E-07	1.894	3.788	0.00E+00	1.43E-06	2.85E-06			5.0000	3.323E+00
Kr-85	2.0705E-01	1.894	3.788	0.00E+00	3.92E-01	7.84E-01			7.0000	3.746E-01
Np-237	9.5507E-06	1.894	3.788	0.00E+00	1.81E-05	3.62E-05			11.0000	4.251E-02
Pa-231	1.2740E-09	1.894	3.788	0.00E+00	2.41E-09	4.83E-09				
Pb-210	1.1838E-11	1.894	3.788	0.00E+00	2.24E-11	4.48E-11				
Pm-147	6.7974E-01	1.894	3.788	0.00E+00	1.29E+00	2.57E+00				
Pu-238	1.9755E-02	1.894	3.788	0.00E+00	3.74E-02	7.48E-02				
Pu-239	4.2838E-04	1.894	3.788	0.00E+00	8.11E-04	1.62E-03				
Pu-240	2.4390E-04	1.894	3.788	0.00E+00	4.62E-04	9.24E-04				
Pu-241	5.4058E-02	1.894	3.788	0.00E+00	1.02E-01	2.05E-01				
Pu-242	3.6329E-07	1.894	3.788	0.00E+00	6.88E-07	1.38E-06				
Ra-226	8.3742E-11	1.894	3.788	0.00E+00	1.59E-10	3.17E-10				
Ra-228	5.7734E-15	1.894	3.788	0.00E+00	1.09E-14	2.19E-14				
Ru-106	6.1356E-03	1.894	3.788	0.00E+00	1.16E-02	2.32E-02				
Se-79	1.2936E-05	1.894	3.788	0.00E+00	2.45E-05	4.90E-05				
Sn-126	1.1574E-05	1.894	3.788	0.00E+00	2.19E-05	4.38E-05				
Sr-90	2.4417E+00	1.894	3.788	0.00E+00	4.62E+00	9.25E+00				
Tc-99	4.2239E-04	1.894	3.788	0.00E+00	8.00E-04	1.60E-03				
Th-229	2.8568E-12	1.894	3.788	0.00E+00	5.41E-12	1.08E-11				
Th-230	2.5310E-08	1.894	3.788	0.00E+00	4.79E-08	9.59E-08				
Th-232	1.1631E-14	1.894	3.788	0.00E+00	2.20E-14	4.41E-14				
Tl-208	4.6705E-08	1.894	3.788	0.00E+00	8.85E-08	1.77E-07				
U-232	1.3151E-07	1.894	3.788	0.00E+00	2.49E-07	4.98E-07				
U-233	2.1650E-09	1.894	3.788	0.00E+00	4.10E-09	8.20E-09				
U-234	1.8399E-04	1.894	3.788	0.00E+00	3.48E-04	6.97E-04				
U-235	-2.7235E-06	1.894	0.000	9.04E-04	8.99E-04	9.04E-04				
U-236	1.5493E-05	1.894	3.788	0.00E+00	2.93E-05	5.87E-05				
U-238	-4.2851E-09	1.894	0.000	5.69E-04	5.69E-04	5.69E-04				
Y-90	2.4423E+00	1.894	3.788	0.00E+00	4.63E+00	9.25E+00				
Other Radionuclides					4.71E+00	9.42E+00				

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.152E+11
0.0250	1.084E+11
0.0375	9.453E+10
0.0575	9.986E+10
0.0850	6.076E+10
0.1250	4.250E+10
0.2250	5.219E+10
0.3750	2.338E+10
0.5750	3.796E+11
0.8500	1.852E+10
1.2500	6.027E+09
1.7500	2.201E+08
2.2500	1.455E+07
2.7500	2.030E+05
3.5000	2.418E+04
5.0000	3.323E+00
7.0000	3.746E-01
11.0000	4.251E-02

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.00E-02	1.20E-01
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	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-ALX	U	
	19.81060606	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	0.004	1.894	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		3.788	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.00	448.40	
Bounding:	0.01		

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: RU-1 (URAGUAY)	¹ Fuel decay start date: 1998
SNF ID #: 1073	Estimates as of: 2010
Fuel Units & Descr: 15 - ASSEMBLY	Template: ATR (Light Water, Alum., 60 to 100%, U)
Heavy Metal Mass: BOL=7.92kg ; EOL=7.91kg	² Template Burnup(MWd): 367.2
ROD Storage Site: SRS	Template BOL Heavy Metal Mass (MT): 0.00116689
	Template Decay Time: 10 years

Estimated Canister usage: 18"x10" 0.42

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	2.8404E-10	7.103	14.205	0.00E+00	2.02E-09	4.03E-09	0.0150	1.932E+12
Am-241	1.4935E-03	7.103	14.205	0.00E+00	1.06E-02	2.12E-02	0.0250	4.066E+11
Am-242m	4.4390E-07	7.103	14.205	0.00E+00	3.15E-06	6.31E-06	0.0375	3.545E+11
Am-243	1.4913E-06	7.103	14.205	0.00E+00	1.06E-05	2.12E-05	0.0575	3.745E+11
C-14	5.7217E-09	7.103	14.205	0.00E+00	4.06E-08	8.13E-08	0.0850	2.278E+11
Cl-36	1.3124E-32	7.103	14.205	0.00E+00	9.32E-32	1.86E-31	0.1250	1.594E+11
Cm-243	2.0967E-07	7.103	14.205	0.00E+00	1.49E-06	2.98E-06	0.2250	1.957E+11
Cm-244	4.3001E-05	7.103	14.205	0.00E+00	3.05E-04	6.11E-04	0.3750	8.768E+10
Co-60	1.9798E-05	7.103	14.205	0.00E+00	1.41E-04	2.81E-04	0.5750	1.424E+12
Cs-134	9.0795E-02	7.103	14.205	0.00E+00	6.45E-01	1.29E+00	0.8500	6.944E+10
Cs-135	3.4477E-06	7.103	14.205	0.00E+00	2.45E-05	4.90E-05	1.2500	2.260E+10
Cs-137	2.5588E+00	7.103	14.205	0.00E+00	1.82E+01	3.63E+01	1.7500	8.253E+08
Eu-154	5.4847E-02	7.103	14.205	0.00E+00	3.90E-01	7.79E-01	2.2500	5.456E+07
Eu-155	1.9469E-02	7.103	14.205	0.00E+00	1.38E-01	2.77E-01	2.7500	7.613E+05
Fe-55	1.7797E-03	7.103	14.205	0.00E+00	1.26E-02	2.53E-02	3.5000	9.067E+04
H-3	8.0065E-03	7.103	14.205	0.00E+00	5.69E-02	1.14E-01	5.0000	1.246E+01
I-129	7.5300E-07	7.103	14.205	0.00E+00	5.35E-06	1.07E-05	7.0000	1.405E+00
Kr-85	2.0705E-01	7.103	14.205	0.00E+00	1.47E+00	2.94E+00	11.0000	1.594E-01
Np-237	9.5507E-06	7.103	14.205	0.00E+00	6.78E-05	1.36E-04		
Pa-231	1.2740E-09	7.103	14.205	0.00E+00	9.05E-09	1.81E-08		
Pb-210	1.1838E-11	7.103	14.205	0.00E+00	8.41E-11	1.68E-10		
Pm-147	6.7974E-01	7.103	14.205	0.00E+00	4.83E+00	9.66E+00		
Pu-238	1.9755E-02	7.103	14.205	0.00E+00	1.40E-01	2.81E-01		
Pu-239	4.2838E-04	7.103	14.205	0.00E+00	3.04E-03	6.09E-03		
Pu-240	2.4390E-04	7.103	14.205	0.00E+00	1.73E-03	3.46E-03		
Pu-241	5.4058E-02	7.103	14.205	0.00E+00	3.84E-01	7.68E-01		
Pu-242	3.6329E-07	7.103	14.205	0.00E+00	2.58E-06	5.16E-06		
Ra-226	8.3742E-11	7.103	14.205	0.00E+00	5.95E-10	1.19E-09		
Ra-228	5.7734E-15	7.103	14.205	0.00E+00	4.10E-14	8.20E-14		
Ru-106	6.1356E-03	7.103	14.205	0.00E+00	4.36E-02	8.72E-02		
Se-79	1.2936E-05	7.103	14.205	0.00E+00	9.19E-05	1.84E-04		
Sn-126	1.1574E-05	7.103	14.205	0.00E+00	8.22E-05	1.64E-04		
Sr-90	2.4417E+00	7.103	14.205	0.00E+00	1.73E+01	3.47E+01		
Tc-99	4.2239E-04	7.103	14.205	0.00E+00	3.00E-03	6.00E-03		
Th-229	2.8568E-12	7.103	14.205	0.00E+00	2.03E-11	4.06E-11		
Th-230	2.5310E-08	7.103	14.205	0.00E+00	1.80E-07	3.60E-07		
Th-232	1.1631E-14	7.103	14.205	0.00E+00	8.26E-14	1.65E-13		
Ti-208	4.6705E-08	7.103	14.205	0.00E+00	3.32E-07	6.63E-07		
U-232	1.3151E-07	7.103	14.205	0.00E+00	9.34E-07	1.87E-06		
U-233	2.1650E-09	7.103	14.205	0.00E+00	1.54E-08	3.08E-08		
U-234	1.8399E-04	7.103	14.205	0.00E+00	1.31E-03	2.61E-03		
U-235	-2.7235E-06	7.103	0.000	3.39E-03	3.37E-03	3.39E-03		
U-236	1.5493E-05	7.103	14.205	0.00E+00	1.10E-04	2.20E-04		
U-238	-4.2851E-09	7.103	0.000	2.13E-03	2.13E-03	2.13E-03		
Y-90	2.4423E+00	7.103	14.205	0.00E+00	1.73E+01	3.47E+01		
Other Radionuclides					1.77E+01	3.53E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.25E-01	4.50E-01
Total	Total

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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	19.81060606	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	0.016	7.103	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		14.205	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.00	448.40	1.00
Bounding:	0.01		

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: RV-1 (VENEZUELA) ¹Fuel decay start date: 1997
 SNF ID #: 816 Estimates as of: 2010
 Fuel Units & Descr: 56 - MTR TYPE Template: ATR (Light Water, Alum., 60 to 100%, U)
 Heavy Metal Mass: BOL=39.70kg ; EOL=38.71kg ²Template Burnup(MWd): 367.2
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 10 years

Estimated
 Canister usage:
 18"x10"
 2.33

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8404E-10	933.382	1,866.765	0.00E+00	2.65E-07	5.30E-07	Avg. MeV	
Am-241	1.4935E-03	933.382	1,866.765	0.00E+00	1.39E+00	2.79E+00	0.0150	2.539E+14
Am-242m	4.4390E-07	933.382	1,866.765	0.00E+00	4.14E-04	8.29E-04	0.0250	5.343E+13
Am-243	1.4913E-06	933.382	1,866.765	0.00E+00	1.39E-03	2.78E-03	0.0375	4.659E+13
C-14	5.7217E-09	933.382	1,866.765	0.00E+00	5.34E-06	1.07E-05	0.0575	4.921E+13
Cl-36	1.3124E-32	933.382	1,866.765	0.00E+00	1.22E-29	2.45E-29	0.0850	2.994E+13
Cm-243	2.0967E-07	933.382	1,866.765	0.00E+00	1.96E-04	3.91E-04	0.1250	2.094E+13
Cm-244	4.3001E-05	933.382	1,866.765	0.00E+00	4.01E-02	8.03E-02	0.2250	2.571E+13
Co-60	1.9798E-05	933.382	1,866.765	0.00E+00	1.85E-02	3.70E-02	0.3750	1.152E+13
Cs-134	9.0795E-02	933.382	1,866.765	0.00E+00	8.47E+01	1.69E+02	0.5750	1.871E+14
Cs-135	3.4477E-06	933.382	1,866.765	0.00E+00	3.22E-03	6.44E-03	0.8500	9.125E+12
Cs-137	2.5588E+00	933.382	1,866.765	0.00E+00	2.39E+03	4.78E+03	1.2500	2.970E+12
Eu-154	5.4847E-02	933.382	1,866.765	0.00E+00	5.12E+01	1.02E+02	1.7500	1.085E+11
Eu-155	1.9469E-02	933.382	1,866.765	0.00E+00	1.82E+01	3.63E+01	2.2500	7.170E+09
Fe-55	1.7797E-03	933.382	1,866.765	0.00E+00	1.66E+00	3.32E+00	2.7500	1.000E+08
H-3	8.0065E-03	933.382	1,866.765	0.00E+00	7.47E+00	1.49E+01	3.5000	1.191E+07
I-129	7.5300E-07	933.382	1,866.765	0.00E+00	7.03E-04	1.41E-03	5.0000	1.014E+03
Kr-85	2.0705E-01	933.382	1,866.765	0.00E+00	1.93E+02	3.87E+02	7.0000	1.128E+02
Np-237	9.5507E-06	933.382	1,866.765	0.00E+00	8.91E-03	1.78E-02	11.0000	1.270E+01
Pa-231	1.2740E-09	933.382	1,866.765	0.00E+00	1.19E-06	2.38E-06		
Pb-210	1.1838E-11	933.382	1,866.765	0.00E+00	1.10E-08	2.21E-08		
Pm-147	6.7974E-01	933.382	1,866.765	0.00E+00	6.34E+02	1.27E+03		
Pu-238	1.9755E-02	933.382	1,866.765	0.00E+00	1.84E+01	3.69E+01		
Pu-239	4.2838E-04	933.382	1,866.765	0.00E+00	4.00E-01	8.00E-01		
Pu-240	2.4390E-04	933.382	1,866.765	0.00E+00	2.28E-01	4.55E-01		
Pu-241	5.4058E-02	933.382	1,866.765	0.00E+00	5.05E+01	1.01E+02		
Pu-242	3.6329E-07	933.382	1,866.765	0.00E+00	3.39E-04	6.78E-04		
Ra-226	8.3742E-11	933.382	1,866.765	0.00E+00	7.82E-08	1.56E-07		
Ra-228	5.7734E-15	933.382	1,866.765	0.00E+00	5.39E-12	1.08E-11		
Ru-106	6.1356E-03	933.382	1,866.765	0.00E+00	5.73E+00	1.15E+01		
Se-79	1.2936E-05	933.382	1,866.765	0.00E+00	1.21E-02	2.41E-02		
Sn-126	1.1574E-05	933.382	1,866.765	0.00E+00	1.08E-02	2.16E-02		
Sr-90	2.4417E+00	933.382	1,866.765	0.00E+00	2.28E+03	4.56E+03		
Tc-99	4.2239E-04	933.382	1,866.765	0.00E+00	3.94E-01	7.88E-01		
Th-229	2.8568E-12	933.382	1,866.765	0.00E+00	2.67E-09	5.33E-09		
Th-230	2.5310E-08	933.382	1,866.765	0.00E+00	2.36E-05	4.72E-05		
Th-232	1.1631E-14	933.382	1,866.765	0.00E+00	1.09E-11	2.17E-11		
Tl-208	4.6705E-08	933.382	1,866.765	0.00E+00	4.36E-05	8.72E-05		
U-232	1.3151E-07	933.382	1,866.765	0.00E+00	1.23E-04	2.45E-04		
U-233	2.1650E-09	933.382	1,866.765	0.00E+00	2.02E-06	4.04E-06		
U-234	1.8399E-04	933.382	1,866.765	0.00E+00	1.72E-01	3.43E-01		
U-235	-2.7235E-06	933.382	0.000	1.64E-02	1.39E-02	1.64E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.5493E-05	933.382	1,866.765	0.00E+00	1.45E-02	2.89E-02	2.95E+01	5.91E+01
U-238	-4.2851E-09	933.382	0.000	1.08E-02	1.08E-02	1.08E-02	Total	Total
Y-90	2.4423E+00	933.382	1,866.765	0.00E+00	2.28E+03	4.56E+03		
Other Radionuclides					2.32E+03	4.64E+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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	19.1126847	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		933.382	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		1,866.765	

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.07	
Bounding:	0.15	
		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: SAPHIR (SWITZERLAND) 1Fuel decay start date: 1993
 SNF ID #: 444 Estimates as of: 2010
 Fuel Units & Descr: 76 - MTR TYPE Template: ATR (Light Water, Alum., 60 to 100%, U)
 Heavy Metal Mass: BOL=21.45kg ; EOL=12.00kg 2Template Burnup(MWd): 367.2
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 15 years

Estimated
 Canister usage:
 18"x10"
 3.17

Radionuclide	II. Estimates		Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
	m	x _n						Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	8,946.303	17,892.606	0.00E+00	4.10E-06	8.21E-06			
Am-241	1.7832E-03	8,946.303	17,892.606	0.00E+00	1.60E+01	3.19E+01	0.0150	2.134E+15	
Am-242m	4.3410E-07	8,946.303	17,892.606	0.00E+00	3.88E-03	7.77E-03	0.0250	4.451E+14	
Am-243	1.4907E-06	8,946.303	17,892.606	0.00E+00	1.33E-02	2.67E-02	0.0375	3.887E+14	
C-14	5.7162E-09	8,946.303	17,892.606	0.00E+00	5.11E-05	1.02E-04	0.0575	4.145E+14	
Cl-36	1.3124E-32	8,946.303	17,892.606	0.00E+00	1.17E-28	2.35E-28	0.0850	2.510E+14	
Cm-243	1.8568E-07	8,946.303	17,892.606	0.00E+00	1.66E-03	3.32E-03	0.1250	1.721E+14	
Cm-244	3.5512E-05	8,946.303	17,892.606	0.00E+00	3.18E-01	6.35E-01	0.2250	2.163E+14	
Co-60	1.0261E-05	8,946.303	17,892.606	0.00E+00	9.18E-02	1.84E-01	0.3750	9.475E+13	
Cs-134	1.6931E-02	8,946.303	17,892.606	0.00E+00	1.51E+02	3.03E+02	0.5750	1.538E+15	
Cs-135	3.4477E-06	8,946.303	17,892.606	0.00E+00	3.08E-02	6.17E-02	0.8500	3.653E+13	
Cs-137	2.2800E+00	8,946.303	17,892.606	0.00E+00	2.04E+04	4.08E+04	1.2500	1.846E+13	
Eu-154	3.6656E-02	8,946.303	17,892.606	0.00E+00	3.28E+02	6.56E+02	1.7500	7.734E+11	
Eu-155	9.6841E-03	8,946.303	17,892.606	0.00E+00	8.66E+01	1.73E+02	2.2500	9.675E+08	
Fe-55	4.6977E-04	8,946.303	17,892.606	0.00E+00	4.20E+00	8.41E+00	2.7500	5.813E+07	
H-3	6.0485E-03	8,946.303	17,892.606	0.00E+00	5.41E+01	1.08E+02	3.5000	3.696E+06	
I-129	7.5300E-07	8,946.303	17,892.606	0.00E+00	6.74E-03	1.35E-02	5.0000	8.546E+03	
Kr-85	1.4989E-01	8,946.303	17,892.606	0.00E+00	1.34E+03	2.68E+03	7.0000	9.466E+02	
Np-237	9.5534E-06	8,946.303	17,892.606	0.00E+00	8.55E-02	1.71E-01	11.0000	1.063E+02	
Pa-231	1.6550E-09	8,946.303	17,892.606	0.00E+00	1.48E-05	2.96E-05			
Pb-210	2.6631E-11	8,946.303	17,892.606	0.00E+00	2.38E-07	4.77E-07			
Pm-147	1.8156E-01	8,946.303	17,892.606	0.00E+00	1.62E+03	3.25E+03			
Pu-238	1.8990E-02	8,946.303	17,892.606	0.00E+00	1.70E+02	3.40E+02			
Pu-239	4.2838E-04	8,946.303	17,892.606	0.00E+00	3.83E+00	7.66E+00			
Pu-240	2.4379E-04	8,946.303	17,892.606	0.00E+00	2.18E+00	4.36E+00			
Pu-241	4.2511E-02	8,946.303	17,892.606	0.00E+00	3.80E+02	7.61E+02			
Pu-242	3.6329E-07	8,946.303	17,892.606	0.00E+00	3.25E-03	6.50E-03			
Ra-226	1.4725E-10	8,946.303	17,892.606	0.00E+00	1.32E-06	2.63E-06			
Ra-228	8.9760E-15	8,946.303	17,892.606	0.00E+00	8.03E-11	1.61E-10			
Ru-106	1.9752E-04	8,946.303	17,892.606	0.00E+00	1.77E+00	3.53E+00			
Se-79	1.2933E-05	8,946.303	17,892.606	0.00E+00	1.16E-01	2.31E-01			
Sn-126	1.1574E-05	8,946.303	17,892.606	0.00E+00	1.04E-01	2.07E-01			
Sr-90	2.1680E+00	8,946.303	17,892.606	0.00E+00	1.94E+04	3.88E+04			
Tc-99	4.2239E-04	8,946.303	17,892.606	0.00E+00	3.78E+00	7.56E+00			
Th-229	3.9270E-12	8,946.303	17,892.606	0.00E+00	3.51E-08	7.03E-08			
Th-230	3.3578E-08	8,946.303	17,892.606	0.00E+00	3.00E-04	6.01E-04			
Th-232	1.5452E-14	8,946.303	17,892.606	0.00E+00	1.38E-10	2.76E-10			
Tl-208	4.6705E-08	8,946.303	17,892.606	0.00E+00	4.18E-04	8.36E-04			
U-232	1.3045E-07	8,946.303	17,892.606	0.00E+00	1.17E-03	2.33E-03			
U-233	2.3739E-09	8,946.303	17,892.606	0.00E+00	2.12E-05	4.25E-05			
U-234	1.8423E-04	8,946.303	17,892.606	0.00E+00	1.65E+00	3.30E+00			
U-235	-2.7235E-06	8,946.303	0.000	4.20E-02	1.76E-02	4.20E-02			
U-236	1.5493E-05	8,946.303	17,892.606	0.00E+00	1.39E-01	2.77E-01			
U-238	-4.2851E-09	8,946.303	0.000	6.76E-04	6.38E-04	6.76E-04			
Y-90	2.1686E+00	8,946.303	17,892.606	0.00E+00	1.94E+04	3.88E+04			
Other Radionuclides					1.95E+04	3.89E+04			

Thermal Power
 Nominal Heat Output (Watts) **2.42E+02**
 Bounding Heat Output (Watts) **4.84E+02**
 Total Total

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-ALX	U	
BOL Enrichment %:	90.62318257	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		8,946.303	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		17,892.606	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	1.33		1.05
Bounding:	2.65		

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: SAPHIR (SWITZERLAND) ¹Fuel decay start date: 1993
 SNF ID #: 443 Estimates as of: 2010
 Fuel Units & Descr: 39 - MTR TYPE Template: ATR (Light Water, Alum., 60 to 100%, U)
 Heavy Metal Mass: BOL=79.73kg ; EOL=71.19kg ²Template Burnup(MWd): 367.2
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 15 years

Estimated
 Canister usage:
 18"x10"
 1.63

Radionuclide	II. Estimates		Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
	m	x _n						Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	8,088.493	16,176.985	0.00E+00	3.71E-06	7.42E-06	Avg. MeV		
Am-241	1.7832E-03	8,088.493	16,176.985	0.00E+00	1.44E+01	2.88E+01	0.0150	1.930E+15	
Am-242m	4.3410E-07	8,088.493	16,176.985	0.00E+00	3.51E-03	7.02E-03	0.0250	4.025E+14	
Am-243	1.4907E-06	8,088.493	16,176.985	0.00E+00	1.21E-02	2.41E-02	0.0375	3.514E+14	
C-14	5.7162E-09	8,088.493	16,176.985	0.00E+00	4.62E-05	9.25E-05	0.0575	3.747E+14	
Cl-36	1.3124E-32	8,088.493	16,176.985	0.00E+00	1.06E-28	2.12E-28	0.0850	2.270E+14	
Cm-243	1.8568E-07	8,088.493	16,176.985	0.00E+00	1.50E-03	3.00E-03	0.1250	1.556E+14	
Cm-244	3.5512E-05	8,088.493	16,176.985	0.00E+00	2.87E-01	5.74E-01	0.2250	1.956E+14	
Co-60	1.0261E-05	8,088.493	16,176.985	0.00E+00	8.30E-02	1.66E-01	0.3750	8.566E+13	
Cs-134	1.6931E-02	8,088.493	16,176.985	0.00E+00	1.37E+02	2.74E+02	0.5750	1.391E+15	
Cs-135	3.4477E-06	8,088.493	16,176.985	0.00E+00	2.79E-02	5.58E-02	0.8500	3.303E+13	
Cs-137	2.2800E+00	8,088.493	16,176.985	0.00E+00	1.84E+04	3.69E+04	1.2500	1.669E+13	
Eu-154	3.6656E-02	8,088.493	16,176.985	0.00E+00	2.96E+02	5.93E+02	1.7500	6.992E+11	
Eu-155	9.6841E-03	8,088.493	16,176.985	0.00E+00	7.83E+01	1.57E+02	2.2500	8.747E+08	
Fe-55	4.6977E-04	8,088.493	16,176.985	0.00E+00	3.80E+00	7.60E+00	2.7500	5.256E+07	
H-3	6.0485E-03	8,088.493	16,176.985	0.00E+00	4.89E+01	9.78E+01	3.5000	3.342E+06	
I-129	7.5300E-07	8,088.493	16,176.985	0.00E+00	6.09E-03	1.22E-02	5.0000	7.774E+03	
Kr-85	1.4989E-01	8,088.493	16,176.985	0.00E+00	1.21E+03	2.42E+03	7.0000	8.613E+02	
Np-237	9.5534E-06	8,088.493	16,176.985	0.00E+00	7.73E-02	1.55E-01	11.0000	9.672E-01	
Pa-231	1.6550E-09	8,088.493	16,176.985	0.00E+00	1.34E-05	2.68E-05			
Pb-210	2.6631E-11	8,088.493	16,176.985	0.00E+00	2.15E-07	4.31E-07			
Pm-147	1.8156E-01	8,088.493	16,176.985	0.00E+00	1.47E+03	2.94E+03			
Pu-238	1.8990E-02	8,088.493	16,176.985	0.00E+00	1.54E+02	3.07E+02			
Pu-239	4.2838E-04	8,088.493	16,176.985	0.00E+00	3.46E+00	6.93E+00			
Pu-240	2.4379E-04	8,088.493	16,176.985	0.00E+00	1.97E+00	3.94E+00			
Pu-241	4.2511E-02	8,088.493	16,176.985	0.00E+00	3.44E+02	6.88E+02			
Pu-242	3.6329E-07	8,088.493	16,176.985	0.00E+00	2.94E-03	5.88E-03			
Ra-226	1.4725E-10	8,088.493	16,176.985	0.00E+00	1.19E-06	2.38E-06			
Ra-228	8.9760E-15	8,088.493	16,176.985	0.00E+00	7.26E-11	1.45E-10			
Ru-106	1.9752E-04	8,088.493	16,176.985	0.00E+00	1.60E+00	3.20E+00			
Se-79	1.2933E-05	8,088.493	16,176.985	0.00E+00	1.05E-01	2.09E-01			
Sn-126	1.1574E-05	8,088.493	16,176.985	0.00E+00	9.36E-02	1.87E-01			
Sr-90	2.1680E+00	8,088.493	16,176.985	0.00E+00	1.75E+04	3.51E+04			
Tc-99	4.2239E-04	8,088.493	16,176.985	0.00E+00	3.42E+00	6.83E+00			
Th-229	3.9270E-12	8,088.493	16,176.985	0.00E+00	3.18E-08	6.35E-08			
Th-230	3.3578E-08	8,088.493	16,176.985	0.00E+00	2.72E-04	5.43E-04			
Th-232	1.5452E-14	8,088.493	16,176.985	0.00E+00	1.25E-10	2.50E-10			
Tl-208	4.6705E-08	8,088.493	16,176.985	0.00E+00	3.78E-04	7.56E-04			
U-232	1.3045E-07	8,088.493	16,176.985	0.00E+00	1.06E-03	2.11E-03			
U-233	2.3739E-09	8,088.493	16,176.985	0.00E+00	1.92E-05	3.84E-05			
U-234	1.8423E-04	8,088.493	16,176.985	0.00E+00	1.49E+00	2.98E+00			
U-235	-2.7235E-06	8,088.493	0.000	3.42E-02	1.22E-02	3.42E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
U-236	1.5493E-05	8,088.493	16,176.985	0.00E+00	1.25E-01	2.51E-01	2.19E+02	4.38E+02	
U-238	-4.2851E-09	8,088.493	0.000	2.15E-02	2.14E-02	2.15E-02	Total	Total	
Y-90	2.1686E+00	8,088.493	16,176.985	0.00E+00	1.75E+04	3.51E+04			
Other Radionuclides					1.76E+04	3.52E+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: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	ALUM	ALUM	
BOL Enrichment %:	U3Si2	U	
	19.83740991	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		8,088.493	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		16,176.985	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.32		1.01
Bounding:	0.64		

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: SAPHIR (SWITZERLAND)	¹ Fuel decay start date: 1993	Estimated
SNF ID #: 945	Estimates as of: 2010	Canister usage:
Fuel Units & Descr: 52 - MTR TYPE	Template: ATR (Light Water, Alum., 60 to 100%, U)	18"x10"
Heavy Metal Mass: BOL=35.98kg ; EOL=28.81kg	367.2	2.17
ROD Storage Site: SRS	² Template Burnup(MWd): 15 years	
	Template BOL Heavy Metal Mass (MT): 0.00116689	
	Template Decay Time: 15 years	

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	6,795.811	13,591.622	0.00E+00	3.12E-06	6.23E-06	Avg. MeV	
Am-241	1.7832E-03	6,795.811	13,591.622	0.00E+00	1.21E+01	2.42E+01	0.0150	1.621E+15
Am-242m	4.3410E-07	6,795.811	13,591.622	0.00E+00	2.95E-03	5.90E-03	0.0250	3.381E+14
Am-243	1.4907E-06	6,795.811	13,591.622	0.00E+00	1.01E-02	2.03E-02	0.0375	2.953E+14
C-14	5.7162E-09	6,795.811	13,591.622	0.00E+00	3.88E-05	7.77E-05	0.0575	3.148E+14
Cl-36	1.3124E-32	6,795.811	13,591.622	0.00E+00	8.92E-29	1.78E-28	0.0850	1.907E+14
Cm-243	1.8568E-07	6,795.811	13,591.622	0.00E+00	1.26E-03	2.52E-03	0.1250	1.307E+14
Cm-244	3.5512E-05	6,795.811	13,591.622	0.00E+00	2.41E-01	4.83E-01	0.2250	1.643E+14
Co-60	1.0261E-05	6,795.811	13,591.622	0.00E+00	6.97E-02	1.39E-01	0.3750	7.197E+13
Cs-134	1.6931E-02	6,795.811	13,591.622	0.00E+00	1.15E+02	2.30E+02	0.5750	1.168E+15
Cs-135	3.4477E-06	6,795.811	13,591.622	0.00E+00	2.34E-02	4.69E-02	0.8500	2.775E+13
Cs-137	2.2800E+00	6,795.811	13,591.622	0.00E+00	1.55E+04	3.10E+04	1.2500	1.402E+13
Eu-154	3.6656E-02	6,795.811	13,591.622	0.00E+00	2.49E+02	4.98E+02	1.7500	5.875E+11
Eu-155	9.6841E-03	6,795.811	13,591.622	0.00E+00	6.58E+01	1.32E+02	2.2500	7.349E+08
Fe-55	4.6977E-04	6,795.811	13,591.622	0.00E+00	3.19E+00	6.38E+00	2.7500	4.416E+07
H-3	6.0485E-03	6,795.811	13,591.622	0.00E+00	4.11E+01	8.22E+01	3.5000	2.808E+06
I-129	7.5300E-07	6,795.811	13,591.622	0.00E+00	5.12E-03	1.02E-02	5.0000	6.505E+03
Kr-85	1.4989E-01	6,795.811	13,591.622	0.00E+00	1.02E+03	2.04E+03	7.0000	7.206E+01
Np-237	9.5534E-06	6,795.811	13,591.622	0.00E+00	6.49E-02	1.30E-01	11.0000	8.092E-01
Pa-231	1.6550E-09	6,795.811	13,591.622	0.00E+00	1.12E-05	2.25E-05		
Pb-210	2.6631E-11	6,795.811	13,591.622	0.00E+00	1.81E-07	3.62E-07		
Pm-147	1.8156E-01	6,795.811	13,591.622	0.00E+00	1.23E+03	2.47E+03		
Pu-238	1.8990E-02	6,795.811	13,591.622	0.00E+00	1.29E+02	2.58E+02		
Pu-239	4.2838E-04	6,795.811	13,591.622	0.00E+00	2.91E+00	5.82E+00		
Pu-240	2.4379E-04	6,795.811	13,591.622	0.00E+00	1.66E+00	3.31E+00		
Pu-241	4.2511E-02	6,795.811	13,591.622	0.00E+00	2.89E+02	5.78E+02		
Pu-242	3.6329E-07	6,795.811	13,591.622	0.00E+00	2.47E-03	4.94E-03		
Ra-226	1.4725E-10	6,795.811	13,591.622	0.00E+00	1.00E-06	2.00E-06		
Ra-228	8.9760E-15	6,795.811	13,591.622	0.00E+00	6.10E-11	1.22E-10		
Ru-106	1.9752E-04	6,795.811	13,591.622	0.00E+00	1.34E+00	2.68E+00		
Se-79	1.2933E-05	6,795.811	13,591.622	0.00E+00	8.79E-02	1.76E-01		
Sn-126	1.1574E-05	6,795.811	13,591.622	0.00E+00	7.87E-02	1.57E-01		
Sr-90	2.1680E+00	6,795.811	13,591.622	0.00E+00	1.47E+04	2.95E+04		
Tc-99	4.2239E-04	6,795.811	13,591.622	0.00E+00	2.87E+00	5.74E+00		
Th-229	3.9270E-12	6,795.811	13,591.622	0.00E+00	2.67E-08	5.34E-08		
Th-230	3.3578E-08	6,795.811	13,591.622	0.00E+00	2.28E-04	4.56E-04		
Th-232	1.5452E-14	6,795.811	13,591.622	0.00E+00	1.05E-10	2.10E-10		
Ti-208	4.6705E-08	6,795.811	13,591.622	0.00E+00	3.17E-04	6.35E-04		
U-232	1.3045E-07	6,795.811	13,591.622	0.00E+00	8.86E-04	1.77E-03		
U-233	2.3739E-09	6,795.811	13,591.622	0.00E+00	1.61E-05	3.23E-05		
U-234	1.8423E-04	6,795.811	13,591.622	0.00E+00	1.25E+00	2.50E+00		
U-235	-2.7235E-06	6,795.811	0.000	3.50E-02	1.65E-02	3.50E-02		
U-236	1.5493E-05	6,795.811	13,591.622	0.00E+00	1.05E-01	2.11E-01		
U-238	-4.2851E-09	6,795.811	0.000	6.64E-03	6.61E-03	6.64E-03		
Y-90	2.1686E+00	6,795.811	13,591.622	0.00E+00	1.47E+04	2.95E+04		
Other Radionuclides					1.48E+04	2.96E+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	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:	U3Si2	U	
BOL Enrichment %:	45.07146122	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		6,795.811	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		13,591.622	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.60		1.01
Bounding:	1.20		

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: SEXTON
 SNF ID #: 882
 Fuel Units & Descr: 20 - ELEMENT
 Heavy Metal Mass: BOL = : EOL=10.40kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1972
 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"
 0.69

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	2.3344E-08	16.671	16.671	0.00E+00	3.89E-07	3.89E-07	0.0150	1.245E+12
Am-241	1.1135E-04	16.671	16.671	0.00E+00	1.86E-03	1.86E-03	0.0250	2.586E+11
Am-242m	8.5075E-09	16.671	16.671	0.00E+00	1.42E-07	1.42E-07	0.0375	2.237E+11
Am-243	9.8519E-10	16.671	16.671	0.00E+00	1.64E-08	1.64E-08	0.0575	2.411E+11
C-14	2.3012E-04	16.671	16.671	0.00E+00	3.84E-03	3.84E-03	0.0850	1.457E+11
Cl-36	1.2261E-06	16.671	16.671	0.00E+00	2.04E-05	2.04E-05	0.1250	9.469E+10
Cm-243	2.4875E-10	16.671	16.671	0.00E+00	4.15E-09	4.15E-09	0.2250	1.258E+11
Cm-244	2.3178E-09	16.671	16.671	0.00E+00	3.86E-08	3.86E-08	0.3750	5.469E+10
Co-60	7.0849E-02	16.671	16.671	0.00E+00	1.18E+00	1.18E+00	0.5750	9.009E+11
Cs-134	3.0266E-06	16.671	16.671	0.00E+00	5.05E-05	5.05E-05	0.8500	9.119E+09
Cs-135	3.0316E-05	16.671	16.671	0.00E+00	5.05E-04	5.05E-04	1.2500	9.064E+10
Cs-137	1.4511E+00	16.671	16.671	0.00E+00	2.42E+01	2.42E+01	1.7500	2.353E+08
Eu-154	6.6955E-04	16.671	16.671	0.00E+00	1.12E-02	1.12E-02	2.2500	4.884E+05
Eu-155	6.9850E-04	16.671	16.671	0.00E+00	1.16E-02	1.16E-02	2.7500	1.412E+04
Fe-55	1.2318E-03	16.671	16.671	0.00E+00	2.05E-02	2.05E-02	3.5000	2.911E+00
H-3	2.5141E-03	16.671	16.671	0.00E+00	4.19E-02	4.19E-02	5.0000	1.214E+00
I-129	7.3195E-07	16.671	16.671	0.00E+00	1.22E-05	1.22E-05	7.0000	1.358E-01
Kr-85	4.1281E-02	16.671	16.671	0.00E+00	6.88E-01	6.88E-01	11.0000	1.536E-02
Np-237	1.1489E-06	16.671	16.671	0.00E+00	1.92E-05	1.92E-05		
Pa-231	4.5241E-08	16.671	16.671	0.00E+00	7.54E-07	7.54E-07		
Pb-210	6.4476E-13	16.671	16.671	0.00E+00	1.07E-11	1.07E-11		
Pm-147	1.1651E-03	16.671	16.671	0.00E+00	1.94E-02	1.94E-02		
Pu-238	2.9517E-04	16.671	16.671	0.00E+00	4.92E-03	4.92E-03		
Pu-239	6.6772E-04	16.671	16.671	0.00E+00	1.11E-02	1.11E-02		
Pu-240	8.6839E-05	16.671	16.671	0.00E+00	1.45E-03	1.45E-03		
Pu-241	7.1514E-04	16.671	16.671	0.00E+00	1.19E-02	1.19E-02		
Pu-242	1.9717E-09	16.671	16.671	0.00E+00	3.29E-08	3.29E-08		
Ra-226	1.7654E-12	16.671	16.671	0.00E+00	2.94E-11	2.94E-11		
Ra-228	8.2928E-12	16.671	16.671	0.00E+00	1.38E-10	1.38E-10		
Ru-106	1.8419E-10	16.671	16.671	0.00E+00	3.07E-09	3.07E-09		
Se-79	1.3223E-05	16.671	16.671	0.00E+00	2.20E-04	2.20E-04		
Sn-126	1.1493E-05	16.671	16.671	0.00E+00	1.92E-04	1.92E-04		
Sr-90	1.3649E+00	16.671	16.671	0.00E+00	2.28E+01	2.28E+01		
Tc-99	4.6656E-04	16.671	16.671	0.00E+00	7.78E-03	7.78E-03		
Th-229	1.4547E-11	16.671	16.671	0.00E+00	2.43E-10	2.43E-10		
Th-230	1.6617E-10	16.671	16.671	0.00E+00	2.77E-09	2.77E-09		
Th-232	8.3361E-12	16.671	16.671	0.00E+00	1.39E-10	1.39E-10		
Ti-208	2.1664E-08	16.671	16.671	0.00E+00	3.61E-07	3.61E-07		
U-232	5.8669E-08	16.671	16.671	0.00E+00	9.78E-07	9.78E-07		
U-233	3.1847E-09	16.671	16.671	0.00E+00	5.31E-08	5.31E-08		
U-234	3.8769E-07	16.671	16.671	0.00E+00	6.46E-06	6.46E-06		
U-235	-2.7761E-06	16.671	0.000	2.10E-02	2.10E-02	2.10E-02		
U-236	1.6190E-05	16.671	16.671	0.00E+00	2.70E-04	2.70E-04		
U-238	-2.8547E-09	16.671	0.000	2.28E-04	2.27E-04	2.28E-04		
Y-90	1.3652E+00	16.671	16.671	0.00E+00	2.28E+01	2.28E+01		
Other Radionuclides					2.75E+01	2.75E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: LIGHT WATER	Used: LIGHT WATER	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	SST	SST	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated: 16.671	Nominal burnup set equal to bounding burnup. Bounding burnup taken from SFD and converted to MWd using BOL=10.420kg
Bounding:		16.671	

Checks		
Nominal:	Burnup Multiplier: 0.03	Estimated Burnup/ Given Burnup: 1.00
Bounding:	0.03	

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: SAXTON
 SNF ID #: 787
 Fuel Units & Descr: 43 - ELEMENT
 Heavy Metal Mass: BOL= ; EOL=239.88kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1972
 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"
 1.34

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	2.3072E-06	240.132	240.132	0.00E+00	5.54E-04	5.54E-04	0.0150	5.419E+14
Am-241	8.4448E+00	240.132	240.132	0.00E+00	2.03E+03	2.03E+03	0.0250	5.856E+13
Am-242m	1.6848E-02	240.132	240.132	0.00E+00	4.05E+00	4.05E+00	0.0375	5.167E+13
Am-243	1.6320E-02	240.132	240.132	0.00E+00	3.92E+00	3.92E+00	0.0575	8.057E+13
C-14	1.2090E-01	240.132	240.132	0.00E+00	2.90E+01	2.90E+01	0.0850	3.152E+13
Cl-36	2.2849E-03	240.132	240.132	0.00E+00	5.49E-01	5.49E-01	0.1250	2.464E+13
Cm-243	8.6624E-04	240.132	240.132	0.00E+00	2.08E-01	2.08E-01	0.2250	2.723E+13
Cm-244	1.6848E-01	240.132	240.132	0.00E+00	4.05E+01	4.05E+01	0.3750	1.185E+13
Co-60	2.8086E+01	240.132	240.132	0.00E+00	6.74E+03	6.74E+03	0.5750	1.893E+12
Cs-134	3.4148E-04	240.132	240.132	0.00E+00	8.20E-02	8.20E-02	0.8500	7.234E+12
Cs-135	4.3976E-04	240.132	240.132	0.00E+00	1.06E-01	1.06E-01	1.2500	5.056E+12
Cs-137	2.1049E+01	240.132	240.132	0.00E+00	5.05E+03	5.05E+03	1.7500	2.237E+11
Eu-154	1.2500E+00	240.132	240.132	0.00E+00	3.00E+02	3.00E+02	2.2500	2.660E+09
Eu-155	6.8986E-02	240.132	240.132	0.00E+00	1.66E+01	1.66E+01	2.7500	7.523E+08
Fe-55	2.9308E-01	240.132	240.132	0.00E+00	7.04E+01	7.04E+01	3.5000	5.129E+06
H-3	2.4311E-01	240.132	240.132	0.00E+00	5.84E+01	5.84E+01	5.0000	2.166E+06
I-129	1.0618E-05	240.132	240.132	0.00E+00	2.55E-03	2.55E-03	7.0000	2.453E+05
Kr-85	5.9882E-01	240.132	240.132	0.00E+00	1.44E+02	1.44E+02	11.0000	2.795E+04
Np-237	1.5668E-04	240.132	240.132	0.00E+00	3.76E-02	3.76E-02		
Pa-231	2.8656E-06	240.132	240.132	0.00E+00	6.88E-04	6.88E-04		
Pb-210	2.3918E-08	240.132	240.132	0.00E+00	5.74E-06	5.74E-06		
Pm-147	1.6900E-02	240.132	240.132	0.00E+00	4.06E+00	4.06E+00		
Pu-238	-8.6123E-01	240.132	0.000	3.09E+04	3.07E+04	3.09E+04		
Pu-239	-4.8440E-02	240.132	0.000	3.73E+03	3.72E+03	3.73E+03		
Pu-240	-3.0095E-01	240.132	0.000	4.77E+03	4.70E+03	4.77E+03		
Pu-241	-1.0411E+02	240.132	0.000	1.23E+06	1.20E+06	1.23E+06		
Pu-242	-1.1381E-04	240.132	0.000	2.06E+01	2.06E+01	2.06E+01		
Ra-226	6.4400E-08	240.132	240.132	0.00E+00	1.55E-05	1.55E-05		
Ra-228	5.9952E-07	240.132	240.132	0.00E+00	1.44E-04	1.44E-04		
Ru-106	8.5526E-07	240.132	240.132	0.00E+00	2.05E-04	2.05E-04		
Se-79	1.9181E-04	240.132	240.132	0.00E+00	4.61E-02	4.61E-02		
Sn-126	1.6671E-04	240.132	240.132	0.00E+00	4.00E-02	4.00E-02		
Sr-90	1.9799E+01	240.132	240.132	0.00E+00	4.75E+03	4.75E+03		
Tc-99	6.7678E-03	240.132	240.132	0.00E+00	1.63E+00	1.63E+00		
Th-229	1.7488E-06	240.132	240.132	0.00E+00	4.20E-04	4.20E-04		
Th-230	5.8704E-06	240.132	240.132	0.00E+00	1.41E-03	1.41E-03		
Th-232	6.0208E-07	240.132	240.132	0.00E+00	1.45E-04	1.45E-04		
Th-208	8.7573E-05	240.132	240.132	0.00E+00	2.10E-02	2.10E-02		
U-232	2.3706E-04	240.132	240.132	0.00E+00	5.69E-02	5.69E-02		
U-233	3.6128E-04	240.132	240.132	0.00E+00	8.68E-02	8.68E-02		
U-234	1.2788E-02	240.132	240.132	0.00E+00	3.07E+00	3.07E+00		
U-235	5.7486E-04	240.132	240.132	1.03E-01	2.41E-01	2.41E-01		
U-236	2.3485E-04	240.132	240.132	0.00E+00	5.64E-02	5.64E-02		
U-238	1.1581E-04	240.132	240.132	1.29E-02	4.07E-02	4.07E-02		
Y-90	1.9804E+01	240.132	240.132	0.00E+00	4.76E+03	4.76E+03		
Other Radionuclides					1.48E+04	1.48E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: LIGHT WATER	Used: (Worst Case)	This Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	ZIRC	SST/Inconel	
BOL HM Constituents:	PuO2-UO2	U, Th, & Pu	
BOL Enrichment %:		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD: 240.132	Estimated: 240.132	Nominal burnup set equal to bounding burnup. Bounding burnup taken from SFD and converted to MWd using BOL=240.132kg
Bounding:		240.132	

Checks		
Nominal:	Burnup Multiplier: 0.03	Estimated Burnup/ Given Burnup: 1.40
Bounding:	0.03	

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: SAXTON
 SNF ID #: 883
 Fuel Units & Descr: 25 - ELEMENT
 Heavy Metal Mass: BOL = : EOL=95.59kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1972
 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"
 0.78

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	2.3072E-06	95.688	95.688	0.00E+00	2.21E-04	2.21E-04	0.0150	2.160E+14
Am-241	8.4448E+00	95.688	95.688	0.00E+00	8.08E+02	8.08E+02	0.0250	2.339E+13
Am-242m	1.6848E-02	95.688	95.688	0.00E+00	1.61E+00	1.61E+00	0.0375	2.059E+13
Am-243	1.6320E-02	95.688	95.688	0.00E+00	1.56E+00	1.56E+00	0.0575	3.211E+13
C-14	1.2090E-01	95.688	95.688	0.00E+00	1.16E+01	1.16E+01	0.0850	1.256E+12
Cl-36	2.2849E-03	95.688	95.688	0.00E+00	2.19E-01	2.19E-01	0.1250	9.820E+13
Cm-243	8.6624E-04	95.688	95.688	0.00E+00	8.29E-02	8.29E-02	0.2250	1.085E+13
Cm-244	1.6848E-01	95.688	95.688	0.00E+00	1.61E+01	1.61E+01	0.3750	4.642E+12
Co-60	2.8086E+01	95.688	95.688	0.00E+00	2.69E+03	2.69E+03	0.5750	7.543E+13
Cs-134	3.4148E-04	95.688	95.688	0.00E+00	3.27E-02	3.27E-02	0.8500	2.882E+12
Cs-135	4.3976E-04	95.688	95.688	0.00E+00	4.21E-02	4.21E-02	1.2500	2.015E+14
Cs-137	2.1049E+01	95.688	95.688	0.00E+00	2.01E+03	2.01E+03	1.7500	8.914E+10
Eu-154	1.2500E+00	95.688	95.688	0.00E+00	1.20E+02	1.20E+02	2.2500	1.060E+09
Eu-155	6.8986E-02	95.688	95.688	0.00E+00	6.60E+00	6.60E+00	2.7500	2.998E+08
Fe-55	2.9308E-01	95.688	95.688	0.00E+00	2.80E+01	2.80E+01	3.5000	2.044E+06
H-3	2.4311E-01	95.688	95.688	0.00E+00	2.33E+01	2.33E+01	5.0000	8.630E+05
I-129	1.0618E-05	95.688	95.688	0.00E+00	1.02E-03	1.02E-03	7.0000	9.777E+04
Kr-85	5.9882E-01	95.688	95.688	0.00E+00	5.73E+01	5.73E+01	11.0000	1.114E+04
Np-237	1.5668E-04	95.688	95.688	0.00E+00	1.50E-02	1.50E-02		
Pa-231	2.8656E-06	95.688	95.688	0.00E+00	2.74E-04	2.74E-04		
Pb-210	2.3918E-08	95.688	95.688	0.00E+00	2.29E-06	2.29E-06		
Pm-147	1.6900E-02	95.688	95.688	0.00E+00	1.62E+00	1.62E+00		
Pu-238	-8.6123E-01	95.688	0.000	1.23E+04	1.22E+04	1.23E+04		
Pu-239	-4.8440E-02	95.688	0.000	1.49E+03	1.48E+03	1.49E+03		
Pu-240	-3.0095E-01	95.688	0.000	1.90E+03	1.87E+03	1.90E+03		
Pu-241	-1.0411E+02	95.688	0.000	4.89E+05	4.79E+05	4.89E+05		
Pu-242	-1.1381E-04	95.688	0.000	8.22E+00	8.21E+00	8.22E+00		
Ra-226	6.4400E-08	95.688	95.688	0.00E+00	6.16E-06	6.16E-06		
Ra-228	5.9952E-07	95.688	95.688	0.00E+00	5.74E-05	5.74E-05		
Ru-106	8.5526E-07	95.688	95.688	0.00E+00	8.18E-05	8.18E-05		
Se-79	1.9181E-04	95.688	95.688	0.00E+00	1.84E-02	1.84E-02		
Sn-126	1.6671E-04	95.688	95.688	0.00E+00	1.60E-02	1.60E-02		
Sr-90	1.9799E+01	95.688	95.688	0.00E+00	1.89E+03	1.89E+03		
Tc-99	6.7678E-03	95.688	95.688	0.00E+00	6.48E-01	6.48E-01		
Th-229	1.7488E-06	95.688	95.688	0.00E+00	1.67E-04	1.67E-04		
Th-230	5.8704E-06	95.688	95.688	0.00E+00	5.62E-04	5.62E-04		
Th-232	6.0208E-07	95.688	95.688	0.00E+00	5.76E-05	5.76E-05		
Th-208	8.7573E-05	95.688	95.688	0.00E+00	8.38E-03	8.38E-03		
U-232	2.3706E-04	95.688	95.688	0.00E+00	2.27E-02	2.27E-02		
U-233	3.6128E-04	95.688	95.688	0.00E+00	3.46E-02	3.46E-02		
U-234	1.2788E-02	95.688	95.688	0.00E+00	1.22E+00	1.22E+00		
U-235	5.7486E-04	95.688	95.688	4.12E-02	9.62E-02	9.62E-02		
U-236	2.3485E-04	95.688	95.688	0.00E+00	2.25E-02	2.25E-02		
U-238	1.1581E-04	95.688	95.688	5.12E-03	1.62E-02	1.62E-02		
Y-90	1.9804E+01	95.688	95.688	0.00E+00	1.89E+03	1.89E+03		
Other Radionuclides					5.90E+03	5.90E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.18E+02	6.22E+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	(Worst Case)	This Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
BOL HM Constituents:	SST	SST/Inconel	
BOL Enrichment %:	PuO2-UO2	U, Th, & Pu	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		95.688	Nominal burnup set equal to bounding burnup.
Bounding:		95.688	Bounding burnup taken from SFD and converted to MWd using BOL=95.688kg

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.03		
Bounding:	0.03		

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: SAXTON
 SNF ID #: 788
 Fuel Units & Descr: 9 - ELEMENT
 Heavy Metal Mass: BOL= : EOL=41.48kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1972
 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"
 0.31

II. Estimates	m	x _n	x _b	b	y _n	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	8.7758E-10	66.483	66.483	0.00E+00	5.83E-08	5.83E-08	0.0150	3.577E+12
Am-241	1.4352E-01	66.483	66.483	0.00E+00	9.54E+00	9.54E+00	0.0250	7.214E+11
Am-242m	2.8698E-04	66.483	66.483	0.00E+00	1.91E-02	1.91E-02	0.0375	6.880E+11
Am-243	6.2565E-04	66.483	66.483	0.00E+00	4.16E-02	4.16E-02	0.0575	7.949E+11
C-14	4.7901E-05	66.483	66.483	0.00E+00	3.18E-03	3.18E-03	0.0850	4.003E+11
Cl-36	8.0297E-07	66.483	66.483	0.00E+00	5.34E-05	5.34E-05	0.1250	2.778E+11
Cm-243	2.5081E-04	66.483	66.483	0.00E+00	1.67E-02	1.67E-02	0.2250	3.433E+11
Cm-244	4.9015E-02	66.483	66.483	0.00E+00	3.26E+00	3.26E+00	0.3750	1.476E+11
Co-60	2.5581E-03	66.483	66.483	0.00E+00	1.70E-01	1.70E-01	0.5750	3.433E+12
Cs-134	4.0536E-05	66.483	66.483	0.00E+00	2.69E-03	2.69E-03	0.8500	4.749E+10
Cs-135	1.4433E-05	66.483	66.483	0.00E+00	9.60E-04	9.60E-04	1.2500	4.665E+10
Cs-137	1.3979E+00	66.483	66.483	0.00E+00	9.29E+01	9.29E+01	1.7500	1.397E+09
Eu-154	2.0203E-02	66.483	66.483	0.00E+00	1.34E+00	1.34E+00	2.2500	2.251E+05
Eu-155	1.7684E-03	66.483	66.483	0.00E+00	1.18E-01	1.18E-01	2.7500	4.609E+05
Fe-55	4.3136E-05	66.483	66.483	0.00E+00	2.87E-03	2.87E-03	3.5000	4.753E+04
H-3	2.0769E-02	66.483	66.483	0.00E+00	1.38E+00	1.38E+00	5.0000	2.032E+04
I-129	9.8288E-07	66.483	66.483	0.00E+00	6.53E-05	6.53E-05	7.0000	2.342E+03
Kr-85	2.8214E-02	66.483	66.483	0.00E+00	1.88E+00	1.88E+00	11.0000	2.690E+02
Np-237	1.1218E-05	66.483	66.483	0.00E+00	7.46E-04	7.46E-04		
Pa-231	1.3036E-09	66.483	66.483	0.00E+00	8.67E-08	8.67E-08		
Pb-210	8.5078E-11	66.483	66.483	0.00E+00	5.66E-09	5.66E-09		
Pm-147	3.6531E-04	66.483	66.483	0.00E+00	2.43E-02	2.43E-02		
Pu-238	7.4564E-02	66.483	66.483	0.00E+00	4.96E+00	4.96E+00		
Pu-239	1.1623E-02	66.483	66.483	0.00E+00	7.73E-01	7.73E-01		
Pu-240	1.5132E-02	66.483	66.483	0.00E+00	1.01E+00	1.01E+00		
Pu-241	9.0036E-01	66.483	66.483	0.00E+00	5.99E+01	5.99E+01		
Pu-242	6.4260E-05	66.483	66.483	0.00E+00	4.27E-03	4.27E-03		
Ra-226	2.2804E-10	66.483	66.483	0.00E+00	1.52E-08	1.52E-08		
Ra-228	5.2713E-12	66.483	66.483	0.00E+00	3.50E-10	3.50E-10		
Ru-106	6.1160E-10	66.483	66.483	0.00E+00	4.07E-08	4.07E-08		
Se-79	1.2377E-05	66.483	66.483	0.00E+00	8.23E-04	8.23E-04		
Sn-126	2.5210E-05	66.483	66.483	0.00E+00	1.68E-03	1.68E-03		
Sr-90	9.1667E-01	66.483	66.483	0.00E+00	6.09E+01	6.09E+01		
Tc-99	3.9357E-04	66.483	66.483	0.00E+00	2.62E-02	2.62E-02		
Th-229	1.2057E-10	66.483	66.483	0.00E+00	8.02E-09	8.02E-09		
Th-230	2.1043E-08	66.483	66.483	0.00E+00	1.40E-06	1.40E-06		
Th-232	5.2972E-12	66.483	66.483	0.00E+00	3.52E-10	3.52E-10		
Tl-208	1.7474E-07	66.483	66.483	0.00E+00	1.16E-05	1.16E-05		
U-232	4.7368E-07	66.483	66.483	0.00E+00	3.15E-05	3.15E-05		
U-233	2.5097E-08	66.483	66.483	0.00E+00	1.67E-06	1.67E-06		
U-234	5.0000E-05	66.483	66.483	0.00E+00	3.32E-03	3.32E-03		
U-235	-1.4489E-06	66.483	0.000	2.87E-03	2.78E-03	2.87E-03		
U-236	7.5824E-06	66.483	66.483	0.00E+00	5.04E-04	5.04E-04		
U-238	-2.6129E-07	66.483	0.000	1.35E-02	1.35E-02	1.35E-02		
Y-90	9.1699E-01	66.483	66.483	0.00E+00	6.10E+01	6.10E+01		
Other Radionuclides					8.92E+01	8.92E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.53E+00	1.53E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: LIGHT WATER	Used: LIGHT WATER	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	Nominal burnup set equal to bounding burnup. Bounding burnup taken from SFD and converted to MWd using BOL=41.552kg
Bounding:		66.483	

Checks		
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup
Bounding:	0.05	
	0.05	
		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: SHIPPINGPORT (MET MOUNTS)
 SNF ID #: 1087
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL = ; EOL = .05kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1964
 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:
 HIC
 1.00

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	9.7360E-05	2.522	2.522	0.00E+00	2.46E-04	2.46E-04	0.0150	2.080E+11
Am-241	2.4345E-04	2.522	2.522	0.00E+00	6.14E-04	6.14E-04	0.0250	4.285E+10
Am-242m	1.4821E-06	2.522	2.522	0.00E+00	3.74E-06	3.74E-06	0.0375	3.662E+10
Am-243	3.1152E-07	2.522	2.522	0.00E+00	7.86E-07	7.86E-07	0.0575	4.003E+10
C-14	9.2432E-05	2.522	2.522	0.00E+00	2.33E-04	2.33E-04	0.0850	2.557E+10
Cl-36	1.8103E-06	2.522	2.522	0.00E+00	4.57E-06	4.57E-06	0.1250	1.602E+10
Cm-243	3.0597E-07	2.522	2.522	0.00E+00	7.72E-07	7.72E-07	0.2250	2.293E+10
Cm-244	1.4149E-05	2.522	2.522	0.00E+00	3.57E-05	3.57E-05	0.3750	9.207E+09
Co-60	8.7369E-04	2.522	2.522	0.00E+00	2.20E-03	2.20E-03	0.5750	1.406E+11
Cs-134	2.5601E-05	2.522	2.522	0.00E+00	6.46E-05	6.46E-05	0.8500	2.512E+09
Cs-135	2.8639E-05	2.522	2.522	0.00E+00	7.22E-05	7.22E-05	1.2500	1.110E+09
Cs-137	1.4772E+00	2.522	2.522	0.00E+00	3.73E+00	3.73E+00	1.7500	1.731E+08
Eu-154	8.6025E-03	2.522	2.522	0.00E+00	2.17E-02	2.17E-02	2.2500	5.030E+03
Eu-155	6.6062E-04	2.522	2.522	0.00E+00	1.67E-03	1.67E-03	2.7500	1.237E+09
Fe-55	2.3011E-06	2.522	2.522	0.00E+00	5.80E-06	5.80E-06	3.5000	4.516E+00
H-3	2.1277E-03	2.522	2.522	0.00E+00	5.37E-03	5.37E-03	5.0000	1.418E+00
I-129	1.5853E-06	2.522	2.522	0.00E+00	4.00E-06	4.00E-06	7.0000	1.040E-01
Kr-85	6.2625E-02	2.522	2.522	0.00E+00	1.58E-01	1.58E-01	11.0000	7.998E-03
Np-237	1.2620E-07	2.522	2.522	0.00E+00	3.18E-07	3.18E-07		
Pa-231	1.2017E-04	2.522	2.522	0.00E+00	3.03E-04	3.03E-04		
Pb-210	1.4247E-08	2.522	2.522	0.00E+00	3.59E-08	3.59E-08		
Pm-147	2.6224E-04	2.522	2.522	0.00E+00	6.61E-04	6.61E-04		
Pu-238	4.2477E-04	2.522	2.522	0.00E+00	1.07E-03	1.07E-03		
Pu-239	2.7519E-05	2.522	2.522	0.00E+00	6.94E-05	6.94E-05		
Pu-240	1.6184E-05	2.522	2.522	0.00E+00	4.08E-05	4.08E-05		
Pu-241	1.4695E-03	2.522	2.522	0.00E+00	3.71E-03	3.71E-03		
Pu-242	4.0831E-08	2.522	2.522	0.00E+00	1.03E-07	1.03E-07		
Ra-226	2.1423E-08	2.522	2.522	0.00E+00	5.40E-08	5.40E-08		
Ra-228	4.6236E-06	2.522	2.522	0.00E+00	1.17E-05	1.17E-05		
Ru-106	4.0208E-11	2.522	2.522	0.00E+00	1.01E-10	1.01E-10		
Se-79	3.5417E-05	2.522	2.522	0.00E+00	8.93E-05	8.93E-05		
Sn-126	3.9848E-05	2.522	2.522	0.00E+00	1.01E-04	1.01E-04		
Sr-90	1.4928E+00	2.522	2.522	0.00E+00	3.77E+00	3.77E+00		
Tc-99	3.2525E-04	2.522	2.522	0.00E+00	8.20E-04	8.20E-04		
Th-229	6.4582E-05	2.522	2.522	0.00E+00	1.63E-04	1.63E-04		
Th-230	1.1432E-06	2.522	2.522	0.00E+00	2.88E-06	2.88E-06		
Th-232	-9.0328E-08	2.522	0.000	5.03E-06	4.80E-06	5.03E-06		
Ti-208	1.3964E-02	2.522	2.522	0.00E+00	3.52E-02	3.52E-02		
U-232	3.7822E-02	2.522	2.522	0.00E+00	9.54E-02	9.54E-02		
U-233	-3.3244E-03	2.522	0.000	1.69E-02	8.52E-03	1.69E-02		
U-234	8.1769E-04	2.522	2.522	0.00E+00	2.06E-03	2.06E-03		
U-235	5.7813E-08	2.522	2.522	3.46E-09	1.49E-07	1.49E-07		
U-236	1.3273E-07	2.522	2.522	0.00E+00	3.35E-07	3.35E-07		
U-238	-3.1121E-10	2.522	0.000	2.21E-09	1.43E-09	2.21E-09		
Y-90	1.4928E+00	2.522	2.522	0.00E+00	3.77E+00	3.77E+00		
Other Radionuclides					4.21E+00	4.21E+00		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.75E-02	6.77E-02
Total	Total

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:	ZIRC	ZIRC	
BOL Enrichment %:	ThO2-UO2	Th and U	
		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup. Bounding burnup taken from SFD and converted to MWd using BOL=0.048kg
	From SFD	Estimated	
Nominal:		2.522	
Bounding:		2.522	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	2.37		1.00
Bounding:	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: SHIPPINGPORT LWBR BLKT I
 SNF ID #: 374
 Fuel Units & Descr: 3 - 443 ROD ARRAY
 Heavy Metal Mass: BOL=3795.70kg ; EOL=3755.20kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1982
 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: 25 years

Estimated
 Canister usage:
 24"x15"
 3.00

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)		
Ac-227	8.3425E-05	50,103.239	88,060.238	0.00E+00	4.18E+00	7.35E+00	Avg. MeV	
Am-241	2.2387E-04	50,103.239	88,060.238	0.00E+00	1.12E+01	1.97E+01	0.0150	9.216E+15
Am-242m	1.5512E-06	50,103.239	88,060.238	0.00E+00	7.77E-02	1.37E-01	0.0250	1.902E+15
Am-243	3.1181E-07	50,103.239	88,060.238	0.00E+00	1.56E-02	2.75E-02	0.0375	1.629E+15
C-14	9.2539E-05	50,103.239	88,060.238	0.00E+00	4.64E+00	8.15E+00	0.0575	1.776E+15
Ci-36	1.8103E-06	50,103.239	88,060.238	0.00E+00	9.07E-02	1.59E-01	0.0850	1.127E+15
Cm-243	3.9020E-07	50,103.239	88,060.238	0.00E+00	1.96E-02	3.44E-02	0.1250	7.219E+14
Cm-244	2.0742E-05	50,103.239	88,060.238	0.00E+00	1.04E+00	1.83E+00	0.2250	1.006E+15
Co-60	3.2554E-03	50,103.239	88,060.238	0.00E+00	1.63E+02	2.87E+02	0.3750	4.084E+14
Cs-134	7.3823E-04	50,103.239	88,060.238	0.00E+00	3.70E+01	6.50E+01	0.5750	6.185E+15
Cs-135	2.8639E-05	50,103.239	88,060.238	0.00E+00	1.43E+00	2.52E+00	0.8500	1.224E+14
Cs-137	1.8609E+00	50,103.239	88,060.238	0.00E+00	9.32E+04	1.64E+05	1.2500	7.742E+13
Eu-154	1.9262E-02	50,103.239	88,060.238	0.00E+00	9.65E+02	1.70E+03	1.7500	7.383E+12
Eu-155	2.6721E-03	50,103.239	88,060.238	0.00E+00	1.34E+02	2.35E+02	2.2500	2.972E+08
Fe-55	3.3099E-05	50,103.239	88,060.238	0.00E+00	1.66E+00	2.91E+00	2.7500	4.757E+13
H-3	3.7296E-03	50,103.239	88,060.238	0.00E+00	1.87E+02	3.28E+02	3.5000	1.879E+05
I-129	1.5853E-06	50,103.239	88,060.238	0.00E+00	7.94E-02	1.40E-01	5.0000	5.851E+04
Kr-85	1.1958E-01	50,103.239	88,060.238	0.00E+00	5.99E+03	1.05E+04	7.0000	4.394E+03
Np-237	1.2513E-07	50,103.239	88,060.238	0.00E+00	6.27E-03	1.10E-02	11.0000	3.485E+02
Pa-231	1.2017E-04	50,103.239	88,060.238	0.00E+00	6.02E+00	1.06E+01		
Pb-210	1.1939E-08	50,103.239	88,060.238	0.00E+00	5.98E-04	1.05E-03		
Pm-147	3.6819E-03	50,103.239	88,060.238	0.00E+00	1.84E+02	3.24E+02		
Pu-238	4.5953E-04	50,103.239	88,060.238	0.00E+00	2.30E+01	4.05E+01		
Pu-239	2.7529E-05	50,103.239	88,060.238	0.00E+00	1.38E+00	2.42E+00		
Pu-240	1.6184E-05	50,103.239	88,060.238	0.00E+00	8.11E-01	1.43E+00		
Pu-241	2.3780E-03	50,103.239	88,060.238	0.00E+00	1.19E+02	2.09E+02		
Pu-242	4.0821E-08	50,103.239	88,060.238	0.00E+00	2.05E-03	3.59E-03		
Ra-226	1.4471E-08	50,103.239	88,060.238	0.00E+00	7.25E-04	1.27E-03		
Ra-228	4.5651E-06	50,103.239	88,060.238	0.00E+00	2.29E-01	4.02E-01		
Ru-106	3.8971E-08	50,103.239	88,060.238	0.00E+00	1.95E-03	3.43E-03		
Se-79	3.5417E-05	50,103.239	88,060.238	0.00E+00	1.77E+00	3.12E+00		
Sn-126	3.9848E-05	50,103.239	88,060.238	0.00E+00	2.00E+00	3.51E+00		
Sr-90	1.8940E+00	50,103.239	88,060.238	0.00E+00	9.49E+04	1.67E+05		
Tc-99	3.2534E-04	50,103.239	88,060.238	0.00E+00	1.63E+01	2.86E+01		
Th-229	4.6839E-05	50,103.239	88,060.238	0.00E+00	2.35E+00	4.12E+00		
Th-230	1.0322E-06	50,103.239	88,060.238	0.00E+00	5.17E-02	9.09E-02		
Th-232	-9.0328E-08	50,103.239	0.000	4.01E-01	3.96E-01	4.01E-01		
Ti-208	1.5386E-02	50,103.239	88,060.238	0.00E+00	7.71E+02	1.35E+03		
U-232	4.1639E-02	50,103.239	88,060.238	0.00E+00	2.09E+03	3.67E+03		
U-233	-3.3244E-03	50,103.239	0.000	1.35E+03	1.18E+03	1.35E+03		
U-234	8.1769E-04	50,103.239	88,060.238	0.00E+00	4.10E+01	7.20E+01		
U-235	5.7813E-08	50,103.239	88,060.238	2.76E-04	3.17E-03	5.37E-03		
U-236	1.3273E-07	50,103.239	88,060.238	0.00E+00	6.65E-03	1.17E-02	1.66E+03	2.89E+03
U-238	-3.1121E-10	50,103.239	0.000	1.76E-04	1.61E-04	1.76E-04	Total	Total
Y-90	1.8940E+00	50,103.239	88,060.238	0.00E+00	9.49E+04	1.67E+05		
Other Radionuclides					1.03E+05	1.81E+05		

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:	ZIRC-4	ZIRC	
BOL HM Constituents:	ThO ₂ UO ₂ CER	Th and U	
BOL Enrichment %:	0.089989331	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	50,103.239	39,413.097	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup taken directly from SFD (converted to MWd).
Bounding:	88,060.238	78,826.195	

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.59	0.79
Bounding:	1.04	0.90

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: SHIPPINGPORT LWBR BLKT II
 SNF ID #: 375
 Fuel Units & Descr: 3 - 261 ROD ARRAY
 Heavy Metal Mass: BOL=4373.50kg ; EOL=4331.70kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1982
 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: 25 years

Estimated
 Canister usage:
 24"x15"
 3.00

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	8.3425E-05	64,290.449	110,212.197	0.00E+00	5.36E+00	9.19E+00	0.0150	1.153E+16
Am-241	2.2387E-04	64,290.449	110,212.197	0.00E+00	1.44E+01	2.47E+01	0.0250	2.381E+15
Am-242m	1.5512E-06	64,290.449	110,212.197	0.00E+00	9.97E-02	1.71E-01	0.0375	2.039E+15
Am-243	3.1181E-07	64,290.449	110,212.197	0.00E+00	2.00E-02	3.44E-02	0.0575	2.223E+15
C-14	9.2539E-05	64,290.449	110,212.197	0.00E+00	5.95E+00	1.02E+01	0.0850	1.411E+15
Cl-36	1.8103E-06	64,290.449	110,212.197	0.00E+00	1.16E-01	2.00E-01	0.1250	9.035E+14
Cm-243	3.9020E-07	64,290.449	110,212.197	0.00E+00	2.51E-02	4.30E-02	0.2250	1.259E+15
Cm-244	2.0742E-05	64,290.449	110,212.197	0.00E+00	1.33E+00	2.29E+00	0.3750	5.111E+14
Co-60	3.2554E-03	64,290.449	110,212.197	0.00E+00	2.09E+02	3.59E+02	0.5750	7.741E+15
Cs-134	7.3823E-04	64,290.449	110,212.197	0.00E+00	4.75E+01	8.14E+01	0.8500	1.532E+14
Cs-135	2.8639E-05	64,290.449	110,212.197	0.00E+00	1.84E+00	3.16E+00	1.2500	9.690E+13
Cs-137	1.8609E+00	64,290.449	110,212.197	0.00E+00	1.20E+05	2.05E+05	1.7500	9.240E+12
Eu-154	1.9262E-02	64,290.449	110,212.197	0.00E+00	1.24E+03	2.12E+03	2.2500	3.719E+08
Eu-155	2.6721E-03	64,290.449	110,212.197	0.00E+00	1.72E+02	2.94E+02	2.7500	5.954E+13
Fe-55	3.3099E-05	64,290.449	110,212.197	0.00E+00	2.13E+00	3.65E+00	3.5000	2.343E+05
H-3	3.7296E-03	64,290.449	110,212.197	0.00E+00	2.40E+02	4.11E+02	5.0000	7.297E+04
I-129	1.5853E-06	64,290.449	110,212.197	0.00E+00	1.02E-01	1.75E-01	7.0000	5.482E+03
Kr-85	1.1958E-01	64,290.449	110,212.197	0.00E+00	7.69E+03	1.32E+04	11.0000	4.351E+02
Np-237	1.2513E-07	64,290.449	110,212.197	0.00E+00	8.04E-03	1.38E-02		
Pa-231	1.2017E-04	64,290.449	110,212.197	0.00E+00	7.73E+00	1.32E+01		
Pb-210	1.1939E-08	64,290.449	110,212.197	0.00E+00	7.68E-04	1.32E-03		
Pm-147	3.6819E-03	64,290.449	110,212.197	0.00E+00	2.37E+02	4.06E+02		
Pu-238	4.5953E-04	64,290.449	110,212.197	0.00E+00	2.95E+01	5.06E+01		
Pu-239	2.7529E-05	64,290.449	110,212.197	0.00E+00	1.77E+00	3.03E+00		
Pu-240	1.6184E-05	64,290.449	110,212.197	0.00E+00	1.04E+00	1.78E+00		
Pu-241	2.3780E-03	64,290.449	110,212.197	0.00E+00	1.53E+02	2.62E+02		
Pu-242	4.0821E-08	64,290.449	110,212.197	0.00E+00	2.62E-03	4.50E-03		
Ra-226	1.4471E-08	64,290.449	110,212.197	0.00E+00	9.30E-04	1.59E-03		
Ra-228	4.5651E-06	64,290.449	110,212.197	0.00E+00	2.93E-01	5.03E-01		
Ru-106	3.8971E-08	64,290.449	110,212.197	0.00E+00	2.51E-03	4.30E-03		
Se-79	3.5417E-05	64,290.449	110,212.197	0.00E+00	2.28E+00	3.90E+00		
Sn-126	3.9848E-05	64,290.449	110,212.197	0.00E+00	2.56E+00	4.39E+00		
Sr-90	1.8940E+00	64,290.449	110,212.197	0.00E+00	1.22E+05	2.09E+05		
Tc-99	3.2534E-04	64,290.449	110,212.197	0.00E+00	2.09E+01	3.59E+01		
Th-229	4.6839E-05	64,290.449	110,212.197	0.00E+00	3.01E+00	5.16E+00		
Th-230	1.0322E-06	64,290.449	110,212.197	0.00E+00	6.64E-02	1.14E-01		
Th-232	-9.0328E-08	64,290.449	0.000	4.62E-01	4.56E-01	4.62E-01		
Tl-208	1.5386E-02	64,290.449	110,212.197	0.00E+00	9.89E+02	1.70E+03		
U-232	4.1639E-02	64,290.449	110,212.197	0.00E+00	2.68E+03	4.59E+03		
U-233	-3.3244E-03	64,290.449	0.000	1.55E+03	1.34E+03	1.55E+03		
U-234	8.1769E-04	64,290.449	110,212.197	0.00E+00	5.26E+01	9.01E+01		
U-235	5.7813E-08	64,290.449	110,212.197	3.18E-04	4.03E-03	6.69E-03		
U-236	1.3273E-07	64,290.449	110,212.197	0.00E+00	8.53E-03	1.46E-02		
U-238	-3.1121E-10	64,290.449	0.000	2.03E-04	1.83E-04	2.03E-04		
Y-90	1.8940E+00	64,290.449	110,212.197	0.00E+00	1.22E+05	2.09E+05		
Other Radionuclides					1.32E+05	2.27E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.12E+03	3.61E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	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:	ZIRC-4	ZIRC	
BOL HM Constituents:	ThO2UO2CER	Th and U	
BOL Enrichment %:	0.071220718	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	64,290.449	40,678.112	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup taken directly from SFD (converted to MWd).
Bounding:	110,212.197	81,356.224	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.66	0.63	0.99
Bounding:	1.13	0.74	

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: SHIPPINGPORT LWBR BLKT III
 SNF ID #: 376
 Fuel Units & Descr: 6 - 445 ROD ARRAY
 Heavy Metal Mass: BOL=8776.50kg ; EOL=8700.87kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1982
 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: 25 years

Estimated
 Canister usage:
 24"x15"
 6.00

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	8.3425E-05	129,014.550	221,167.800	0.00E+00	1.08E+01	1.85E+01	0.0150	2.314E+16
Am-241	2.2387E-04	129,014.550	221,167.800	0.00E+00	2.89E+01	4.95E+01	0.0250	4.778E+15
Am-242m	1.5512E-06	129,014.550	221,167.800	0.00E+00	2.00E-01	3.43E-01	0.0375	4.091E+15
Am-243	3.1181E-07	129,014.550	221,167.800	0.00E+00	4.02E-02	6.90E-02	0.0575	4.462E+15
C-14	9.2539E-05	129,014.550	221,167.800	0.00E+00	1.19E+01	2.05E+01	0.0850	2.831E+15
Cl-36	1.8103E-06	129,014.550	221,167.800	0.00E+00	2.34E-01	4.00E-01	0.1250	1.813E+15
Cm-243	3.9020E-07	129,014.550	221,167.800	0.00E+00	5.03E-02	8.63E-02	0.2250	2.527E+15
Cm-244	2.0742E-05	129,014.550	221,167.800	0.00E+00	2.68E+00	4.59E+00	0.3750	1.026E+15
Co-60	3.2554E-03	129,014.550	221,167.800	0.00E+00	4.20E+02	7.20E+02	0.5750	1.553E+16
Cs-134	7.3823E-04	129,014.550	221,167.800	0.00E+00	9.52E+01	1.63E+02	0.8500	3.074E+14
Cs-135	2.8639E-05	129,014.550	221,167.800	0.00E+00	3.69E+00	6.33E+00	1.2500	1.945E+14
Cs-137	1.8609E+00	129,014.550	221,167.800	0.00E+00	2.40E+05	4.12E+05	1.7500	1.854E+13
Eu-154	1.9262E-02	129,014.550	221,167.800	0.00E+00	2.49E+03	4.26E+03	2.2500	7.464E+08
Eu-155	2.6721E-03	129,014.550	221,167.800	0.00E+00	3.45E+02	5.91E+02	2.7500	1.195E+14
Fe-55	3.3099E-05	129,014.550	221,167.800	0.00E+00	4.27E+00	7.32E+00	3.5000	4.702E+05
H-3	3.7296E-03	129,014.550	221,167.800	0.00E+00	4.81E+02	8.25E+02	5.0000	1.464E+05
I-129	1.5853E-06	129,014.550	221,167.800	0.00E+00	2.05E-01	3.51E-01	7.0000	1.100E+04
Kr-85	1.1958E-01	129,014.550	221,167.800	0.00E+00	1.54E+04	2.64E+04	11.0000	8.732E+02
Np-237	1.2513E-07	129,014.550	221,167.800	0.00E+00	1.61E-02	2.77E-02		
Pa-231	1.2017E-04	129,014.550	221,167.800	0.00E+00	1.55E+01	2.66E+01		
Pb-210	1.1939E-08	129,014.550	221,167.800	0.00E+00	1.54E-03	2.64E-03		
Pm-147	3.6819E-03	129,014.550	221,167.800	0.00E+00	4.75E+02	8.14E+02		
Pu-238	4.5953E-04	129,014.550	221,167.800	0.00E+00	5.93E+01	1.02E+02		
Pu-239	2.7529E-05	129,014.550	221,167.800	0.00E+00	3.55E+00	6.09E+00		
Pu-240	1.6184E-05	129,014.550	221,167.800	0.00E+00	2.09E+00	3.58E+00		
Pu-241	2.3780E-03	129,014.550	221,167.800	0.00E+00	3.07E+02	5.26E+02		
Pu-242	4.0821E-08	129,014.550	221,167.800	0.00E+00	5.27E-03	9.03E-03		
Ra-226	1.4471E-08	129,014.550	221,167.800	0.00E+00	1.87E-03	3.20E-03		
Ra-228	4.5651E-06	129,014.550	221,167.800	0.00E+00	5.89E-01	1.01E+00		
Ru-106	3.8971E-08	129,014.550	221,167.800	0.00E+00	5.03E-03	8.62E-03		
Se-79	3.5417E-05	129,014.550	221,167.800	0.00E+00	4.57E+00	7.83E+00		
Sn-126	3.9848E-05	129,014.550	221,167.800	0.00E+00	5.14E+00	8.81E+00		
Sr-90	1.8940E+00	129,014.550	221,167.800	0.00E+00	2.44E+05	4.19E+05		
Tc-99	3.2534E-04	129,014.550	221,167.800	0.00E+00	4.20E+01	7.20E+01		
Th-229	4.6839E-05	129,014.550	221,167.800	0.00E+00	6.04E+00	1.04E+01		
Th-230	1.0322E-06	129,014.550	221,167.800	0.00E+00	1.33E-01	2.28E-01		
Th-232	-9.0328E-08	129,014.550	0.000	9.27E-01	9.15E-01	9.27E-01		
Th-208	1.5386E-02	129,014.550	221,167.800	0.00E+00	1.99E+03	3.40E+03		
U-232	4.1639E-02	129,014.550	221,167.800	0.00E+00	5.37E+03	9.21E+03		
U-233	-3.3244E-03	129,014.550	0.000	3.12E+03	2.69E+03	3.12E+03		
U-234	8.1769E-04	129,014.550	221,167.800	0.00E+00	1.05E+02	1.81E+02		
U-235	5.7813E-08	129,014.550	221,167.800	6.38E-04	8.10E-03	1.34E-02		
U-236	1.3273E-07	129,014.550	221,167.800	0.00E+00	1.71E-02	2.94E-02		
U-238	-3.1121E-10	129,014.550	0.000	4.08E-04	3.68E-04	4.08E-04		
Y-90	1.8940E+00	129,014.550	221,167.800	0.00E+00	2.44E+05	4.19E+05		
Other Radionuclides					2.66E+05	4.56E+05		

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:	ZIRC-4	ZIRC	
BOL HM Constituents:	ThO2UO2CER	Th and U	
BOL Enrichment %:	0.072866152	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	129,014.550	73,600.310	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup taken directly from SFD (converted to MWd).
Bounding:	221,167.800	147,200.620	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.66	0.57	0.99
Bounding:	1.13	0.67	

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: SHIPPINGPORT LWBR REFLCT. IV
 SNF ID #: 371
 Fuel Units & Descr: 9 - 261 ROD ARRAY
 Heavy Metal Mass: BOL=11491.60kg ; EOL=11491.50kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1982
 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: 25 years

Estimated
 Canister usage:
 24"x15"
 9.00

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	8.3425E-05	25,281.519	51,712.198	0.00E+00	2.11E+00	4.31E+00	0.0150	5.422E+15
Am-241	2.2387E-04	25,281.519	51,712.198	0.00E+00	5.66E+00	1.16E+01	0.0275	1.117E+15
Am-242m	1.5512E-06	25,281.519	51,712.198	0.00E+00	3.92E-02	8.02E-02	0.0350	9.567E+14
Am-243	3.1181E-07	25,281.519	51,712.198	0.00E+00	7.88E-03	1.61E-02	0.0575	1.043E+15
C-14	9.2539E-05	25,281.519	51,712.198	0.00E+00	2.34E+00	4.79E+00	0.0850	6.620E+14
Cl-36	1.8103E-06	25,281.519	51,712.198	0.00E+00	4.58E-02	9.36E-02	0.1250	4.240E+14
Cm-243	3.9020E-07	25,281.519	51,712.198	0.00E+00	9.86E-03	2.02E-02	0.2250	5.910E+14
Cm-244	2.0742E-05	25,281.519	51,712.198	0.00E+00	5.24E-01	1.07E+00	0.3750	2.398E+14
Co-60	3.2554E-03	25,281.519	51,712.198	0.00E+00	8.23E+01	1.68E+02	0.5750	3.632E+15
Cs-134	7.3823E-04	25,281.519	51,712.198	0.00E+00	1.87E+01	3.82E+01	0.8500	7.187E+13
Cs-135	2.8639E-05	25,281.519	51,712.198	0.00E+00	7.24E-01	1.48E+00	1.2500	4.547E+13
Cs-137	1.8609E+00	25,281.519	51,712.198	0.00E+00	4.70E+04	9.62E+04	1.7500	4.336E+14
Eu-154	1.9262E-02	25,281.519	51,712.198	0.00E+00	4.87E+02	9.96E+02	2.2500	1.746E+08
Eu-155	2.6721E-03	25,281.519	51,712.198	0.00E+00	6.76E+01	1.38E+02	2.7500	2.793E+13
Fe-55	3.3099E-05	25,281.519	51,712.198	0.00E+00	8.37E-01	1.71E+00	3.5000	1.318E+05
H-3	3.7296E-03	25,281.519	51,712.198	0.00E+00	9.43E+01	1.93E+02	5.0000	4.077E+04
I-129	1.5853E-06	25,281.519	51,712.198	0.00E+00	4.01E-02	8.20E-02	7.0000	2.997E+03
Kr-85	1.1958E-01	25,281.519	51,712.198	0.00E+00	3.02E+03	6.18E+03	11.0000	2.311E+02
Np-237	1.2513E-07	25,281.519	51,712.198	0.00E+00	3.16E-03	6.47E-03		
Pa-231	1.2017E-04	25,281.519	51,712.198	0.00E+00	3.04E+00	6.21E+00		
Pb-210	1.1939E-08	25,281.519	51,712.198	0.00E+00	3.02E-04	6.17E-04		
Pm-147	3.6819E-03	25,281.519	51,712.198	0.00E+00	9.31E+01	1.90E+02		
Pu-238	4.5953E-04	25,281.519	51,712.198	0.00E+00	1.16E+01	2.38E+01		
Pu-239	2.7529E-05	25,281.519	51,712.198	0.00E+00	6.96E-01	1.42E+00		
Pu-240	1.6184E-05	25,281.519	51,712.198	0.00E+00	4.09E-01	8.37E-01		
Pu-241	2.3780E-03	25,281.519	51,712.198	0.00E+00	6.01E+01	1.23E+02		
Pu-242	4.0821E-08	25,281.519	51,712.198	0.00E+00	1.03E-03	2.11E-03		
Ra-226	1.4471E-08	25,281.519	51,712.198	0.00E+00	3.66E-04	7.48E-04		
Ra-228	4.5651E-06	25,281.519	51,712.198	0.00E+00	1.15E-01	2.36E-01		
Ru-106	3.8971E-08	25,281.519	51,712.198	0.00E+00	9.85E-04	2.02E-03		
Se-79	3.5417E-05	25,281.519	51,712.198	0.00E+00	8.95E-01	1.83E+00		
Sn-126	3.9848E-05	25,281.519	51,712.198	0.00E+00	1.01E+00	2.06E+00		
Sr-90	1.8940E+00	25,281.519	51,712.198	0.00E+00	4.79E+04	9.79E+04		
Tc-99	3.2534E-04	25,281.519	51,712.198	0.00E+00	8.23E+00	1.68E+01		
Th-229	4.6839E-05	25,281.519	51,712.198	0.00E+00	1.18E+00	2.42E+00		
Th-230	1.0322E-06	25,281.519	51,712.198	0.00E+00	2.61E-02	5.34E-02		
Th-232	-9.0328E-08	25,281.519	0.000	1.21E+00	1.21E+00	1.21E+00		
Ti-208	1.5386E-02	25,281.519	51,712.198	0.00E+00	3.89E+02	7.96E+02		
U-232	4.1639E-02	25,281.519	51,712.198	0.00E+00	1.05E+03	2.15E+03		
U-233	-3.3244E-03	25,281.519	0.000	4.08E+03	4.08E+03	4.08E+03		
U-234	8.1769E-04	25,281.519	51,712.198	0.00E+00	2.07E+01	4.23E+01		
U-235	5.7813E-08	25,281.519	51,712.198	8.35E-04	2.30E-03	3.82E-03		
U-236	1.3273E-07	25,281.519	51,712.198	0.00E+00	3.36E-03	6.86E-03		
U-238	-3.1121E-10	25,281.519	0.000	5.34E-04	5.26E-04	5.34E-04		
Y-90	1.8940E+00	25,281.519	51,712.198	0.00E+00	4.79E+04	9.79E+04		
Other Radionuclides					5.21E+04	1.07E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.34E+02	1.79E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: LIGHT WATER	Used: LIGHT WATER	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	ZIRC-4	ZIRC	
BOL HM Constituents:	ThO ₂ UO ₂ CER	Th and U	
BOL Enrichment %:		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup taken directly from SFD (converted to MWd).
Nominal:	25,281.519	97,219	
Bounding:	51,712.198	194,438	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	1.00
Nominal:	0.10	0.00	
Bounding:	0.20	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: SHIPPINGPORT LWBR REFLCT. V
 SNF ID #: 372
 Fuel Units & Descr: 6 - 166 ROD ARRAY
 Heavy Metal Mass: BOL=5847.10kg ; EOL=5844.70kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1982
 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: 25 years

Estimated
 Canister usage:
 24"x15"
 6.00

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	8.3425E-05	12,863.620	26,311.951	0.00E+00	1.07E+00	2.20E+00	0.0150	2.759E+15
Am-241	2.2387E-04	12,863.620	26,311.951	0.00E+00	2.88E+00	5.89E+00	0.0250	5.684E+14
Am-242m	1.5512E-06	12,863.620	26,311.951	0.00E+00	2.00E-02	4.08E-02	0.0375	4.868E+14
Am-243	3.1181E-07	12,863.620	26,311.951	0.00E+00	4.01E-03	8.20E-03	0.0575	5.308E+14
C-14	9.2539E-05	12,863.620	26,311.951	0.00E+00	1.19E+00	2.43E+00	0.0850	3.368E+14
Cl-36	1.8103E-06	12,863.620	26,311.951	0.00E+00	2.33E-02	4.76E-02	0.1250	2.157E+14
Cm-243	3.9020E-07	12,863.620	26,311.951	0.00E+00	5.02E-03	1.03E-02	0.2250	3.007E+14
Cm-244	2.0742E-05	12,863.620	26,311.951	0.00E+00	2.67E-01	5.46E-01	0.3750	1.220E+14
Co-60	3.2554E-03	12,863.620	26,311.951	0.00E+00	4.19E+01	8.57E+01	0.5750	1.848E+15
Cs-134	7.3823E-04	12,863.620	26,311.951	0.00E+00	9.50E+00	1.94E+01	0.8500	3.657E+13
Cs-135	2.8639E-05	12,863.620	26,311.951	0.00E+00	3.68E-01	7.54E-01	1.2500	2.313E+13
Cs-137	1.8609E+00	12,863.620	26,311.951	0.00E+00	2.39E+04	4.90E+04	1.7500	2.206E+12
Eu-154	1.9262E-02	12,863.620	26,311.951	0.00E+00	2.48E+02	5.07E+02	2.2500	8.882E+07
Eu-155	2.6721E-03	12,863.620	26,311.951	0.00E+00	3.44E+01	7.03E+01	2.7500	1.421E+13
Fe-55	3.3099E-05	12,863.620	26,311.951	0.00E+00	4.26E-01	8.71E-01	3.5000	6.705E+04
H-3	3.7296E-03	12,863.620	26,311.951	0.00E+00	4.80E+01	9.81E+01	5.0000	2.074E+04
I-129	1.5853E-06	12,863.620	26,311.951	0.00E+00	2.04E-02	4.17E-02	7.0000	1.525E+03
Kr-85	1.1958E-01	12,863.620	26,311.951	0.00E+00	1.54E+03	3.15E+03	11.0000	1.176E+02
Np-237	1.2513E-07	12,863.620	26,311.951	0.00E+00	1.61E-03	3.29E-03		
Pa-231	1.2017E-04	12,863.620	26,311.951	0.00E+00	1.55E+00	3.16E+00		
Pb-210	1.1939E-08	12,863.620	26,311.951	0.00E+00	1.54E-04	3.14E-04		
Pm-147	3.6819E-03	12,863.620	26,311.951	0.00E+00	4.74E+01	9.69E+01		
Pu-238	4.5953E-04	12,863.620	26,311.951	0.00E+00	5.91E+00	1.21E+01		
Pu-239	2.7529E-05	12,863.620	26,311.951	0.00E+00	3.54E-01	7.24E-01		
Pu-240	1.6184E-05	12,863.620	26,311.951	0.00E+00	2.08E-01	4.26E-01		
Pu-241	2.3780E-03	12,863.620	26,311.951	0.00E+00	3.06E+01	6.26E+01		
Pu-242	4.0821E-08	12,863.620	26,311.951	0.00E+00	5.25E-04	1.07E-03		
Ra-226	1.4471E-08	12,863.620	26,311.951	0.00E+00	1.86E-04	3.81E-04		
Ra-228	4.5651E-06	12,863.620	26,311.951	0.00E+00	5.87E-02	1.20E-01		
Ru-106	3.8971E-08	12,863.620	26,311.951	0.00E+00	5.01E-04	1.03E-03		
Se-79	3.5417E-05	12,863.620	26,311.951	0.00E+00	4.56E-01	9.32E-01		
Sn-126	3.9848E-05	12,863.620	26,311.951	0.00E+00	5.13E-01	1.05E+00		
Sr-90	1.8940E+00	12,863.620	26,311.951	0.00E+00	2.44E+04	4.98E+04		
Tc-99	3.2534E-04	12,863.620	26,311.951	0.00E+00	4.19E+00	8.56E+00		
Th-229	4.6839E-05	12,863.620	26,311.951	0.00E+00	6.03E-01	1.23E+00		
Th-230	1.0322E-06	12,863.620	26,311.951	0.00E+00	1.33E-02	2.72E-02		
Th-232	-9.0328E-08	12,863.620	0.000	6.17E-01	6.16E-01	6.17E-01		
Tl-208	1.5386E-02	12,863.620	26,311.951	0.00E+00	1.98E+02	4.05E+02		
U-232	4.1639E-02	12,863.620	26,311.951	0.00E+00	5.36E+02	1.10E+03		
U-233	-3.3244E-03	12,863.620	0.000	2.08E+03	2.03E+03	2.08E+03		
U-234	8.1769E-04	12,863.620	26,311.951	0.00E+00	1.05E+01	2.15E+01		
U-235	5.7813E-08	12,863.620	26,311.951	4.25E-04	1.17E-03	1.95E-03		
U-236	1.3273E-07	12,863.620	26,311.951	0.00E+00	1.71E-03	3.49E-03		
U-238	-3.1121E-10	12,863.620	0.000	2.72E-04	2.68E-04	2.72E-04		
Y-90	1.8940E+00	12,863.620	26,311.951	0.00E+00	2.44E+04	4.98E+04		
Other Radionuclides					2.65E+04	5.42E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.75E+02	9.12E+02
Total	Total

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 (unknown).
Fuel Cladding:	ZIRC-4	ZIRC	
BOL HM Constituents:	ThO2UO2CER	Th and U	
BOL Enrichment %:		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	12,863.620	2,335.591	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup taken directly from SFD (converted to MWd).
Bounding:	26,311.951	4,671.182	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.10	0.18	
Bounding:	0.20	0.18	

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: SHIPPINGPORT LWBR SCRAP
 SNF ID #: 377
 Fuel Units & Descr: 7 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=3143.24kg ; EOL=3122.39kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1982
 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: 25 years

Estimated
 Canister usage:
 HIC
 7.00

Radionuclide	II. Estimates		x _b	b	y _n	y _b	Gamma Sources	
	m	x _n					Photon 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	8.3425E-05	20,285.191	167,848.872	0.00E+00	1.69E+00	1.40E+01		
Am-241	2.2387E-04	20,285.191	167,848.872	0.00E+00	4.54E+00	3.76E+01	0.0150	1.756E+16
Am-242m	1.5512E-06	20,285.191	167,848.872	0.00E+00	3.15E-02	2.60E-01	0.0250	3.626E+15
Am-243	3.1181E-07	20,285.191	167,848.872	0.00E+00	6.33E-03	5.23E-02	0.0375	3.105E+15
C-14	9.2539E-05	20,285.191	167,848.872	0.00E+00	1.88E+00	1.55E+01	0.0575	3.386E+15
Cl-36	1.8103E-06	20,285.191	167,848.872	0.00E+00	3.67E-02	3.04E-01	0.0850	2.149E+15
Cm-243	3.9020E-07	20,285.191	167,848.872	0.00E+00	7.92E-03	6.55E-02	0.1250	1.376E+15
Cm-244	2.0742E-05	20,285.191	167,848.872	0.00E+00	4.21E-01	3.48E+00	0.2250	1.918E+15
Co-60	3.2554E-03	20,285.191	167,848.872	0.00E+00	6.60E+01	5.46E+02	0.3750	7.784E+14
Cs-134	7.3823E-04	20,285.191	167,848.872	0.00E+00	1.50E+01	1.24E+02	0.5750	1.179E+16
Cs-135	2.8639E-05	20,285.191	167,848.872	0.00E+00	5.81E-01	4.81E+00	0.8500	2.333E+14
Cs-137	1.8609E+00	20,285.191	167,848.872	0.00E+00	3.77E+04	3.12E+05	1.2500	1.476E+14
Eu-154	1.9262E-02	20,285.191	167,848.872	0.00E+00	3.91E+02	3.23E+03	1.7500	1.407E+13
Eu-155	2.6721E-03	20,285.191	167,848.872	0.00E+00	5.42E+01	4.49E+02	2.2500	5.664E+08
Fe-55	3.3099E-05	20,285.191	167,848.872	0.00E+00	6.71E-01	5.56E+00	2.7500	9.067E+13
H-3	3.7296E-03	20,285.191	167,848.872	0.00E+00	7.57E+01	6.26E+02	3.5000	3.487E+05
I-129	1.5853E-06	20,285.191	167,848.872	0.00E+00	3.22E-02	2.66E-01	5.0000	1.087E+05
Kr-85	1.1958E-01	20,285.191	167,848.872	0.00E+00	2.43E+03	2.01E+04	7.0000	8.191E+03
Np-237	1.2513E-07	20,285.191	167,848.872	0.00E+00	2.54E-03	2.10E-02	11.0000	6.526E+02
Pa-231	1.2017E-04	20,285.191	167,848.872	0.00E+00	2.44E+00	2.02E+01		
Pb-210	1.1939E-08	20,285.191	167,848.872	0.00E+00	2.42E-04	2.00E-03		
Pm-147	3.6819E-03	20,285.191	167,848.872	0.00E+00	7.47E+01	6.18E+02		
Pu-238	4.5953E-04	20,285.191	167,848.872	0.00E+00	9.32E+00	7.71E+01		
Pu-239	2.7529E-05	20,285.191	167,848.872	0.00E+00	5.58E-01	4.62E+00		
Pu-240	1.6184E-05	20,285.191	167,848.872	0.00E+00	3.28E-01	2.72E+00		
Pu-241	2.3780E-03	20,285.191	167,848.872	0.00E+00	4.82E+01	3.99E+02		
Pu-242	4.0821E-08	20,285.191	167,848.872	0.00E+00	8.28E-04	6.85E-03		
Ra-226	1.4471E-08	20,285.191	167,848.872	0.00E+00	2.94E-04	2.43E-03		
Ra-228	4.5651E-06	20,285.191	167,848.872	0.00E+00	9.26E-02	7.66E-01		
Ru-106	3.8971E-08	20,285.191	167,848.872	0.00E+00	7.91E-04	6.54E-03		
Se-79	3.5417E-05	20,285.191	167,848.872	0.00E+00	7.18E-01	5.94E+00		
Sn-126	3.9848E-05	20,285.191	167,848.872	0.00E+00	8.08E-01	6.69E+00		
Sr-90	1.8940E+00	20,285.191	167,848.872	0.00E+00	3.84E+04	3.18E+05		
Tc-99	3.2534E-04	20,285.191	167,848.872	0.00E+00	6.60E+00	5.46E+01		
Th-229	4.6839E-05	20,285.191	167,848.872	0.00E+00	9.50E-01	7.86E+00		
Th-230	1.0322E-06	20,285.191	167,848.872	0.00E+00	2.09E-02	1.73E-01		
Th-232	-9.0328E-08	20,285.191	0.000	3.32E-01	3.30E-01	3.32E-01		
Tl-208	1.5386E-02	20,285.191	167,848.872	0.00E+00	3.12E+02	2.58E+03		
U-232	4.1639E-02	20,285.191	167,848.872	0.00E+00	8.45E+02	6.99E+03		
U-233	-3.3244E-03	20,285.191	0.000	1.12E+03	1.05E+03	1.12E+03		
U-234	8.1769E-04	20,285.191	167,848.872	0.00E+00	1.66E+01	1.37E+02		
U-235	5.7813E-08	20,285.191	167,848.872	2.28E-04	1.40E-03	9.93E-03		
U-236	1.3273E-07	20,285.191	167,848.872	0.00E+00	2.69E-03	2.23E-02		
U-238	-3.1121E-10	20,285.191	0.000	1.46E-04	1.40E-04	1.46E-04		
Y-90	1.8940E+00	20,285.191	167,848.872	0.00E+00	3.84E+04	3.18E+05		
Other Radionuclides					4.18E+04	3.46E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.87E+02	5.46E+03
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	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
BOL HM Constituents:	ZIRC-4	ZIRC	
BOL Enrichment %:	ThO ₂ UO ₂ CER	Th and U	
	0.079983883	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:	167,848.872	20,285.191	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup taken directly from SFD (converted to MWd).
		40,570.383	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup	
Bounding:	0.29	0.24	1.00
	2.39		

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: SHIPPINGPORT LWBR SCRAP (LINER 15718)
 SNF ID #: 379
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL = ; EOL=242.90kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1982
 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: 25 years

Estimated
 Canister usage:
 HIC
 1.00

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	8.3425E-05	13,723.928	13,723.928	0.00E+00	1.14E+00	1.14E+00		
Am-241	2.2387E-04	13,723.928	13,723.928	0.00E+00	3.07E+00	3.07E+00	0.0150	1.436E+15
Am-242m	1.5512E-06	13,723.928	13,723.928	0.00E+00	2.13E-02	2.13E-02	0.0250	2.965E+14
Am-243	3.1181E-07	13,723.928	13,723.928	0.00E+00	4.28E-03	4.28E-03	0.0375	2.539E+14
C-14	9.2539E-05	13,723.928	13,723.928	0.00E+00	1.27E+00	1.27E+00	0.0575	2.769E+14
Cl-36	1.8103E-06	13,723.928	13,723.928	0.00E+00	2.48E-02	2.48E-02	0.0850	1.757E+14
Cm-243	3.9020E-07	13,723.928	13,723.928	0.00E+00	5.36E-03	5.36E-03	0.1250	1.125E+14
Cm-244	2.0742E-05	13,723.928	13,723.928	0.00E+00	2.85E-01	2.85E-01	0.2250	1.568E+14
Co-60	3.2554E-03	13,723.928	13,723.928	0.00E+00	4.47E+01	4.47E+01	0.3750	6.364E+13
Cs-134	7.3823E-04	13,723.928	13,723.928	0.00E+00	1.01E+01	1.01E+01	0.5750	9.639E+14
Cs-135	2.8639E-05	13,723.928	13,723.928	0.00E+00	3.93E-01	3.93E-01	0.8500	1.907E+13
Cs-137	1.8609E+00	13,723.928	13,723.928	0.00E+00	2.55E+04	2.55E+04	1.2500	1.207E+13
Eu-154	1.9262E-02	13,723.928	13,723.928	0.00E+00	2.64E+02	2.64E+02	1.7500	1.151E+12
Eu-155	2.6721E-03	13,723.928	13,723.928	0.00E+00	3.67E+01	3.67E+01	2.2500	4.631E+07
Fe-55	3.3099E-05	13,723.928	13,723.928	0.00E+00	4.54E-01	4.54E-01	2.7500	7.414E+12
H-3	3.7296E-03	13,723.928	13,723.928	0.00E+00	5.12E+01	5.12E+01	3.5000	2.851E+04
I-129	1.5853E-06	13,723.928	13,723.928	0.00E+00	2.18E-02	2.18E-02	5.0000	8.888E+03
Kr-85	1.1958E-01	13,723.928	13,723.928	0.00E+00	1.64E+03	1.64E+03	7.0000	6.698E+02
Np-237	1.2513E-07	13,723.928	13,723.928	0.00E+00	1.72E-03	1.72E-03	11.0000	5.336E+01
Pa-231	1.2017E-04	13,723.928	13,723.928	0.00E+00	1.65E+00	1.65E+00		
Pb-210	1.1939E-08	13,723.928	13,723.928	0.00E+00	1.64E-04	1.64E-04		
Pm-147	3.6819E-03	13,723.928	13,723.928	0.00E+00	5.05E+01	5.05E+01		
Pu-238	4.5953E-04	13,723.928	13,723.928	0.00E+00	6.31E+00	6.31E+00		
Pu-239	2.7529E-05	13,723.928	13,723.928	0.00E+00	3.78E-01	3.78E-01		
Pu-240	1.6184E-05	13,723.928	13,723.928	0.00E+00	2.22E-01	2.22E-01		
Pu-241	2.3780E-03	13,723.928	13,723.928	0.00E+00	3.26E+01	3.26E+01		
Pu-242	4.0821E-08	13,723.928	13,723.928	0.00E+00	5.60E-04	5.60E-04		
Ra-226	1.4471E-08	13,723.928	13,723.928	0.00E+00	1.99E-04	1.99E-04		
Ra-228	4.5651E-06	13,723.928	13,723.928	0.00E+00	6.27E-02	6.27E-02		
Ru-106	3.8971E-08	13,723.928	13,723.928	0.00E+00	5.35E-04	5.35E-04		
Se-79	3.5417E-05	13,723.928	13,723.928	0.00E+00	4.86E-01	4.86E-01		
Sn-126	3.9848E-05	13,723.928	13,723.928	0.00E+00	5.47E-01	5.47E-01		
Sr-90	1.8940E+00	13,723.928	13,723.928	0.00E+00	2.60E+04	2.60E+04		
Tc-99	3.2534E-04	13,723.928	13,723.928	0.00E+00	4.46E+00	4.46E+00		
Th-229	4.6839E-05	13,723.928	13,723.928	0.00E+00	6.43E-01	6.43E-01		
Th-230	1.0322E-06	13,723.928	13,723.928	0.00E+00	1.42E-02	1.42E-02		
Th-232	-9.0328E-08	13,723.928	0.000	2.71E-02	2.59E-02	2.71E-02		
Ti-208	1.5386E-02	13,723.928	13,723.928	0.00E+00	2.11E+02	2.11E+02		
U-232	4.1639E-02	13,723.928	13,723.928	0.00E+00	5.71E+02	5.71E+02		
U-233	-3.3244E-03	13,723.928	0.000	9.13E+01	4.57E+01	9.13E+01		
U-234	8.1769E-04	13,723.928	13,723.928	0.00E+00	1.12E+01	1.12E+01		
U-235	5.7813E-08	13,723.928	13,723.928	1.87E-05	8.12E-04	8.12E-04		
U-236	1.3273E-07	13,723.928	13,723.928	0.00E+00	1.82E-03	1.82E-03		
U-238	-3.1121E-10	13,723.928	0.000	1.19E-05	7.67E-06	1.19E-05		
Y-90	1.8940E+00	13,723.928	13,723.928	0.00E+00	2.60E+04	2.60E+04		
Other Radionuclides					2.83E+04	2.83E+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	This Template was used for the following reasons: This fuel matches on all parameters except enrichment.
Fuel Cladding:	ZIRC-4	ZIRC	
BOL HM Constituents:	ThO ₂ UO ₂ CER	Th and U	
BOL Enrichment %:		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		13,723.928	Nominal burnup set equal to bounding burnup. Bounding burnup taken from SFD and converted to MWd using BOL=257.002kg
Bounding:		13,723.928	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	2.39		
Bounding:	2.39		

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: SHIPPINGPORT LWBR SEED
 SNF ID #: 380
 Fuel Units & Descr: 12 - 619 ROD HEX ARRAY
 Heavy Metal Mass: BOL=5218.30kg ; EOL=5110.50kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1982
 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: 25 years

Estimated
 Canister usage:
 18"x15"
 12.00

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	8.3425E-05	155,505.328	278,657.199	0.00E+00	1.30E+01	2.32E+01	Avg. MeV	
Am-241	2.2387E-04	155,505.328	278,657.199	0.00E+00	3.48E+01	6.24E+01	0.0150	2.915E+16
Am-242m	1.5512E-06	155,505.328	278,657.199	0.00E+00	2.41E-01	4.32E-01	0.0250	6.019E+15
Am-243	3.1181E-07	155,505.328	278,657.199	0.00E+00	4.85E-02	8.69E-02	0.0375	5.155E+15
C-14	9.2539E-05	155,505.328	278,657.199	0.00E+00	1.44E+01	2.58E+01	0.0575	5.621E+15
Cl-36	1.8103E-06	155,505.328	278,657.199	0.00E+00	2.82E-01	5.04E-01	0.0850	3.567E+15
Cm-243	3.9020E-07	155,505.328	278,657.199	0.00E+00	6.07E-02	1.09E-01	0.1250	2.284E+15
Cm-244	2.0742E-05	155,505.328	278,657.199	0.00E+00	3.23E+00	5.78E+00	0.2250	3.184E+15
Co-60	3.2554E-03	155,505.328	278,657.199	0.00E+00	5.06E+02	9.07E+02	0.3750	1.292E+15
Cs-134	7.3823E-04	155,505.328	278,657.199	0.00E+00	1.15E+02	2.06E+02	0.5750	1.957E+14
Cs-135	2.8639E-05	155,505.328	278,657.199	0.00E+00	4.45E+00	7.98E+00	0.8500	3.873E+14
Cs-137	1.8609E+00	155,505.328	278,657.199	0.00E+00	2.89E+05	5.19E+05	1.2500	2.450E+14
Eu-154	1.9262E-02	155,505.328	278,657.199	0.00E+00	3.00E+03	5.37E+03	1.7500	2.336E+13
Eu-155	2.6721E-03	155,505.328	278,657.199	0.00E+00	4.16E+02	7.45E+02	2.2500	9.403E+08
Fe-55	3.3099E-05	155,505.328	278,657.199	0.00E+00	5.15E+00	9.22E+00	2.7500	1.505E+14
H-3	3.7296E-03	155,505.328	278,657.199	0.00E+00	5.80E+02	1.04E+03	3.5000	5.788E+05
I-129	1.5853E-06	155,505.328	278,657.199	0.00E+00	2.47E-01	4.42E-01	5.0000	1.805E+05
Kr-85	1.1958E-01	155,505.328	278,657.199	0.00E+00	1.86E+04	3.33E+04	7.0000	1.360E+04
Np-237	1.2513E-07	155,505.328	278,657.199	0.00E+00	1.95E-02	3.49E-02	11.0000	1.083E+03
Pa-231	1.2017E-04	155,505.328	278,657.199	0.00E+00	1.87E+01	3.35E+01		
Pb-210	1.1939E-08	155,505.328	278,657.199	0.00E+00	1.86E-03	3.33E-03		
Pm-147	3.6819E-03	155,505.328	278,657.199	0.00E+00	5.73E+02	1.03E+03		
Pu-238	4.5953E-04	155,505.328	278,657.199	0.00E+00	7.15E+01	1.28E+02		
Pu-239	2.7529E-05	155,505.328	278,657.199	0.00E+00	4.28E+00	7.67E+00		
Pu-240	1.6184E-05	155,505.328	278,657.199	0.00E+00	2.52E+00	4.51E+00		
Pu-241	2.3780E-03	155,505.328	278,657.199	0.00E+00	3.70E+02	6.63E+02		
Pu-242	4.0821E-08	155,505.328	278,657.199	0.00E+00	6.35E-03	1.14E-02		
Ra-226	1.4471E-08	155,505.328	278,657.199	0.00E+00	2.25E-03	4.03E-03		
Ra-228	4.5651E-06	155,505.328	278,657.199	0.00E+00	7.10E-01	1.27E+00		
Ru-106	3.8971E-08	155,505.328	278,657.199	0.00E+00	6.06E-03	1.09E-02		
Se-79	3.5417E-05	155,505.328	278,657.199	0.00E+00	5.51E+00	9.87E+00		
Sn-126	3.9848E-05	155,505.328	278,657.199	0.00E+00	6.20E+00	1.11E+01		
Sr-90	1.8940E+00	155,505.328	278,657.199	0.00E+00	2.95E+05	5.28E+05		
Tc-99	3.2534E-04	155,505.328	278,657.199	0.00E+00	5.06E+01	9.07E+01		
Th-229	4.6839E-05	155,505.328	278,657.199	0.00E+00	7.28E+00	1.31E+01		
Th-230	1.0322E-06	155,505.328	278,657.199	0.00E+00	1.61E-01	2.88E-01		
Th-232	-9.0328E-08	155,505.328	0.000	5.51E-01	5.37E-01	5.51E-01		
Tl-208	1.5386E-02	155,505.328	278,657.199	0.00E+00	2.39E+03	4.29E+03		
U-232	4.1639E-02	155,505.328	278,657.199	0.00E+00	6.48E+03	1.16E+04		
U-233	-3.3244E-03	155,505.328	0.000	1.85E+03	1.34E+03	1.85E+03		
U-234	8.1769E-04	155,505.328	278,657.199	0.00E+00	1.27E+02	2.28E+02		
U-235	5.7813E-08	155,505.328	278,657.199	3.79E-04	9.37E-03	1.65E-02		
U-236	1.3273E-07	155,505.328	278,657.199	0.00E+00	2.06E-02	3.70E-02		
U-238	-3.1121E-10	155,505.328	0.000	2.42E-04	1.94E-04	2.42E-04		
Y-90	1.8940E+00	155,505.328	278,657.199	0.00E+00	2.95E+05	5.28E+05		
Other Radionuclides					3.20E+05	5.74E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.07E+03	9.07E+03
Total	Total

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:	ZIRC-4	ZIRC	
BOL HM Constituents:	ThO2UO2CER	Th and U	
BOL Enrichment %:	0.070817874	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	155,505.328	104,906.571	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup taken directly from SFD (converted to MWd).
Bounding:	278,657.199	209,813.143	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	1.33	0.67	0.99
Bounding:	2.39	0.75	

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: SHIPPINGPORT PWR C1 BLKT
 SNF ID #: 191
 Fuel Units & Descr: 36 - 17 FLAT PLATES
 Heavy Metal Mass: BOL=583.92kg ; EOL=569.66kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1969
 Estimates as of: 2010
 Template: PWR (Light Water, Zirc. 0 to 5%, U)
²Template Bumup(MWd): 61.92
 Template BOL Heavy Metal Mass (MT): 0.00176911
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x15"
 36.00

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	8.7758E-10	13,560.205	27,120.410	0.00E+00	1.19E-05	2.38E-05	Avg. MeV	
Am-241	1.4352E-01	13,560.205	27,120.410	0.00E+00	1.95E+03	3.89E+03	0.0150	1.459E+15
Am-242m	2.8698E-04	13,560.205	27,120.410	0.00E+00	3.89E+00	7.78E+00	0.0250	2.943E+14
Am-243	6.2565E-04	13,560.205	27,120.410	0.00E+00	8.48E+00	1.70E+01	0.0375	2.807E+14
C-14	4.7901E-05	13,560.205	27,120.410	0.00E+00	6.50E-01	1.30E+00	0.0575	3.243E+14
Cl-36	8.0297E-07	13,560.205	27,120.410	0.00E+00	1.09E-02	2.18E-02	0.0850	1.633E+14
Cm-243	2.5081E-04	13,560.205	27,120.410	0.00E+00	3.40E+00	6.80E+00	0.1250	1.133E+14
Cm-244	4.9015E-02	13,560.205	27,120.410	0.00E+00	6.65E+02	1.33E+03	0.2250	1.400E+14
Co-60	2.5581E-03	13,560.205	27,120.410	0.00E+00	3.47E+01	6.94E+01	0.3750	6.020E+13
Cs-134	4.0536E-05	13,560.205	27,120.410	0.00E+00	5.50E-01	1.10E+00	0.5750	1.400E+15
Cs-135	1.4433E-05	13,560.205	27,120.410	0.00E+00	1.96E-01	3.91E-01	0.8500	1.937E+13
Cs-137	1.3979E+00	13,560.205	27,120.410	0.00E+00	1.90E+04	3.79E+04	1.2500	1.903E+13
Eu-154	2.0203E-02	13,560.205	27,120.410	0.00E+00	2.74E+02	5.48E+02	1.7500	5.699E+11
Eu-155	1.7684E-03	13,560.205	27,120.410	0.00E+00	2.40E+01	4.80E+01	2.2500	9.177E+07
Fe-55	4.3136E-05	13,560.205	27,120.410	0.00E+00	5.85E-01	1.17E+00	2.7500	1.880E+08
H-3	2.0769E-02	13,560.205	27,120.410	0.00E+00	2.82E+02	5.63E+02	3.5000	1.936E+07
I-129	9.8288E-07	13,560.205	27,120.410	0.00E+00	1.33E-02	2.67E-02	5.0000	8.276E+06
Kr-85	2.8214E-02	13,560.205	27,120.410	0.00E+00	3.83E+02	7.65E+02	7.0000	9.599E+05
Np-237	1.1218E-05	13,560.205	27,120.410	0.00E+00	1.52E-01	3.04E-01	11.0000	1.096E+05
Pa-231	1.3036E-09	13,560.205	27,120.410	0.00E+00	1.77E-05	3.54E-05		
Pb-210	8.5078E-11	13,560.205	27,120.410	0.00E+00	1.15E-06	2.31E-06		
Pm-147	3.6531E-04	13,560.205	27,120.410	0.00E+00	4.95E+00	9.91E+00		
Pu-238	7.4564E-02	13,560.205	27,120.410	0.00E+00	1.01E+03	2.02E+03		
Pu-239	1.1623E-02	13,560.205	27,120.410	0.00E+00	1.58E+02	3.15E+02		
Pu-240	1.5132E-02	13,560.205	27,120.410	0.00E+00	2.05E+02	4.10E+02		
Pu-241	9.0036E-01	13,560.205	27,120.410	0.00E+00	1.22E+04	2.44E+04		
Pu-242	6.4260E-05	13,560.205	27,120.410	0.00E+00	8.71E-01	1.74E+00		
Ra-226	2.2804E-10	13,560.205	27,120.410	0.00E+00	3.09E-06	6.18E-06		
Ra-228	5.2713E-12	13,560.205	27,120.410	0.00E+00	7.15E-08	1.43E-07		
Ru-106	6.1160E-10	13,560.205	27,120.410	0.00E+00	8.29E-06	1.66E-05		
Sa-79	1.2377E-05	13,560.205	27,120.410	0.00E+00	1.68E-01	3.36E-01		
Sn-126	2.5210E-05	13,560.205	27,120.410	0.00E+00	3.42E-01	6.84E-01		
Sr-90	9.1667E-01	13,560.205	27,120.410	0.00E+00	1.24E+04	2.49E+04		
Tc-99	3.9357E-04	13,560.205	27,120.410	0.00E+00	5.34E+00	1.07E+01		
Th-229	1.2057E-10	13,560.205	27,120.410	0.00E+00	1.64E-06	3.27E-06		
Th-230	2.1043E-08	13,560.205	27,120.410	0.00E+00	2.85E-04	5.71E-04		
Th-232	5.2972E-12	13,560.205	27,120.410	0.00E+00	7.18E-08	1.44E-07		
Th-208	1.7474E-07	13,560.205	27,120.410	0.00E+00	2.37E-03	4.74E-03		
U-232	4.7368E-07	13,560.205	27,120.410	0.00E+00	6.42E-03	1.28E-02		
U-233	2.5097E-08	13,560.205	27,120.410	0.00E+00	3.40E-04	6.81E-04		
U-234	5.0000E-05	13,560.205	27,120.410	0.00E+00	6.78E-01	1.36E+00		
U-235	-1.4489E-06	13,560.205	0.000	1.24E-02	0.00E+00	1.24E-02		
U-236	7.5824E-06	13,560.205	27,120.410	0.00E+00	1.03E-01	2.06E-01		
U-238	-2.6129E-07	13,560.205	0.000	1.94E-01	1.91E-01	1.94E-01		
Y-90	9.1699E-01	13,560.205	27,120.410	0.00E+00	1.24E+04	2.49E+04		
Other Radionuclides					1.82E+04	3.64E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.12E+02	6.24E+02
Total	Total

III. Template Selection Summary, Bumup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ZIRC-2	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	0.98643828	0 to 5	

Bumup Summary (MWd) ²			Basis for bumup used in estimate:
	From SFD	Estimated	
Nominal:	6,481.512	13,560.205	Nominal bumup calculated from the heavy metal mass destroyed.
Bounding:		27,120.410	Bounding bumup assumed to be twice nominal bumup.

Checks		
	Bumup Multiplier	Estimated Bumup/ Given Bumup
Nominal:	0.66	2.09
Bounding:	1.33	
		Estimated EOL HM/ Given EOL HM
		1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT PWR C1 BLKT (RODS)
 SNF ID #: 189
 Fuel Units & Descr: 2 - ROD
 Heavy Metal Mass: BOL=16.89kg ; EOL=16.11kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1959
 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: 50 years

Estimated
 Canister usage:
 18"x15"
 0.07

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	1.0733E-09	744.596	1,489.192	0.00E+00	7.99E-07	1.60E-06	0.0150	5.666E+13
Am-241	1.4751E-01	744.596	1,489.192	0.00E+00	1.10E+02	2.20E+02	0.0250	1.136E+13
Am-242m	2.6809E-04	744.596	1,489.192	0.00E+00	2.00E-01	3.99E-01	0.0375	1.070E+13
Am-243	6.2484E-04	744.596	1,489.192	0.00E+00	4.65E-01	9.31E-01	0.0575	1.339E+13
C-14	4.7820E-05	744.596	1,489.192	0.00E+00	3.56E-02	7.12E-02	0.0850	6.256E+12
Cl-36	8.0297E-07	744.596	1,489.192	0.00E+00	5.98E-04	1.20E-03	0.1250	4.162E+12
Cm-243	1.7426E-04	744.596	1,489.192	0.00E+00	1.30E-01	2.60E-01	0.2250	5.341E+12
Cm-244	2.7616E-02	744.596	1,489.192	0.00E+00	2.06E+01	4.11E+01	0.3750	2.307E+12
Co-60	3.5610E-04	744.596	1,489.192	0.00E+00	2.65E-01	5.30E-01	0.5750	5.432E+13
Cs-134	2.6260E-07	744.596	1,489.192	0.00E+00	1.96E-04	3.91E-04	0.8500	5.304E+11
Cs-135	1.4433E-05	744.596	1,489.192	0.00E+00	1.07E-02	2.15E-02	1.2500	3.375E+11
Cs-137	9.8870E-01	744.596	1,489.192	0.00E+00	7.36E+02	1.47E+03	1.7500	1.484E+10
Eu-154	6.0320E-03	744.596	1,489.192	0.00E+00	4.49E+00	8.98E+00	2.2500	2.439E+06
Eu-155	2.1770E-04	744.596	1,489.192	0.00E+00	1.62E-01	3.24E-01	2.7500	8.596E+06
Fe-55	7.9296E-07	744.596	1,489.192	0.00E+00	5.90E-04	1.18E-03	3.5000	6.135E+05
H-3	8.9486E-03	744.596	1,489.192	0.00E+00	6.66E+00	1.33E+01	5.0000	2.621E+05
I-129	9.8288E-07	744.596	1,489.192	0.00E+00	7.32E-04	1.46E-03	7.0000	3.020E+04
Kr-85	1.0707E-02	744.596	1,489.192	0.00E+00	7.97E+00	1.59E+01	11.0000	3.467E+03
Np-237	1.1927E-05	744.596	1,489.192	0.00E+00	8.88E-03	1.78E-02		
Pa-231	1.4703E-09	744.596	1,489.192	0.00E+00	1.09E-06	2.19E-06		
Pb-210	1.6828E-10	744.596	1,489.192	0.00E+00	1.25E-07	2.51E-07		
Pm-147	6.9606E-06	744.596	1,489.192	0.00E+00	5.18E-03	1.04E-02		
Pu-238	6.6263E-02	744.596	1,489.192	0.00E+00	4.93E+01	9.87E+01		
Pu-239	1.1618E-02	744.596	1,489.192	0.00E+00	8.65E+00	1.73E+01		
Pu-240	1.5142E-02	744.596	1,489.192	0.00E+00	1.13E+01	2.25E+01		
Pu-241	4.3766E-01	744.596	1,489.192	0.00E+00	3.26E+02	6.52E+02		
Pu-242	6.4260E-05	744.596	1,489.192	0.00E+00	4.78E-02	9.57E-02		
Ra-226	3.8501E-10	744.596	1,489.192	0.00E+00	2.87E-07	5.73E-07		
Ra-228	5.2955E-12	744.596	1,489.192	0.00E+00	3.94E-09	7.89E-09		
Ru-106	2.0413E-14	744.596	1,489.192	0.00E+00	1.52E-11	3.04E-11		
Se-79	1.2376E-05	744.596	1,489.192	0.00E+00	9.21E-03	1.84E-02		
Sn-126	2.5210E-05	744.596	1,489.192	0.00E+00	1.88E-02	3.75E-02		
Sr-90	6.4163E-01	744.596	1,489.192	0.00E+00	4.78E+02	9.56E+02		
Tc-99	3.9357E-04	744.596	1,489.192	0.00E+00	2.93E-01	5.86E-01		
Th-229	1.5644E-10	744.596	1,489.192	0.00E+00	1.16E-07	2.33E-07		
Th-230	2.7972E-08	744.596	1,489.192	0.00E+00	2.08E-05	4.17E-05		
Th-232	5.3036E-12	744.596	1,489.192	0.00E+00	3.95E-09	7.90E-09		
Tl-208	1.5136E-07	744.596	1,489.192	0.00E+00	1.13E-04	2.25E-04		
U-232	4.1005E-07	744.596	1,489.192	0.00E+00	3.05E-04	6.11E-04		
U-233	2.5856E-08	744.596	1,489.192	0.00E+00	1.93E-05	3.85E-05		
U-234	5.2665E-05	744.596	1,489.192	0.00E+00	3.92E-02	7.84E-02		
U-235	-1.4487E-06	744.596	0.000	2.60E-04	0.00E+00	2.60E-04		
U-236	7.5888E-06	744.596	1,489.192	0.00E+00	5.65E-03	1.13E-02		
U-238	-2.6129E-07	744.596	0.000	5.64E-03	5.44E-03	5.64E-03		
Y-90	6.4180E-01	744.596	1,489.192	0.00E+00	4.78E+02	9.56E+02		
Other Radionuclides					7.10E+02	1.42E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.35E+01	2.69E+01
Total	Total

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-2	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	0.711001091	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nomina.:		744.596	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	304.038	1,489.192	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	1.26		1.02
Bounding:	2.52	4.90	

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: SHIPPINGPORT PWR C2 BLKT
 SNF ID #: 193
 Fuel Units & Descr: 72 - 19 FLAT PLATES
 Heavy Metal Mass: BOL=16236.00kg ; EOL=15780.00kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1969
 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:
 MCO
 18.00

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	8.7758E-10	433,632.149	867,264.298	0.00E+00	3.81E-04	7.61E-04		
Am-241	1.4352E-01	433,632.149	867,264.298	0.00E+00	6.22E+04	1.24E+05	0.0150	4.666E+16
Am-242m	2.8698E-04	433,632.149	867,264.298	0.00E+00	1.24E+02	2.49E+02	0.0250	9.410E+15
Am-243	6.2565E-04	433,632.149	867,264.298	0.00E+00	2.71E+02	5.43E+02	0.0375	8.975E+15
C-14	4.7901E-05	433,632.149	867,264.298	0.00E+00	2.08E+01	4.15E+01	0.0575	1.037E+16
Cl-36	8.0297E-07	433,632.149	867,264.298	0.00E+00	3.48E-01	6.96E-01	0.0850	5.221E+15
Cm-243	2.5081E-04	433,632.149	867,264.298	0.00E+00	1.09E+02	2.18E+02	0.1250	3.623E+15
Cm-244	4.9015E-02	433,632.149	867,264.298	0.00E+00	2.13E+04	4.25E+04	0.2250	4.477E+15
Co-60	2.5581E-03	433,632.149	867,264.298	0.00E+00	1.11E+03	2.22E+03	0.3750	1.925E+15
Cs-134	4.0536E-05	433,632.149	867,264.298	0.00E+00	1.76E+01	3.52E+01	0.5750	4.478E+16
Cs-135	1.4439E-05	433,632.149	867,264.298	0.00E+00	6.26E+00	1.25E+01	0.8500	6.195E+14
Cs-137	1.3979E+00	433,632.149	867,264.298	0.00E+00	6.06E+05	1.21E+06	1.2500	6.085E+14
Eu-154	2.0203E-02	433,632.149	867,264.298	0.00E+00	8.76E+03	1.75E+04	1.7500	1.823E+13
Eu-155	1.7684E-03	433,632.149	867,264.298	0.00E+00	7.67E+02	1.53E+03	2.2500	2.935E+09
Fe-55	4.3136E-05	433,632.149	867,264.298	0.00E+00	1.87E+01	3.74E+01	2.7500	6.011E+09
H-3	2.0769E-02	433,632.149	867,264.298	0.00E+00	9.01E+03	1.80E+04	3.5000	6.191E+08
I-129	9.8288E-07	433,632.149	867,264.298	0.00E+00	4.26E-01	8.52E-01	5.0000	2.647E+08
Kr-85	2.8214E-02	433,632.149	867,264.298	0.00E+00	1.22E+04	2.45E+04	7.0000	3.050E+07
Np-237	1.1218E-05	433,632.149	867,264.298	0.00E+00	4.86E+00	9.73E+00	11.0000	3.503E+06
Pa-231	1.3036E-09	433,632.149	867,264.298	0.00E+00	5.65E-04	1.13E-03		
Pb-210	8.5078E-11	433,632.149	867,264.298	0.00E+00	3.69E-05	7.38E-05		
Pm-147	3.6531E-04	433,632.149	867,264.298	0.00E+00	1.58E+02	3.17E+02		
Pu-238	7.4564E-02	433,632.149	867,264.298	0.00E+00	3.23E+04	6.47E+04		
Pu-239	1.1623E-02	433,632.149	867,264.298	0.00E+00	5.04E+03	1.01E+04		
Pu-240	1.5132E-02	433,632.149	867,264.298	0.00E+00	6.56E+03	1.31E+04		
Pu-241	9.0036E-01	433,632.149	867,264.298	0.00E+00	3.90E+05	7.81E+05		
Pu-242	6.4260E-05	433,632.149	867,264.298	0.00E+00	2.79E+01	5.57E+01		
Ra-226	2.2804E-10	433,632.149	867,264.298	0.00E+00	9.89E-05	1.98E-04		
Ra-228	5.2713E-12	433,632.149	867,264.298	0.00E+00	2.29E-06	4.57E-06		
Ru-106	6.1160E-10	433,632.149	867,264.298	0.00E+00	2.65E-04	5.30E-04		
Se-79	1.2377E-05	433,632.149	867,264.298	0.00E+00	5.37E+00	1.07E+01		
Sn-126	2.5210E-05	433,632.149	867,264.298	0.00E+00	1.09E+01	2.19E+01		
Sr-90	9.1667E-01	433,632.149	867,264.298	0.00E+00	3.97E+05	7.95E+05		
Tc-99	3.9357E-04	433,632.149	867,264.298	0.00E+00	1.71E+02	3.41E+02		
Th-229	1.2057E-10	433,632.149	867,264.298	0.00E+00	5.23E-05	1.05E-04		
Th-230	2.1043E-08	433,632.149	867,264.298	0.00E+00	9.13E-03	1.83E-02		
Th-232	5.2972E-12	433,632.149	867,264.298	0.00E+00	2.30E-06	4.59E-06		
Tl-208	1.7474E-07	433,632.149	867,264.298	0.00E+00	7.58E-02	1.52E-01		
U-232	4.7368E-07	433,632.149	867,264.298	0.00E+00	2.05E-01	4.11E-01		
U-233	2.5097E-08	433,632.149	867,264.298	0.00E+00	1.09E-02	2.18E-02		
U-234	5.0000E-05	433,632.149	867,264.298	0.00E+00	2.17E+01	4.34E+01		
U-235	-1.4489E-06	433,632.149	0.000	2.49E-01	0.00E+00	2.49E-01		
U-236	7.5824E-06	433,632.149	867,264.298	0.00E+00	3.29E+00	6.58E+00		
U-238	-2.6129E-07	433,632.149	0.000	5.42E+00	5.30E+00	5.42E+00		
Y-90	9.1699E-01	433,632.149	867,264.298	0.00E+00	3.98E+05	7.95E+05		
Other Radionuclides					5.82E+05	1.16E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.97E+03	1.99E+04
Total	Total

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-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	0.71	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	263,023.200	433,632.149	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	399,405.600	867,264.298	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.76	1.65	1.01
Bounding:	1.53	2.17	

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: SHIPPINGPORT PWR C2 BLKT
 SNF ID #: 192
 Fuel Units & Descr: 17 - 17 FLAT PLATES
 Heavy Metal Mass: BOL=1323.64kg ; EOL=1039.00kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1974
 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"x15"
 17.00

Radionuclide	II. Estimates		x _b	b	y _n	y _b	Gamma Sources	
	m	x _n					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	270,675.468	541,350.936	0.00E+00	2.38E-04	4.75E-04	0.0150	2.913E+16
Am-241	1.4352E-01	270,675.468	541,350.936	0.00E+00	3.88E+04	7.77E+04	0.0250	5.874E+15
Am-242m	2.8698E-04	270,675.468	541,350.936	0.00E+00	7.77E+01	1.55E+02	0.0375	5.602E+15
Am-243	6.2565E-04	270,675.468	541,350.936	0.00E+00	1.69E+02	3.39E+02	0.0575	6.473E+15
C-14	4.7901E-05	270,675.468	541,350.936	0.00E+00	1.30E+01	2.59E+01	0.0850	3.259E+15
Cl-36	8.0297E-07	270,675.468	541,350.936	0.00E+00	2.17E-01	4.35E-01	0.1250	2.262E+15
Cm-243	2.5081E-04	270,675.468	541,350.936	0.00E+00	6.79E+01	1.36E+02	0.2250	2.795E+15
Cm-244	4.9015E-02	270,675.468	541,350.936	0.00E+00	1.33E+04	2.65E+04	0.3750	1.202E+15
Co-60	2.5581E-03	270,675.468	541,350.936	0.00E+00	6.92E+02	1.38E+03	0.5750	2.795E+16
Cs-134	4.0536E-05	270,675.468	541,350.936	0.00E+00	1.10E+01	2.19E+01	0.8500	3.867E+14
Cs-135	1.4433E-05	270,675.468	541,350.936	0.00E+00	3.91E+00	7.81E+00	1.2500	3.798E+14
Cs-137	1.3979E+00	270,675.468	541,350.936	0.00E+00	3.78E+05	7.57E+05	1.7500	1.138E+15
Eu-154	2.0203E-02	270,675.468	541,350.936	0.00E+00	5.47E+03	1.09E+04	2.2500	1.832E+09
Eu-155	1.7684E-03	270,675.468	541,350.936	0.00E+00	4.79E+02	9.57E+02	2.7500	3.752E+09
Fe-55	4.3136E-05	270,675.468	541,350.936	0.00E+00	1.17E+01	2.34E+01	3.5000	3.864E+08
H-3	2.0769E-02	270,675.468	541,350.936	0.00E+00	5.62E+03	1.12E+04	5.0000	1.652E+08
I-129	9.8288E-07	270,675.468	541,350.936	0.00E+00	2.66E-01	5.32E-01	7.0000	1.904E+07
Kr-85	2.8214E-02	270,675.468	541,350.936	0.00E+00	7.64E+03	1.53E+04	11.0000	2.187E+06
Np-237	1.1218E-05	270,675.468	541,350.936	0.00E+00	3.04E+00	6.07E+00		
Pa-231	1.3036E-09	270,675.468	541,350.936	0.00E+00	3.53E-04	7.06E-04		
Pb-210	8.5078E-11	270,675.468	541,350.936	0.00E+00	2.30E-05	4.61E-05		
Pm-147	3.6531E-04	270,675.468	541,350.936	0.00E+00	9.89E+01	1.98E+02		
Pu-238	7.4564E-02	270,675.468	541,350.936	0.00E+00	2.02E+04	4.04E+04		
Pu-239	1.1623E-02	270,675.468	541,350.936	0.00E+00	3.15E+03	6.29E+03		
Pu-240	1.5132E-02	270,675.468	541,350.936	0.00E+00	4.10E+03	8.19E+03		
Pu-241	9.0036E-01	270,675.468	541,350.936	0.00E+00	2.44E+05	4.87E+05		
Pu-242	6.4260E-05	270,675.468	541,350.936	0.00E+00	1.74E+01	3.48E+01		
Ra-226	2.2804E-10	270,675.468	541,350.936	0.00E+00	6.17E-05	1.23E-04		
Ra-228	5.2713E-12	270,675.468	541,350.936	0.00E+00	1.43E-06	2.85E-06		
Ru-106	6.1160E-10	270,675.468	541,350.936	0.00E+00	1.66E-04	3.31E-04		
Se-79	1.2377E-05	270,675.468	541,350.936	0.00E+00	3.35E+00	6.70E+00		
Sn-126	2.5210E-05	270,675.468	541,350.936	0.00E+00	6.82E+00	1.36E+01		
Sr-90	9.1667E-01	270,675.468	541,350.936	0.00E+00	2.48E+05	4.96E+05		
Tc-99	3.9357E-04	270,675.468	541,350.936	0.00E+00	1.07E+02	2.13E+02		
Th-229	1.2057E-10	270,675.468	541,350.936	0.00E+00	3.26E-05	6.53E-05		
Th-230	2.1043E-08	270,675.468	541,350.936	0.00E+00	5.70E-03	1.14E-02		
Th-232	5.2972E-12	270,675.468	541,350.936	0.00E+00	1.43E-06	2.87E-06		
Ti-208	1.7474E-07	270,675.468	541,350.936	0.00E+00	4.73E-02	9.46E-02		
U-232	4.7368E-07	270,675.468	541,350.936	0.00E+00	1.28E-01	2.56E-01		
U-233	2.5097E-08	270,675.468	541,350.936	0.00E+00	6.79E-03	1.36E-02		
U-234	5.0000E-05	270,675.468	541,350.936	0.00E+00	1.35E+01	2.71E+01		
U-235	-1.4489E-06	270,675.468	0.000	2.03E-02	0.00E+00	2.03E-02		
U-236	7.5824E-06	270,675.468	541,350.936	0.00E+00	2.05E+00	4.10E+00		
U-238	-2.6129E-07	270,675.468	0.000	4.42E-01	3.71E-01	4.42E-01		
Y-90	9.1699E-01	270,675.468	541,350.936	0.00E+00	2.48E+05	4.96E+05		
Other Radionuclides					3.63E+05	7.27E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.23E+03	1.25E+04
Total	Total

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-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	0.70999887	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	18,892.247	270,675.468	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		541,350.936	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	5.84	14.33	1.17
Bounding:	11.69		

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: SHIPPINGPORT PWR-C1-S4
 SNF ID #: 194
 Fuel Units & Descr: 1 - 17 FLAT PLATES
 Heavy Metal Mass: BOL=3.02kg : EOL=2.06kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1964
 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"x15"
 1.00

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	2.3344E-08	907.995	1,815.991	0.00E+00	2.12E-05	4.24E-05		
Am-241	1.1135E-04	907.995	1,815.991	0.00E+00	1.01E-01	2.02E-01	0.0150	1.355E+14
Am-242m	8.5075E-09	907.995	1,815.991	0.00E+00	7.72E-06	1.54E-05	0.0250	2.817E+13
Am-243	9.8519E-10	907.995	1,815.991	0.00E+00	8.95E-07	1.79E-06	0.0375	2.436E+13
C-14	2.3012E-04	907.995	1,815.991	0.00E+00	2.09E-01	4.18E-01	0.0575	2.626E+13
Cl-36	1.2261E-06	907.995	1,815.991	0.00E+00	1.11E-03	2.23E-03	0.0850	1.587E+13
Cm-243	2.4875E-10	907.995	1,815.991	0.00E+00	2.26E-07	4.52E-07	0.1250	1.030E+13
Cm-244	2.3178E-09	907.995	1,815.991	0.00E+00	2.10E-06	4.21E-06	0.2250	1.366E+13
Co-60	7.0849E-02	907.995	1,815.991	0.00E+00	6.43E+01	1.29E+02	0.3750	5.957E+12
Cs-134	3.0266E-06	907.995	1,815.991	0.00E+00	2.75E-03	5.50E-03	0.5750	9.813E+13
Cs-135	3.0316E-05	907.995	1,815.991	0.00E+00	2.75E-02	5.51E-02	0.8500	9.933E+11
Cs-137	1.4511E+00	907.995	1,815.991	0.00E+00	1.32E+03	2.64E+03	1.2500	9.873E+12
Eu-154	6.6955E-04	907.995	1,815.991	0.00E+00	6.08E-01	1.22E+00	1.7500	2.563E+10
Eu-155	6.9850E-04	907.995	1,815.991	0.00E+00	6.34E-01	1.27E+00	2.2500	5.320E+07
Fe-55	1.2318E-03	907.995	1,815.991	0.00E+00	1.12E+00	2.24E+00	2.7500	1.538E+06
H-3	2.5141E-03	907.995	1,815.991	0.00E+00	2.28E+00	4.57E+00	3.5000	1.083E+02
I-129	7.3195E-07	907.995	1,815.991	0.00E+00	6.65E-04	1.33E-03	5.0000	4.454E+01
Kr-85	4.1281E-02	907.995	1,815.991	0.00E+00	3.75E+01	7.50E+01	7.0000	4.918E+00
Np-237	1.1489E-06	907.995	1,815.991	0.00E+00	1.04E-03	2.09E-03	11.0000	5.518E-01
Pa-231	4.5241E-08	907.995	1,815.991	0.00E+00	4.11E-05	8.22E-05		
Pb-210	6.4476E-13	907.995	1,815.991	0.00E+00	5.85E-10	1.17E-09		
Pm-147	1.1651E-03	907.995	1,815.991	0.00E+00	1.06E+00	2.12E+00		
Pu-238	2.9517E-04	907.995	1,815.991	0.00E+00	2.68E-01	5.36E-01		
Pu-239	6.6772E-04	907.995	1,815.991	0.00E+00	6.06E-01	1.21E+00		
Pu-240	8.6839E-05	907.995	1,815.991	0.00E+00	7.88E-02	1.58E-01		
Pu-241	7.1514E-04	907.995	1,815.991	0.00E+00	6.49E-01	1.30E+00		
Pu-242	1.9717E-09	907.995	1,815.991	0.00E+00	1.79E-06	3.58E-06		
Ra-226	1.7654E-12	907.995	1,815.991	0.00E+00	1.60E-09	3.21E-09		
Ra-228	8.2928E-12	907.995	1,815.991	0.00E+00	7.53E-09	1.51E-08		
Ru-106	1.8419E-10	907.995	1,815.991	0.00E+00	1.67E-07	3.34E-07		
Se-79	1.3223E-05	907.995	1,815.991	0.00E+00	1.20E-02	2.40E-02		
Sn-126	1.1493E-05	907.995	1,815.991	0.00E+00	1.04E-02	2.09E-02		
Sr-90	1.3649E+00	907.995	1,815.991	0.00E+00	1.24E+03	2.48E+03		
Tc-99	4.6656E-04	907.995	1,815.991	0.00E+00	4.24E-01	8.47E-01		
Th-229	1.4547E-11	907.995	1,815.991	0.00E+00	1.32E-08	2.64E-08		
Th-230	1.6617E-10	907.995	1,815.991	0.00E+00	1.51E-07	3.02E-07		
Th-232	8.3361E-12	907.995	1,815.991	0.00E+00	7.57E-09	1.51E-08		
Tl-208	2.1664E-08	907.995	1,815.991	0.00E+00	1.97E-05	3.93E-05		
U-232	5.8669E-08	907.995	1,815.991	0.00E+00	5.33E-05	1.07E-04		
U-233	3.1847E-09	907.995	1,815.991	0.00E+00	2.89E-06	5.78E-06		
U-234	3.8769E-07	907.995	1,815.991	0.00E+00	3.52E-04	7.04E-04		
U-235	-2.7761E-06	907.995	0.000	6.08E-03	3.56E-03	6.08E-03		
U-236	1.6190E-05	907.995	1,815.991	0.00E+00	1.47E-02	2.94E-02		
U-238	-2.8547E-09	907.995	0.000	7.12E-05	6.86E-05	7.12E-05		
Y-90	1.3652E+00	907.995	1,815.991	0.00E+00	1.24E+03	2.48E+03		
Other Radionuclides					1.50E+03	3.00E+03		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							1.59E+01	3.17E+01
							Total	Total

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 Pathfinder Template on all but one parameter (cladding, but substituting Stainless Steel is a good conservative assumption).
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	LIGHT WATER	LIGHT WATER	
BOL HM Constituents:	ZIRC-2	SST	
BOL Enrichment %:	U-Zr	U	
	92.9998016	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:		907.995	
Bounding:		1,815.991	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	6.44		
Bounding:	12.87		
			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: SHIPPINGPORT PWR-C2-S1
 SNF ID #: 195
 Fuel Units & Descr: 19 - 19 FLAT PLATES
 Heavy Metal Mass: BOL=343.23kg ; EOL=220.03kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1969
 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"x15"
 19.00

II. Estimates

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3344E-08	116,375.011	232,750.022	0.00E+00	2.72E-03	5.43E-03	Avg. MeV	
Am-241	1.1135E-04	116,375.011	232,750.022	0.00E+00	1.30E+01	2.59E+01	0.0150	1.737E+16
Am-242m	8.5075E-09	116,375.011	232,750.022	0.00E+00	9.90E-04	1.98E-03	0.0250	3.610E+15
Am-243	9.8519E-10	116,375.011	232,750.022	0.00E+00	1.15E-04	2.29E-04	0.0375	3.123E+15
C-14	2.3012E-04	116,375.011	232,750.022	0.00E+00	2.68E+01	5.36E+01	0.0575	3.366E+15
Cf-252	1.2261E-06	116,375.011	232,750.022	0.00E+00	1.43E-01	2.85E-01	0.0850	2.034E+15
Cm-243	2.4875E-10	116,375.011	232,750.022	0.00E+00	2.89E-05	5.79E-05	0.1250	1.320E+15
Cm-244	2.3178E-09	116,375.011	232,750.022	0.00E+00	2.70E-04	5.39E-04	0.2250	1.750E+15
Co-60	7.0849E-02	116,375.011	232,750.022	0.00E+00	8.25E+03	1.65E+04	0.3750	7.635E+14
Cs-134	3.0266E-06	116,375.011	232,750.022	0.00E+00	3.52E-01	7.04E-01	0.5750	1.258E+16
Cs-135	3.0316E-05	116,375.011	232,750.022	0.00E+00	3.53E+00	7.06E+00	0.8500	1.273E+14
Cs-137	1.4511E+00	116,375.011	232,750.022	0.00E+00	1.69E+05	3.38E+05	1.2500	1.265E+15
Eu-154	6.6955E-04	116,375.011	232,750.022	0.00E+00	7.79E+01	1.56E+02	1.7500	3.285E+12
Eu-155	6.9850E-04	116,375.011	232,750.022	0.00E+00	8.13E+01	1.63E+02	2.2500	6.818E+09
Fe-55	1.2318E-03	116,375.011	232,750.022	0.00E+00	1.43E+02	2.87E+02	2.7500	1.971E+08
H-3	2.5141E-03	116,375.011	232,750.022	0.00E+00	2.93E+02	5.85E+02	3.5000	1.387E+04
I-129	7.3195E-07	116,375.011	232,750.022	0.00E+00	8.52E-02	1.70E-01	5.0000	5.704E+03
Kr-85	4.1281E-02	116,375.011	232,750.022	0.00E+00	4.80E+03	9.61E+03	7.0000	6.299E+02
Np-237	1.1489E-06	116,375.011	232,750.022	0.00E+00	1.34E-01	2.67E-01	11.0000	7.068E+01
Pa-231	4.5241E-08	116,375.011	232,750.022	0.00E+00	5.26E-03	1.05E-02		
Pb-210	6.4476E-13	116,375.011	232,750.022	0.00E+00	7.50E-08	1.50E-07		
Pm-147	1.1651E-03	116,375.011	232,750.022	0.00E+00	1.36E+02	2.71E+02		
Pu-238	2.9517E-04	116,375.011	232,750.022	0.00E+00	3.44E+01	6.87E+01		
Pu-239	6.6772E-04	116,375.011	232,750.022	0.00E+00	7.77E+01	1.55E+02		
Pu-240	8.6839E-05	116,375.011	232,750.022	0.00E+00	1.01E+01	2.02E+01		
Pu-241	7.1514E-04	116,375.011	232,750.022	0.00E+00	8.32E+01	1.66E+02		
Pu-242	1.9717E-09	116,375.011	232,750.022	0.00E+00	2.29E-04	4.59E-04		
Ra-226	1.7654E-12	116,375.011	232,750.022	0.00E+00	2.05E-07	4.11E-07		
Ra-228	8.2928E-12	116,375.011	232,750.022	0.00E+00	9.65E-07	1.93E-06		
Ru-106	1.8419E-10	116,375.011	232,750.022	0.00E+00	2.14E-05	4.29E-05		
Se-79	1.3223E-05	116,375.011	232,750.022	0.00E+00	1.54E+00	3.08E+00		
Sn-126	1.1493E-05	116,375.011	232,750.022	0.00E+00	1.34E+00	2.67E+00		
Sr-90	1.3649E+00	116,375.011	232,750.022	0.00E+00	1.59E+05	3.18E+05		
Tc-99	4.6656E-04	116,375.011	232,750.022	0.00E+00	5.43E+01	1.09E+02		
Th-229	1.4547E-11	116,375.011	232,750.022	0.00E+00	1.69E-06	3.39E-06		
Th-230	1.6617E-10	116,375.011	232,750.022	0.00E+00	1.93E-05	3.87E-05		
Th-232	8.3361E-12	116,375.011	232,750.022	0.00E+00	9.70E-07	1.94E-06		
Tl-208	2.1664E-08	116,375.011	232,750.022	0.00E+00	2.52E-03	5.04E-03		
U-232	5.8669E-08	116,375.011	232,750.022	0.00E+00	6.83E-03	1.37E-02		
U-233	3.1847E-09	116,375.011	232,750.022	0.00E+00	3.71E-04	7.41E-04		
U-234	3.8769E-07	116,375.011	232,750.022	0.00E+00	4.51E-02	9.02E-02		
U-235	-2.7761E-06	116,375.011	0.000	6.90E-01	3.67E-01	6.90E-01		
U-236	1.6190E-05	116,375.011	232,750.022	0.00E+00	1.88E+00	3.77E+00		
U-238	-2.8547E-09	116,375.011	0.000	8.07E-03	7.74E-03	8.07E-03		
Y-90	1.3652E+00	116,375.011	232,750.022	0.00E+00	1.59E+05	3.18E+05		
Other Radionuclides					1.92E+05	3.84E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.03E+03	4.06E+03
Total	Total

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 Pathfinder Template on all but one parameter (cladding, but substituting Stainless Steel is a good conservative assumption).
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	LIGHT WATER	LIGHT WATER	
BOL HM Constituents:	ZIRC-2	SST	
BOL Enrichment %:	UO2	U	
	93.00008304	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:		116,375.011	
Bounding:		232,750.022	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	7.27		
Bounding:	14.54		
			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: SHIPPINGPORT PWR-C2-S2
 SNF ID #: 196
 Fuel Units & Descr: 20 - 19 FLAT PLATES
 Heavy Metal Mass: BOL=419.35kg ; EOL=301.59kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1974
 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"x15"
 20.00

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)		
Ac-227	2.3344E-08	111,247.369	222,494.739	0.00E+00	2.60E-03	5.19E-03	Avg. MeV	
Am-241	1.1135E-04	111,247.369	222,494.739	0.00E+00	1.24E+01	2.48E+01	0.0150	1.661E+16
Am-242m	8.5075E-09	111,247.369	222,494.739	0.00E+00	9.46E-04	1.89E-03	0.0250	3.451E+15
Am-243	9.8519E-10	111,247.369	222,494.739	0.00E+00	1.10E-04	2.19E-04	0.0375	2.985E+15
C-14	2.3012E-04	111,247.369	222,494.739	0.00E+00	2.56E+01	5.12E+01	0.0575	3.217E+15
Cl-36	1.2261E-06	111,247.369	222,494.739	0.00E+00	1.36E-01	2.73E-01	0.0850	1.944E+15
Cm-243	2.4875E-10	111,247.369	222,494.739	0.00E+00	2.77E-05	5.53E-05	0.1250	1.262E+15
Cm-244	2.3178E-09	111,247.369	222,494.739	0.00E+00	2.58E-04	5.16E-04	0.2250	1.673E+15
Co-60	7.0849E-02	111,247.369	222,494.739	0.00E+00	7.88E+03	1.58E+04	0.3750	7.298E+14
Cs-134	3.0266E-06	111,247.369	222,494.739	0.00E+00	3.37E-01	6.73E-01	0.5750	1.202E+16
Cs-135	3.0316E-05	111,247.369	222,494.739	0.00E+00	3.37E+00	6.75E+00	0.8500	1.217E+14
Cs-137	1.4511E+00	111,247.369	222,494.739	0.00E+00	1.61E+05	3.23E+05	1.2500	1.210E+15
Eu-154	6.6955E-04	111,247.369	222,494.739	0.00E+00	7.45E+01	1.49E+02	1.7500	3.140E+12
Eu-155	6.9850E-04	111,247.369	222,494.739	0.00E+00	7.77E+01	1.55E+02	2.2500	6.517E+09
Fe-55	1.2318E-03	111,247.369	222,494.739	0.00E+00	1.37E+02	2.74E+02	2.7500	1.884E+08
H-3	2.5141E-03	111,247.369	222,494.739	0.00E+00	2.80E+02	5.59E+02	3.5000	1.328E+04
I-129	7.3195E-07	111,247.369	222,494.739	0.00E+00	8.14E-02	1.63E-01	5.0000	5.461E+03
Kr-85	4.1281E-02	111,247.369	222,494.739	0.00E+00	4.59E+03	9.18E+03	7.0000	6.030E+02
Np-237	1.1489E-06	111,247.369	222,494.739	0.00E+00	1.28E-01	2.56E-01	11.0000	6.766E+01
Pu-238	4.5241E-08	111,247.369	222,494.739	0.00E+00	5.03E-03	1.01E-02		
Pu-239	6.4476E-13	111,247.369	222,494.739	0.00E+00	7.17E-08	1.43E-07		
Pu-240	1.1651E-03	111,247.369	222,494.739	0.00E+00	1.30E+02	2.59E+02		
Pu-241	2.9517E-04	111,247.369	222,494.739	0.00E+00	3.28E+01	6.57E+01		
Pu-242	6.6772E-04	111,247.369	222,494.739	0.00E+00	7.43E+01	1.49E+02		
Pu-243	8.6839E-05	111,247.369	222,494.739	0.00E+00	9.66E+00	1.93E+01		
Pu-244	7.1514E-04	111,247.369	222,494.739	0.00E+00	7.96E+01	1.59E+02		
Pu-245	1.9717E-09	111,247.369	222,494.739	0.00E+00	2.19E-04	4.39E-04		
Ra-226	1.7654E-12	111,247.369	222,494.739	0.00E+00	1.96E-07	3.93E-07		
Ra-228	8.2928E-12	111,247.369	222,494.739	0.00E+00	9.23E-07	1.85E-06		
Ru-106	1.8419E-10	111,247.369	222,494.739	0.00E+00	2.05E-05	4.10E-05		
Se-79	1.3223E-05	111,247.369	222,494.739	0.00E+00	1.47E+00	2.94E+00		
Sn-126	1.1493E-05	111,247.369	222,494.739	0.00E+00	1.28E+00	2.56E+00		
Sr-90	1.3649E+00	111,247.369	222,494.739	0.00E+00	1.52E+05	3.04E+05		
Tc-99	4.6656E-04	111,247.369	222,494.739	0.00E+00	5.19E+01	1.04E+02		
Th-229	1.4547E-11	111,247.369	222,494.739	0.00E+00	1.62E-06	3.24E-06		
Th-230	1.6617E-10	111,247.369	222,494.739	0.00E+00	1.85E-05	3.70E-05		
Th-232	8.3361E-12	111,247.369	222,494.739	0.00E+00	9.27E-07	1.85E-06		
Ti-208	2.1664E-08	111,247.369	222,494.739	0.00E+00	2.41E-03	4.82E-03		
U-232	5.8669E-08	111,247.369	222,494.739	0.00E+00	6.53E-03	1.31E-02		
U-233	3.1847E-09	111,247.369	222,494.739	0.00E+00	3.54E-04	7.09E-04		
U-234	3.8769E-07	111,247.369	222,494.739	0.00E+00	4.31E-02	8.63E-02		
U-235	-2.7761E-06	111,247.369	0.000	8.43E-01	5.34E-01	8.43E-01		
U-236	1.6190E-05	111,247.369	222,494.739	0.00E+00	1.80E+00	3.60E+00		
U-238	-2.8547E-09	111,247.369	0.000	9.87E-03	9.55E-03	9.87E-03		
Y-90	1.3652E+00	111,247.369	222,494.739	0.00E+00	1.52E+05	3.04E+05		
Other Radionuclides					1.84E+05	3.67E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.84E+03	3.88E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons: This fuel matches Pathfinder Template on all but one parameter (cladding, but substituting Stainless Steel is a good conservative assumption).
Fuel Cladding:	ZIRC-2	SST	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	93.00000016	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Nominal:		111,247.369	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		222,494.739	

Checks		
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup
Nominal:	5.69	
Bounding:	11.37	
		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: SINGLE PASS REACTOR FUEL
 SNF ID #: 197
 Fuel Units & Descr: 139 - TUBE
 Heavy Metal Mass: BOL= : EOL=407.01kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1971
 Estimates as of: 2010
 Template: N-Reactor (Graphite, Zirc, 0 to 5%, U)
²Template Burnup(MWd): 69600
 Template BOL Heavy Metal Mass (MT): 11.6
 Template Decay Time: 35 years

Estimated
 Canister usage:
 MCO
 0.14

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	4.2184E-10	407.392	1,234.805	0.00E+00	1.72E-07	5.21E-07	0.0150	6.000E+13
Am-241	9.6379E-02	407.392	1,234.805	0.00E+00	3.93E+01	1.19E+02	0.0250	1.226E+13
Am-242m	5.8463E-05	407.392	1,234.805	0.00E+00	2.38E-02	7.22E-02	0.0375	1.134E+13
Am-243	4.6279E-05	407.392	1,234.805	0.00E+00	1.89E-02	5.71E-02	0.0575	1.295E+13
C-14	9.2026E-05	407.392	1,234.805	0.00E+00	3.75E-02	1.14E-01	0.0850	6.808E+12
Cl-36	0.0000E+00	407.392	1,234.805	0.00E+00	0.00E+00	0.00E+00	0.1250	4.521E+12
Cm-243	0.0000E+00	407.392	1,234.805	0.00E+00	0.00E+00	0.00E+00	0.2250	5.841E+12
Cm-244	4.5445E-04	407.392	1,234.805	0.00E+00	1.85E-01	5.61E-01	0.3750	2.528E+12
Co-60	6.3707E-05	407.392	1,234.805	0.00E+00	2.60E-02	7.87E-02	0.5750	5.453E+13
Cs-134	1.4042E-05	407.392	1,234.805	0.00E+00	5.72E-03	1.73E-02	0.8500	5.540E+11
Cs-135	1.0066E-05	407.392	1,234.805	0.00E+00	4.10E-03	1.24E-02	1.2500	3.022E+11
Cs-137	1.1945E+00	407.392	1,234.805	0.00E+00	4.87E+02	1.48E+03	1.7500	1.533E+10
Eu-154	6.6451E-03	407.392	1,234.805	0.00E+00	2.71E+00	8.21E+00	2.2500	1.239E+06
Eu-155	2.9052E-04	407.392	1,234.805	0.00E+00	1.18E-01	3.59E-01	2.7500	2.970E+04
Fe-55	2.8807E-06	407.392	1,234.805	0.00E+00	1.17E-03	3.56E-03	3.5000	2.627E+04
H-3	2.1063E-03	407.392	1,234.805	0.00E+00	8.58E-01	2.60E+00	5.0000	1.109E+04
I-129	8.6006E-07	407.392	1,234.805	0.00E+00	3.50E-04	1.06E-03	7.0000	1.257E+03
Kr-85	2.6739E-02	407.392	1,234.805	0.00E+00	1.09E+01	3.30E+01	11.0000	1.433E+02
Np-237	8.5589E-06	407.392	1,234.805	0.00E+00	3.49E-03	1.06E-02		
Pa-231	1.2500E-09	407.392	1,234.805	0.00E+00	5.09E-07	1.54E-06		
Pb-210	2.3017E-11	407.392	1,234.805	0.00E+00	9.38E-09	2.84E-08		
Pm-147	5.9856E-04	407.392	1,234.805	0.00E+00	2.44E-01	7.39E-01		
Pu-238	2.0029E-02	407.392	1,234.805	0.00E+00	8.16E+00	2.47E+01		
Pu-239	2.8836E-02	407.392	1,234.805	0.00E+00	1.17E+01	3.56E+01		
Pu-240	2.2802E-02	407.392	1,234.805	0.00E+00	9.29E+00	2.82E+01		
Pu-241	6.1020E-01	407.392	1,234.805	0.00E+00	2.49E+02	7.53E+02		
Pu-242	1.4526E-05	407.392	1,234.805	0.00E+00	5.92E-03	1.79E-02		
Ra-226	9.7701E-11	407.392	1,234.805	0.00E+00	3.98E-08	1.21E-07		
Ra-228	1.1068E-14	407.392	1,234.805	0.00E+00	4.51E-12	1.37E-11		
Ru-106	5.9224E-10	407.392	1,234.805	0.00E+00	2.41E-07	7.31E-07		
Se-79	1.0899E-05	407.392	1,234.805	0.00E+00	4.44E-03	1.35E-02		
Sn-126	0.0000E+00	407.392	1,234.805	0.00E+00	0.00E+00	0.00E+00		
Sr-90	8.4899E-01	407.392	1,234.805	0.00E+00	3.46E+02	1.05E+03		
Tc-99	3.6494E-04	407.392	1,234.805	0.00E+00	1.49E-01	4.51E-01		
Th-229	1.2928E-12	407.392	1,234.805	0.00E+00	5.27E-10	1.60E-09		
Th-230	1.6293E-08	407.392	1,234.805	0.00E+00	6.64E-06	2.01E-05		
Th-232	1.6451E-14	407.392	1,234.805	0.00E+00	6.70E-12	2.03E-11		
Tl-208	3.4382E-15	407.392	1,234.805	0.00E+00	1.40E-12	4.25E-12		
U-232	0.0000E+00	407.392	1,234.805	0.00E+00	0.00E+00	0.00E+00		
U-233	9.9425E-10	407.392	1,234.805	0.00E+00	4.05E-07	1.23E-06		
U-234	6.5575E-05	407.392	1,234.805	0.00E+00	2.67E-02	8.10E-02		
U-235	-1.2944E-06	407.392	0.000	8.34E-03	7.81E-03	8.34E-03		
U-236	1.1951E-05	407.392	1,234.805	0.00E+00	4.87E-03	1.48E-02		
U-238	-3.0619E-07	407.392	0.000	1.36E-01	1.35E-01	1.36E-01		
Y-90	8.4928E-01	407.392	1,234.805	0.00E+00	3.46E+02	1.05E+03		
Other Radionuclides					4.67E+02	1.42E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.85E+00	2.11E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: GRAPHITE	Used: GRAPHITE	This Template was used for the following reasons: This fuel matches on all parameters except cladding and enrichment (unknown)
Fuel Cladding:	ALUM (X-8001)	ZIRC	
BOL HM Constituents:	U METAL	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	Nominal burnup taken from SFD and converted to MWd using BOL=407.392kg Bounding burnup taken from SFD and converted to MWd using BOL=407.392kg
Bounding:		407.392 1,234.805	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	1.00
Bounding:	0.17 0.51		

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: SINGLE PASS REACTOR FUEL
 SNF ID #: 198
 Fuel Units & Descr: 835 - TUBE
 Heavy Metal Mass: BOL= ; EOL=2912.98kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1971
 Estimates as of: 2010
 Template: N-Reactor (Graphite, Zirc. 0 to 5%, U)
²Template Burnup(MWd): 69600
 Template BOL Heavy Metal Mass (MT): 11.6
 Template Decay Time: 35 years

Estimated
 Canister usage:
 MCO
 0.86

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)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.2184E-10	8,854.686	17,709.372	0.00E+00	3.74E-06	7.47E-06	Avg. MeV	
Am-241	9.6379E-02	8,854.686	17,709.372	0.00E+00	8.53E+02	1.71E+03	0.0150	8.605E+14
Am-242m	5.8463E-05	8,854.686	17,709.372	0.00E+00	5.18E-01	1.04E+00	0.0250	1.759E+14
Am-243	4.6279E-05	8,854.686	17,709.372	0.00E+00	4.10E-01	8.20E-01	0.0375	1.627E+14
C-14	9.2026E-05	8,854.686	17,709.372	0.00E+00	8.15E-01	1.63E+00	0.0575	1.857E+14
Cl-36	0.0000E+00	8,854.686	17,709.372	0.00E+00	0.00E+00	0.00E+00	0.0850	9.764E+13
Cm-243	0.0000E+00	8,854.686	17,709.372	0.00E+00	0.00E+00	0.00E+00	0.1250	6.485E+13
Cm-244	4.5445E-04	8,854.686	17,709.372	0.00E+00	4.02E+00	8.05E+00	0.2250	8.377E+13
Co-60	6.3707E-05	8,854.686	17,709.372	0.00E+00	5.64E-01	1.13E+00	0.3750	3.625E+13
Cs-134	1.4042E-05	8,854.686	17,709.372	0.00E+00	1.24E-01	2.49E-01	0.5750	7.820E+14
Cs-135	1.0066E-05	8,854.686	17,709.372	0.00E+00	8.91E-02	1.78E-01	0.8500	7.945E+12
Cs-137	1.1945E+00	8,854.686	17,709.372	0.00E+00	1.06E+04	2.12E+04	1.2500	4.334E+12
Eu-154	6.6451E-03	8,854.686	17,709.372	0.00E+00	5.88E+01	1.18E+02	1.7500	2.198E+11
Eu-155	2.9052E-04	8,854.686	17,709.372	0.00E+00	2.57E+00	5.14E+00	2.2500	1.776E+07
Fe-55	2.8807E-06	8,854.686	17,709.372	0.00E+00	2.55E-02	5.10E-02	2.7500	4.201E+05
H-3	2.1063E-03	8,854.686	17,709.372	0.00E+00	1.87E+01	3.73E+01	3.5000	3.716E+05
I-129	8.6006E-07	8,854.686	17,709.372	0.00E+00	7.62E-03	1.52E-02	5.0000	1.568E+05
Kr-85	2.6739E-02	8,854.686	17,709.372	0.00E+00	2.37E+02	4.74E+02	7.0000	1.778E+04
Np-237	8.5589E-06	8,854.686	17,709.372	0.00E+00	7.58E-02	1.52E-01	11.0000	2.025E+03
Pa-231	1.2500E-09	8,854.686	17,709.372	0.00E+00	1.11E-05	2.21E-05		
Pb-210	2.3017E-11	8,854.686	17,709.372	0.00E+00	2.04E-07	4.08E-07		
Pm-147	5.9856E-04	8,854.686	17,709.372	0.00E+00	5.30E+00	1.06E+01		
Pu-238	2.0029E-02	8,854.686	17,709.372	0.00E+00	1.77E+02	3.55E+02		
Pu-239	2.8836E-02	8,854.686	17,709.372	0.00E+00	2.55E+02	5.11E+02		
Pu-240	2.2802E-02	8,854.686	17,709.372	0.00E+00	2.02E+02	4.04E+02		
Pu-241	6.1020E-01	8,854.686	17,709.372	0.00E+00	5.40E+03	1.08E+04		
Pu-242	1.4526E-05	8,854.686	17,709.372	0.00E+00	1.29E-01	2.57E-01		
Ra-226	9.7701E-11	8,854.686	17,709.372	0.00E+00	8.65E-07	1.73E-06		
Ra-228	1.1068E-14	8,854.686	17,709.372	0.00E+00	9.80E-11	1.96E-10		
Ru-106	5.9224E-10	8,854.686	17,709.372	0.00E+00	5.24E-06	1.05E-05		
Se-79	1.0899E-05	8,854.686	17,709.372	0.00E+00	9.65E-02	1.93E-01		
Sn-126	0.0000E+00	8,854.686	17,709.372	0.00E+00	0.00E+00	0.00E+00		
Sr-90	8.4899E-01	8,854.686	17,709.372	0.00E+00	7.52E+03	1.50E+04		
Tc-99	3.6494E-04	8,854.686	17,709.372	0.00E+00	3.23E+00	6.46E+00		
Th-229	1.2928E-12	8,854.686	17,709.372	0.00E+00	1.14E-08	2.29E-08		
Th-230	1.6293E-08	8,854.686	17,709.372	0.00E+00	1.44E-04	2.89E-04		
Th-232	1.6451E-14	8,854.686	17,709.372	0.00E+00	1.46E-10	2.91E-10		
Ti-208	3.4382E-15	8,854.686	17,709.372	0.00E+00	3.04E-11	6.09E-11		
U-232	0.0000E+00	8,854.686	17,709.372	0.00E+00	0.00E+00	0.00E+00		
U-233	9.9425E-10	8,854.686	17,709.372	0.00E+00	8.80E-06	1.76E-05		
U-234	6.5575E-05	8,854.686	17,709.372	0.00E+00	5.81E-01	1.16E+00		
U-235	-1.2944E-06	8,854.686	0.000	5.98E-02	4.83E-02	5.98E-02		
U-236	1.1951E-05	8,854.686	17,709.372	0.00E+00	1.06E-01	2.12E-01		
U-238	-3.0619E-07	8,854.686	0.000	9.72E-01	9.69E-01	9.72E-01		
Y-90	8.4928E-01	8,854.686	17,709.372	0.00E+00	7.52E+03	1.50E+04		
Other Radionuclides					1.02E+04	2.03E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.51E+02	3.02E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Reactor Moderator:	GRAPHITE	GRAPHITE	This Template was used for the following reasons: This fuel matches on all parameters except cladding and enrichment (unknowns)
Fuel Cladding:	ALUM (X-8001)	ZIRC	
BOL HM Constituents:	U METAL	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Nominal:		8,854.686	Nominal burnup taken from SFD and converted to MWd using BOL=2921.374kg Bounding burnup assumed to be twice nominal burnup.
Bounding:		17,709.372	

Checks		
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup
Nominal:	0.51	
Bounding:	1.01	
		Estimated EOL HM/Given EOL HM
		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: SLOWPOKE (CANADA)
 SNF ID #: 1065
 Fuel Units & Descr: 1 - 297 ROD ARRAY
 Heavy Metal Mass: BOL=.88kg ; EOL=.87kg
 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"
 0.25

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	12.528	25.057	0.00E+00	1.82E-09	3.64E-09		
Am-241	1.1190E-03	12.528	25.057	0.00E+00	1.40E-02	2.80E-02	0.0150	4.834E+12
Am-242m	4.5425E-07	12.528	25.057	0.00E+00	5.69E-06	1.14E-05	0.0250	1.041E+12
Am-243	1.4921E-06	12.528	25.057	0.00E+00	1.87E-05	3.74E-05	0.0375	9.610E+11
C-14	5.7244E-09	12.528	25.057	0.00E+00	7.17E-08	1.43E-07	0.0575	9.450E+11
Cl-36	1.3124E-32	12.528	25.057	0.00E+00	1.64E-31	3.29E-31	0.0850	6.024E+11
Cm-243	2.3676E-07	12.528	25.057	0.00E+00	2.97E-06	5.93E-06	0.1250	5.217E+11
Cm-244	5.2042E-05	12.528	25.057	0.00E+00	6.52E-04	1.30E-03	0.2250	5.106E+11
Co-60	3.8208E-05	12.528	25.057	0.00E+00	4.79E-04	9.57E-04	0.3750	2.471E+11
Cs-134	4.8693E-01	12.528	25.057	0.00E+00	6.10E+00	1.22E+01	0.5750	3.395E+12
Cs-135	3.4477E-06	12.528	25.057	0.00E+00	4.32E-05	8.64E-05	0.8500	4.754E+11
Cs-137	2.8731E+00	12.528	25.057	0.00E+00	3.60E+01	7.20E+01	1.2500	8.845E+10
Eu-154	8.2053E-02	12.528	25.057	0.00E+00	1.03E+00	2.06E+00	1.7500	3.710E+09
Eu-155	3.9134E-02	12.528	25.057	0.00E+00	4.90E-01	9.81E-01	2.2500	7.781E+09
Fe-55	6.7429E-03	12.528	25.057	0.00E+00	8.45E-02	1.69E-01	2.7500	4.476E+07
H-3	1.0599E-02	12.528	25.057	0.00E+00	1.33E-01	2.66E-01	3.5000	4.966E+06
I-129	7.5300E-07	12.528	25.057	0.00E+00	9.43E-06	1.89E-05	5.0000	1.490E+01
Kr-85	2.8595E-01	12.528	25.057	0.00E+00	3.58E+00	7.16E+00	7.0000	1.661E+00
Np-237	9.5479E-06	12.528	25.057	0.00E+00	1.20E-04	2.39E-04	11.0000	1.873E-01
Pa-231	8.9297E-10	12.528	25.057	0.00E+00	1.12E-08	2.24E-08		
Pb-210	3.7609E-12	12.528	25.057	0.00E+00	4.71E-11	9.42E-11		
Pm-147	2.5452E+00	12.528	25.057	0.00E+00	3.19E+01	6.38E+01		
Pu-238	2.0550E-02	12.528	25.057	0.00E+00	2.57E-01	5.15E-01		
Pu-239	4.2838E-04	12.528	25.057	0.00E+00	5.37E-03	1.07E-02		
Pu-240	2.4401E-04	12.528	25.057	0.00E+00	3.06E-03	6.11E-03		
Pu-241	6.8764E-02	12.528	25.057	0.00E+00	8.61E-01	1.72E+00		
Pu-242	3.6329E-07	12.528	25.057	0.00E+00	4.55E-06	9.10E-06		
Ra-226	3.8045E-11	12.528	25.057	0.00E+00	4.77E-10	9.53E-10		
Ra-228	2.9902E-15	12.528	25.057	0.00E+00	3.75E-14	7.49E-14		
Ru-106	1.9055E-01	12.528	25.057	0.00E+00	2.39E+00	4.77E+00		
Se-79	1.2936E-05	12.528	25.057	0.00E+00	1.62E-04	3.24E-04		
Sn-126	1.1574E-05	12.528	25.057	0.00E+00	1.45E-04	2.90E-04		
Sr-90	2.7505E+00	12.528	25.057	0.00E+00	3.45E+01	6.89E+01		
Tc-99	4.2239E-04	12.528	25.057	0.00E+00	5.29E-03	1.06E-02		
Th-229	1.8848E-12	12.528	25.057	0.00E+00	2.36E-11	4.72E-11		
Th-230	1.7042E-08	12.528	25.057	0.00E+00	2.14E-07	4.27E-07		
Th-232	7.8132E-15	12.528	25.057	0.00E+00	9.79E-14	1.96E-13		
Th-208	4.4063E-08	12.528	25.057	0.00E+00	5.52E-07	1.10E-06		
U-232	1.3151E-07	12.528	25.057	0.00E+00	1.65E-06	3.30E-06		
U-233	1.9564E-09	12.528	25.057	0.00E+00	2.45E-08	4.90E-08		
U-234	1.8371E-04	12.528	25.057	0.00E+00	2.30E-03	4.60E-03		
U-235	-2.7235E-06	12.528	0.000	1.78E-03	1.75E-03	1.78E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.5493E-05	12.528	25.057	0.00E+00	1.94E-04	3.88E-04	6.35E-01	1.27E+00
U-238	-4.2851E-09	12.528	0.000	1.68E-05	1.68E-05	1.68E-05	Total	Total
Y-90	2.7505E+00	12.528	25.057	0.00E+00	3.45E+01	6.89E+01		
Other Radionuclides					6.44E+01	1.29E+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:	ALUM	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	94.28571429	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	12.528	4.735	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		25.057	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.05	0.38	0.99
Bounding:	0.09		

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: SLOWPOKE (CANADA)
 SNF ID #: 296
 Fuel Units & Descr: 1 - 297 ROD ARRAY
 Heavy Metal Mass: BOL=88kg ; EOL=.87kg
 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"
 0.25

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	12.528	25.057	0.00E+00	1.82E-09	3.64E-09	0.0150	4.834E+12
Am-241	1.1190E-03	12.528	25.057	0.00E+00	1.40E-02	2.80E-02	0.0250	1.041E+12
Am-242m	4.5425E-07	12.528	25.057	0.00E+00	5.69E-06	1.14E-05	0.0375	9.610E+11
Am-243	1.4921E-06	12.528	25.057	0.00E+00	1.87E-05	3.74E-05	0.0575	9.450E+11
C-14	5.7244E-09	12.528	25.057	0.00E+00	7.17E-08	1.43E-07	0.0850	6.024E+11
Cl-36	1.3124E-32	12.528	25.057	0.00E+00	1.64E-31	3.29E-31	0.1250	5.217E+11
Cm-243	2.3676E-07	12.528	25.057	0.00E+00	2.97E-06	5.93E-06	0.2250	5.106E+11
Cm-244	5.2042E-05	12.528	25.057	0.00E+00	6.52E-04	1.30E-03	0.3750	2.471E+11
Co-60	3.8208E-05	12.528	25.057	0.00E+00	4.79E-04	9.57E-04	0.5750	3.395E+12
Cs-134	4.8693E-01	12.528	25.057	0.00E+00	6.10E+00	1.22E+01	0.8500	4.754E+11
Cs-135	3.4477E-06	12.528	25.057	0.00E+00	4.32E-05	8.64E-05	1.2500	8.845E+10
Cs-137	2.8731E+00	12.528	25.057	0.00E+00	3.60E+01	7.20E+01	1.7500	3.710E+09
Eu-154	8.2053E-02	12.528	25.057	0.00E+00	1.03E+00	2.06E+00	2.2500	7.781E+09
Eu-155	3.9134E-02	12.528	25.057	0.00E+00	4.90E-01	9.81E-01	2.7500	4.476E+07
Fe-55	6.7429E-03	12.528	25.057	0.00E+00	8.45E-02	1.69E-01	3.5000	4.966E+06
H-3	1.0599E-02	12.528	25.057	0.00E+00	1.33E-01	2.66E-01	5.0000	1.490E+01
I-129	7.5300E-07	12.528	25.057	0.00E+00	9.43E-06	1.89E-05	7.0000	1.661E+00
Kr-85	2.8595E-01	12.528	25.057	0.00E+00	3.58E+00	7.16E+00	11.0000	1.873E-01
Np-237	9.5479E-06	12.528	25.057	0.00E+00	1.20E-04	2.39E-04		
Pa-231	8.9297E-10	12.528	25.057	0.00E+00	1.12E-08	2.24E-08		
Pb-210	3.7609E-12	12.528	25.057	0.00E+00	4.71E-11	9.42E-11		
Pm-147	2.5452E+00	12.528	25.057	0.00E+00	3.19E+01	6.38E+01		
Pu-238	2.0550E-02	12.528	25.057	0.00E+00	2.57E-01	5.15E-01		
Pu-239	4.2838E-04	12.528	25.057	0.00E+00	5.37E-03	1.07E-02		
Pu-240	2.4401E-04	12.528	25.057	0.00E+00	3.06E-03	6.11E-03		
Pu-241	6.8764E-02	12.528	25.057	0.00E+00	8.61E-01	1.72E+00		
Pu-242	3.6329E-07	12.528	25.057	0.00E+00	4.55E-06	9.10E-06		
Ra-226	3.8045E-11	12.528	25.057	0.00E+00	4.77E-10	9.53E-10		
Ra-228	2.9902E-15	12.528	25.057	0.00E+00	3.75E-14	7.49E-14		
Ru-106	1.9055E-01	12.528	25.057	0.00E+00	2.39E+00	4.77E+00		
Se-79	1.2936E-05	12.528	25.057	0.00E+00	1.62E-04	3.24E-04		
Sn-126	1.1574E-05	12.528	25.057	0.00E+00	1.45E-04	2.90E-04		
Sr-90	2.7505E+00	12.528	25.057	0.00E+00	3.45E+01	6.89E+01		
Tc-99	4.2239E-04	12.528	25.057	0.00E+00	5.29E-03	1.06E-02		
Th-229	1.8848E-12	12.528	25.057	0.00E+00	2.36E-11	4.72E-11		
Th-230	1.7042E-08	12.528	25.057	0.00E+00	2.14E-07	4.27E-07		
Th-232	7.8132E-15	12.528	25.057	0.00E+00	9.79E-14	1.96E-13		
Tl-208	4.4063E-08	12.528	25.057	0.00E+00	5.52E-07	1.10E-06		
U-232	1.3151E-07	12.528	25.057	0.00E+00	1.65E-06	3.30E-06		
U-233	1.9564E-09	12.528	25.057	0.00E+00	2.45E-08	4.90E-08		
U-234	1.8371E-04	12.528	25.057	0.00E+00	2.30E-03	4.60E-03		
U-235	-2.7235E-06	12.528	0.000	1.78E-03	1.75E-03	1.78E-03		
U-236	1.5493E-05	12.528	25.057	0.00E+00	1.94E-04	3.88E-04		
U-238	-4.2851E-09	12.528	0.000	1.68E-05	1.68E-05	1.68E-05		
Y-90	2.7505E+00	12.528	25.057	0.00E+00	3.45E+01	6.89E+01		
Other Radionuclides					6.44E+01	1.29E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.35E-01	1.27E+00
Total	Total

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-ALX	U	
BOL Enrichment %:	94.28571429	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	12.528	4.735	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.
Bounding:		25.057	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.05	0.38	0.99
Bounding:	0.09		

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: SM-1A
 SNF ID #: 201
 Fuel Units & Descr: 93 - ASSEMBLY
 Heavy Metal Mass: BOL=79.78kg ; EOL=65.75kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1971
 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"
 5.81

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	2.3344E-08	13,248.116	26,496.232	0.00E+00	3.09E-04	6.19E-04	0.0150	1.978E+15
Am-241	1.1135E-04	13,248.116	26,496.232	0.00E+00	1.48E+00	2.95E+00	0.0250	4.110E+14
Am-242m	8.5075E-09	13,248.116	26,496.232	0.00E+00	1.13E-04	2.25E-04	0.0375	3.555E+14
Am-243	9.8519E-10	13,248.116	26,496.232	0.00E+00	1.31E-05	2.61E-05	0.0575	3.832E+14
C-14	2.3012E-04	13,248.116	26,496.232	0.00E+00	3.05E+00	6.10E+00	0.0850	2.315E+14
Cl-36	1.2261E-06	13,248.116	26,496.232	0.00E+00	1.62E-02	3.25E-02	0.1250	1.503E+14
Co-243	2.4875E-10	13,248.116	26,496.232	0.00E+00	3.30E-06	6.59E-06	0.2250	1.993E+14
Co-244	2.3178E-09	13,248.116	26,496.232	0.00E+00	3.07E-05	6.14E-05	0.3750	8.691E+13
Co-60	7.0849E-02	13,248.116	26,496.232	0.00E+00	9.39E+02	1.88E+03	0.5750	1.432E+15
Cs-134	3.0266E-06	13,248.116	26,496.232	0.00E+00	4.01E-02	8.02E-02	0.8500	1.449E+13
Cs-135	3.0316E-05	13,248.116	26,496.232	0.00E+00	4.02E-01	8.03E-01	1.2500	1.441E+14
Cs-137	1.4511E+00	13,248.116	26,496.232	0.00E+00	1.92E+04	3.84E+04	1.7500	3.739E+11
Eu-154	6.6955E-04	13,248.116	26,496.232	0.00E+00	8.87E+00	1.77E+01	2.2500	7.761E+08
Eu-155	6.9850E-04	13,248.116	26,496.232	0.00E+00	9.25E+00	1.85E+01	2.7500	2.243E+07
Fe-55	1.2318E-03	13,248.116	26,496.232	0.00E+00	1.63E+01	3.26E+01	3.5000	1.587E+03
H-3	2.5141E-03	13,248.116	26,496.232	0.00E+00	3.33E+01	6.66E+01	5.0000	6.527E+02
I-129	7.3195E-07	13,248.116	26,496.232	0.00E+00	9.70E-03	1.94E-02	7.0000	7.208E+01
Kr-85	4.1281E-02	13,248.116	26,496.232	0.00E+00	5.47E+02	1.09E+03	11.0000	8.088E+00
Np-237	1.1489E-06	13,248.116	26,496.232	0.00E+00	1.52E-02	3.04E-02		
Pa-231	4.5241E-08	13,248.116	26,496.232	0.00E+00	5.99E-04	1.20E-03		
Pb-210	6.4476E-13	13,248.116	26,496.232	0.00E+00	8.54E-09	1.71E-08		
Pm-147	1.1651E-03	13,248.116	26,496.232	0.00E+00	1.54E+01	3.09E+01		
Pu-238	2.9517E-04	13,248.116	26,496.232	0.00E+00	3.91E+00	7.82E+00		
Pu-239	6.6772E-04	13,248.116	26,496.232	0.00E+00	8.85E+00	1.77E+01		
Pu-240	8.6839E-05	13,248.116	26,496.232	0.00E+00	1.15E+00	2.30E+00		
Pu-241	7.1514E-04	13,248.116	26,496.232	0.00E+00	9.47E+00	1.89E+01		
Pu-242	1.9717E-09	13,248.116	26,496.232	0.00E+00	2.61E-05	5.22E-05		
Ra-226	1.7654E-12	13,248.116	26,496.232	0.00E+00	2.34E-08	4.68E-08		
Ra-228	8.2928E-12	13,248.116	26,496.232	0.00E+00	1.10E-07	2.20E-07		
Ru-106	1.8419E-10	13,248.116	26,496.232	0.00E+00	2.44E-06	4.88E-06		
Se-79	1.3223E-05	13,248.116	26,496.232	0.00E+00	1.75E-01	3.50E-01		
Sn-126	1.1493E-05	13,248.116	26,496.232	0.00E+00	1.52E-01	3.05E-01		
Sr-90	1.3649E+00	13,248.116	26,496.232	0.00E+00	1.81E+04	3.62E+04		
Tc-99	4.6656E-04	13,248.116	26,496.232	0.00E+00	6.18E+00	1.24E+01		
Th-229	1.4547E-11	13,248.116	26,496.232	0.00E+00	1.93E-07	3.85E-07		
Th-230	1.6617E-10	13,248.116	26,496.232	0.00E+00	2.20E-06	4.40E-06		
Th-232	8.3361E-12	13,248.116	26,496.232	0.00E+00	1.10E-07	2.21E-07		
Tl-208	2.1664E-08	13,248.116	26,496.232	0.00E+00	2.87E-04	5.74E-04		
U-232	5.8669E-08	13,248.116	26,496.232	0.00E+00	7.77E-04	1.55E-03		
U-233	3.1847E-09	13,248.116	26,496.232	0.00E+00	4.22E-05	8.44E-05		
U-234	3.8769E-07	13,248.116	26,496.232	0.00E+00	5.14E-03	1.03E-02		
U-235	-2.7761E-06	13,248.116	0.000	1.60E-01	1.24E-01	1.60E-01		
U-236	1.6190E-05	13,248.116	26,496.232	0.00E+00	2.14E-01	4.29E-01		
U-238	-2.8547E-09	13,248.116	0.000	1.87E-03	1.84E-03	1.87E-03		
Y-90	1.3652E+00	13,248.116	26,496.232	0.00E+00	1.81E+04	3.62E+04		
Other Radionuclides					2.19E+04	4.37E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.31E+02	4.63E+02
Total	Total

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:	SST (347)	SST	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	93.01311673	60 to 100	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	408.769	13,248.116	
Bounding:		26,496.232	

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:	3.56	32.41	
Bounding:	7.12		

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: SNAP
 SNF ID #: 203
 Fuel Units & Descr: 615 - DECLAD ROD
 Heavy Metal Mass: BOL= ; EOL=29.77kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1958
 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:
 HIC
 6.15

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	9.4992E-09	28,414.841	28,414.841	0.00E+00	2.70E-04	2.70E-04		
Am-241	4.0120E-03	28,414.841	28,414.841	0.00E+00	1.14E+02	1.14E+02	0.0150	1.387E+15
Am-242m	1.1510E-06	28,414.841	28,414.841	0.00E+00	3.27E-02	3.27E-02	0.0250	2.881E+14
Am-243	1.4713E-07	28,414.841	28,414.841	0.00E+00	4.18E-03	4.18E-03	0.0375	2.508E+14
C-14	1.2800E-04	28,414.841	28,414.841	0.00E+00	3.64E+00	3.64E+00	0.0575	2.702E+14
Ci-36	2.8120E-06	28,414.841	28,414.841	0.00E+00	7.99E-02	7.99E-02	0.0850	1.622E+14
Cm-243	6.0120E-08	28,414.841	28,414.841	0.00E+00	1.71E-03	1.71E-03	0.1250	1.053E+14
Cm-244	3.0331E-07	28,414.841	28,414.841	0.00E+00	8.62E-03	8.62E-03	0.2250	1.398E+14
Co-60	3.4647E-03	28,414.841	28,414.841	0.00E+00	9.84E+01	9.84E+01	0.3750	6.097E+13
Cs-134	2.4632E-08	28,414.841	28,414.841	0.00E+00	7.00E-04	7.00E-04	0.5750	1.031E+15
Cs-135	3.2195E-05	28,414.841	28,414.841	0.00E+00	9.15E-01	9.15E-01	0.8500	1.014E+13
Cs-137	9.7519E-01	28,414.841	28,414.841	0.00E+00	2.77E+04	2.77E+04	1.2500	1.085E+13
Eu-154	4.0947E-04	28,414.841	28,414.841	0.00E+00	1.16E+01	1.16E+01	1.7500	2.618E+11
Eu-155	5.4586E-05	28,414.841	28,414.841	0.00E+00	1.55E+00	1.55E+00	2.2500	6.668E+07
Fe-55	4.7955E-06	28,414.841	28,414.841	0.00E+00	1.36E-01	1.36E-01	2.7500	1.202E+07
H-3	8.9038E-04	28,414.841	28,414.841	0.00E+00	2.53E+01	2.53E+01	3.5000	3.476E+04
I-129	7.3684E-07	28,414.841	28,414.841	0.00E+00	2.09E-02	2.09E-02	5.0000	1.463E+04
Kr-85	1.3791E-02	28,414.841	28,414.841	0.00E+00	3.92E+02	3.92E+02	7.0000	1.650E+03
Np-237	1.3038E-06	28,414.841	28,414.841	0.00E+00	3.70E-02	3.70E-02	11.0000	1.875E+02
Pa-231	1.5534E-08	28,414.841	28,414.841	0.00E+00	4.41E-04	4.41E-04		
Pb-210	7.1759E-13	28,414.841	28,414.841	0.00E+00	2.04E-08	2.04E-08		
Pm-147	1.4547E-05	28,414.841	28,414.841	0.00E+00	4.13E-01	4.13E-01		
Pu-238	7.2827E-04	28,414.841	28,414.841	0.00E+00	2.07E+01	2.07E+01		
Pu-239	5.5218E-03	28,414.841	28,414.841	0.00E+00	1.57E+02	1.57E+02		
Pu-240	2.1173E-03	28,414.841	28,414.841	0.00E+00	6.02E+01	6.02E+01		
Pu-241	1.1702E-02	28,414.841	28,414.841	0.00E+00	3.33E+02	3.33E+02		
Pu-242	2.3128E-07	28,414.841	28,414.841	0.00E+00	6.57E-03	6.57E-03		
Ra-226	1.6827E-12	28,414.841	28,414.841	0.00E+00	4.78E-08	4.78E-08		
Ra-228	2.5263E-10	28,414.841	28,414.841	0.00E+00	7.18E-06	7.18E-06		
Ru-106	3.4090E-15	28,414.841	28,414.841	0.00E+00	9.69E-11	9.69E-11		
Se-79	1.3012E-05	28,414.841	28,414.841	0.00E+00	3.70E-01	3.70E-01		
Sn-126	1.2162E-05	28,414.841	28,414.841	0.00E+00	3.46E-01	3.46E-01		
Sr-90	8.9323E-01	28,414.841	28,414.841	0.00E+00	2.54E+04	2.54E+04		
Tc-99	4.4241E-04	28,414.841	28,414.841	0.00E+00	1.26E+01	1.26E+01		
Th-229	7.6902E-10	28,414.841	28,414.841	0.00E+00	2.19E-05	2.19E-05		
Th-230	1.3059E-10	28,414.841	28,414.841	0.00E+00	3.71E-06	3.71E-06		
Th-232	2.5278E-10	28,414.841	28,414.841	0.00E+00	7.18E-06	7.18E-06		
Ti-208	1.1892E-08	28,414.841	28,414.841	0.00E+00	3.38E-04	3.38E-04		
U-232	3.1970E-08	28,414.841	28,414.841	0.00E+00	9.08E-04	9.08E-04		
U-233	1.2232E-07	28,414.841	28,414.841	0.00E+00	3.48E-03	3.48E-03		
U-234	2.8662E-07	28,414.841	28,414.841	0.00E+00	8.14E-03	8.14E-03		
U-235	-2.6194E-06	28,414.841	0.000	2.57E-02	0.00E+00	2.57E-02		
U-236	1.2696E-05	28,414.841	28,414.841	0.00E+00	3.61E-01	3.61E-01		
U-238	-3.6331E-08	28,414.841	0.000	1.60E-02	1.50E-02	1.60E-02		
Y-90	8.9338E-01	28,414.841	28,414.841	0.00E+00	2.54E+04	2.54E+04		
Other Radionuclides					2.80E+04	2.80E+04		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							3.18E+02	3.18E+02
							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	This Template was used for the following reasons: This fuel matches on all parameters except cladding (SST is conservative) and enrichment (unknown).
Fuel Cladding:	NONE	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:		10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
From SFD	Estimated		
Nominal:	28,414.841		Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:	28,414.841		

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	14.00	
Bounding:	14.00	
		Estimated EOL HM/ Given EOL HM
		1.78

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: SODIUM LIQUOR SAFETY FAC.
 SNF ID #: 352
 Fuel Units & Descr: 20 - ROD
 Heavy Metal Mass: BOL=4.20kg ; EOL=3.97kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1981
 Estimates as of: 2010
 Template: (Worst Case)
²Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 25 years

Estimated
 Canister usage:
 18"x10"
 0.42

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	1.9648E-06	220.482	440.964	0.00E+00	4.33E-04	8.66E-04		
Am-241	7.8064E+00	220.482	440.964	0.00E+00	1.72E+03	3.44E+03	0.0150	7.418E+14
Am-242m	1.7632E-02	220.482	440.964	0.00E+00	3.89E+00	7.78E+00	0.0250	1.463E+14
Am-243	1.6336E-02	220.482	440.964	0.00E+00	3.60E+00	7.20E+00	0.0375	1.306E+14
C-14	1.2101E-01	220.482	440.964	0.00E+00	2.67E+01	5.34E+01	0.0575	1.782E+14
Cl-36	2.2849E-03	220.482	440.964	0.00E+00	5.04E-01	1.01E+00	0.0850	7.705E+13
Cm-243	1.1046E-03	220.482	440.964	0.00E+00	2.44E-01	4.87E-01	0.1250	6.701E+13
Cm-244	2.4704E-01	220.482	440.964	0.00E+00	5.45E+01	1.09E+02	0.2250	6.545E+13
Co-60	1.0466E+02	220.482	440.964	0.00E+00	2.31E+04	4.62E+04	0.3750	2.759E+13
Cs-134	9.8289E-03	220.482	440.964	0.00E+00	2.17E+00	4.33E-01	0.5750	4.401E+14
Cs-135	4.3976E-04	220.482	440.964	0.00E+00	9.70E-02	1.94E-01	0.8500	2.651E+13
Cs-137	2.6526E+01	220.482	440.964	0.00E+00	5.85E+03	1.17E+04	1.2500	3.441E+15
Eu-154	2.7975E+00	220.482	440.964	0.00E+00	6.17E+02	1.23E+03	1.7500	8.338E+11
Eu-155	2.7881E-01	220.482	440.964	0.00E+00	1.65E+01	1.23E+02	2.2500	1.812E+10
Fe-55	4.2151E+00	220.482	440.964	0.00E+00	9.29E+02	1.86E+03	2.7500	1.552E+09
H-3	4.2599E-01	220.482	440.964	0.00E+00	9.39E+01	1.88E+02	3.5000	1.648E+06
I-129	1.0618E-05	220.482	440.964	0.00E+00	2.34E-03	4.68E-03	5.0000	7.009E+05
Kr-85	1.1426E+00	220.482	440.964	0.00E+00	2.52E+02	5.04E+02	7.0000	8.043E+04
Np-237	1.5647E-04	220.482	440.964	0.00E+00	3.45E-02	6.90E-02	11.0000	9.215E+03
Pa-231	2.8624E-06	220.482	440.964	0.00E+00	6.31E-04	1.26E-03		
Pb-210	9.2770E-09	220.482	440.964	0.00E+00	2.05E-06	4.09E-06		
Pm-147	2.3690E-01	220.482	440.964	0.00E+00	5.22E+01	1.04E+02		
Pu-238	-6.1803E-01	220.482	0.000	5.40E+02	4.03E+02	5.40E+02		
Pu-239	-4.8280E-02	220.482	0.000	6.53E+01	5.47E+01	6.53E+01		
Pu-240	-3.0095E-01	220.482	0.000	8.34E+01	1.70E+01	8.34E+01		
Pu-241	-7.4000E+01	220.482	0.000	2.15E+04	5.15E+03	2.15E+04		
Pu-242	-1.1381E-04	220.482	0.000	3.61E-01	3.36E-01	3.61E-01		
Ra-226	3.2167E-08	220.482	440.964	0.00E+00	7.09E-06	1.42E-05		
Ra-228	5.9024E-07	220.482	440.964	0.00E+00	1.30E-04	2.60E-04		
Ru-106	3.9140E-06	220.482	440.964	0.00E+00	8.63E-04	1.73E-03		
Se-79	1.9184E-04	220.482	440.964	0.00E+00	4.23E-02	8.46E-02		
Sn-126	1.6671E-04	220.482	440.964	0.00E+00	3.68E-02	7.35E-02		
Sr-90	2.5126E+01	220.482	440.964	0.00E+00	5.54E+03	1.11E+04		
Tc-99	6.7678E-03	220.482	440.964	0.00E+00	1.49E+00	2.98E+00		
Th-229	1.2398E-06	220.482	440.964	0.00E+00	2.73E-04	5.47E-04		
Th-230	4.1442E-06	220.482	440.964	0.00E+00	9.14E-04	1.83E-03		
Th-232	6.0208E-07	220.482	440.964	0.00E+00	1.33E-04	2.65E-04		
Ti-208	9.6478E-05	220.482	440.964	0.00E+00	2.13E-02	4.25E-02		
U-232	2.6103E-04	220.482	440.964	0.00E+00	5.76E-02	1.15E-01		
U-233	3.6128E-04	220.482	440.964	0.00E+00	7.97E-02	1.59E-01		
U-234	1.2788E-02	220.482	440.964	0.00E+00	2.82E+00	5.64E+00		
U-235	5.7486E-04	220.482	440.964	1.81E-03	1.29E-01	2.55E-01		
U-236	2.3485E-04	220.482	440.964	0.00E+00	5.18E-02	1.04E-01		
U-238	1.1581E-04	220.482	440.964	2.25E-04	2.58E-02	5.13E-02		
Y-90	2.5126E+01	220.482	440.964	0.00E+00	5.54E+03	1.11E+04		
Other Radionuclides					1.55E+04	3.09E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.08E+02	1.01E+03
Total	Total

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 didn't closely match any existing templates, therefore the worst case template was used.
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	(Worst Case)	
Fuel Cladding:	SST (316)	SST/Inconel	
BOL HM Constituents:	PuO2-UO2	U, Th, & Pu	
BOL Enrichment %:	78.23529412	0 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:	42.000	220.482	
Bounding:		440.964	

Checks			Estimated EOL HM/Given EOL HM 35.21
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	1.57	5.25	
Bounding:	3.14		

¹ Reactor shutdown, core removal, storage, shipping or other data 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: SODIUM LOOP SAFETY FAC.
 SNF ID #: 367
 Fuel Units & Descr: 12 - ROD
 Heavy Metal Mass: BOL= ; EOL=7.33kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1981
 Estimates as of: 2010

Template: (Worst Case)
²Template Burnup(MWd): 62.5

Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 25 years

Estimated
 Canister usage:
 18"x10"
 0.25

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
	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	1.9648E-06	74.100	148.199	0.00E+00	1.46E-04	2.91E-04	0.0150	2.555E+14
Am-241	7.8064E+00	74.100	148.199	0.00E+00	5.78E+02	1.16E+03	0.0250	4.918E+13
Am-242m	1.7632E-02	74.100	148.199	0.00E+00	1.31E+00	2.61E+00	0.0375	4.389E+13
Am-243	1.6336E-02	74.100	148.199	0.00E+00	1.21E+00	2.42E+00	0.0575	5.988E+13
C-14	1.2101E-01	74.100	148.199	0.00E+00	8.97E+00	1.79E+01	0.0850	2.590E+13
Cl-36	2.2849E-03	74.100	148.199	0.00E+00	1.69E-01	3.39E-01	0.1250	2.252E+13
Cm-243	1.1046E-03	74.100	148.199	0.00E+00	8.19E-02	1.64E-01	0.2250	2.200E+13
Cm-244	2.4704E-01	74.100	148.199	0.00E+00	1.83E+01	3.66E+01	0.3750	9.271E+12
Co-60	1.0466E+02	74.100	148.199	0.00E+00	7.76E+03	1.55E+04	0.5750	1.479E+14
Cs-134	9.8289E-03	74.100	148.199	0.00E+00	7.28E-01	1.46E+00	0.8500	8.910E+12
Cs-135	4.3976E-04	74.100	148.199	0.00E+00	3.26E-02	6.52E-02	1.2500	1.156E+15
Cs-137	2.6526E+01	74.100	148.199	0.00E+00	1.97E+03	3.93E+03	1.7500	2.802E+11
Eu-154	2.7975E+00	74.100	148.199	0.00E+00	2.07E+02	4.15E+02	2.2500	6.089E+09
Eu-155	2.7881E-01	74.100	148.199	0.00E+00	2.07E+01	4.13E+01	2.7500	5.216E+08
Fe-55	4.2151E+00	74.100	148.199	0.00E+00	3.12E+02	6.25E+02	3.5000	6.674E+05
H-3	4.2599E-01	74.100	148.199	0.00E+00	3.16E+01	6.31E+01	5.0000	2.834E+05
I-129	1.0618E-05	74.100	148.199	0.00E+00	7.87E-04	1.57E-03	7.0000	3.245E+04
Kr-85	1.1426E+00	74.100	148.199	0.00E+00	8.47E+01	1.69E+02	11.0000	3.713E+03
Np-237	1.5647E-04	74.100	148.199	0.00E+00	1.16E-02	2.32E-02		
Pa-231	2.8624E-06	74.100	148.199	0.00E+00	2.12E-04	4.24E-04		
Pb-210	9.2770E-09	74.100	148.199	0.00E+00	6.87E-07	1.37E-06		
Pm-147	2.3690E-01	74.100	148.199	0.00E+00	1.76E+01	3.51E+01		
Pu-238	-6.1803E-01	74.100	0.000	9.52E+02	9.06E+02	9.52E+02		
Pu-239	-4.8280E-02	74.100	0.000	1.15E+02	1.12E+02	1.15E+02		
Pu-240	-3.0095E-01	74.100	0.000	1.47E+02	1.25E+02	1.47E+02		
Pu-241	-7.4000E+01	74.100	0.000	3.79E+04	3.24E+04	3.79E+04		
Pu-242	-1.1381E-04	74.100	0.000	6.37E-01	6.28E-01	6.37E-01		
Ra-226	3.2167E-08	74.100	148.199	0.00E+00	2.38E-06	4.77E-06		
Ra-228	5.9024E-07	74.100	148.199	0.00E+00	4.37E-05	8.75E-05		
Ru-106	3.9140E-06	74.100	148.199	0.00E+00	2.90E-04	5.80E-04		
Se-79	1.9184E-04	74.100	148.199	0.00E+00	1.42E-02	2.84E-02		
Sn-126	1.6671E-04	74.100	148.199	0.00E+00	1.24E-02	2.47E-02		
Sr-90	2.5126E+01	74.100	148.199	0.00E+00	1.86E+03	3.72E+03		
Tc-99	6.7678E-03	74.100	148.199	0.00E+00	5.01E-01	1.00E+00		
Th-229	1.2398E-06	74.100	148.199	0.00E+00	9.19E-05	1.84E-04		
Th-230	4.1442E-06	74.100	148.199	0.00E+00	3.07E-04	6.14E-04		
Th-232	6.0208E-07	74.100	148.199	0.00E+00	4.46E-05	8.92E-05		
Ti-208	9.6478E-05	74.100	148.199	0.00E+00	7.15E-03	1.43E-02		
U-232	2.6103E-04	74.100	148.199	0.00E+00	1.93E-02	3.87E-02		
U-233	3.6128E-04	74.100	148.199	0.00E+00	2.68E-02	5.35E-02		
U-234	1.2788E-02	74.100	148.199	0.00E+00	9.48E-01	1.90E+00		
U-235	5.7486E-04	74.100	148.199	3.19E-03	4.58E-02	8.84E-02		
U-236	2.3485E-04	74.100	148.199	0.00E+00	1.74E-02	3.48E-02		
U-238	1.1581E-04	74.100	148.199	3.97E-04	8.98E-03	1.76E-02		
Y-90	2.5126E+01	74.100	148.199	0.00E+00	1.86E+03	3.72E+03		
Other Radionuclides					5.20E+03	1.04E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.04E+02	3.72E+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	(Worst Case)	This Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
BOL HM Constituents:	SST (316)	SST/Inconel	
BOL Enrichment %:	PuO2-UO2	U, Th, & Pu	
		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		74.100	Nominal burnup taken from SFD and converted to MWd using BOL=7.410kg
		148.199	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup	
Bounding:	0.30		7.04
	0.60		

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: SP-100 FUEL
 SNF ID #: 777
 Fuel Units & Descr: 2 - SCRAP
 Heavy Metal Mass: BOL=2.71kg : EOL=2.63kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1992
 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
 2.00

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	73.366	146.732	0.00E+00	1.58E-06	3.16E-06	0.0150	1.573E+13
Am-241	4.6529E-07	73.366	146.732	0.00E+00	3.41E-05	6.83E-05	0.0250	3.335E+12
Am-242m	0.0000E+00	73.366	146.732	0.00E+00	0.00E+00	0.00E+00	0.0375	2.899E+12
Am-243	8.3923E-15	73.366	146.732	0.00E+00	6.16E-13	1.23E-12	0.0575	3.044E+12
C-14	2.1765E-05	73.366	146.732	0.00E+00	1.60E-03	3.19E-03	0.0850	1.871E+12
Cl-36	5.5188E-08	73.366	146.732	0.00E+00	4.05E-06	8.10E-06	0.1250	1.209E+12
Cm-243	2.5208E-14	73.366	146.732	0.00E+00	1.85E-12	3.70E-12	0.2250	1.579E+12
Cm-244	1.1259E-15	73.366	146.732	0.00E+00	8.26E-14	1.65E-13	0.3750	7.230E+11
Co-60	2.9094E-02	73.366	146.732	0.00E+00	2.13E+00	4.27E+00	0.5750	1.199E+13
Cs-134	5.1932E-04	73.366	146.732	0.00E+00	3.81E-02	7.62E-02	0.8500	1.157E+11
Cs-135	4.4996E-05	73.366	146.732	0.00E+00	3.30E-03	6.60E-03	1.2500	3.554E+11
Cs-137	2.1867E+00	73.366	146.732	0.00E+00	1.60E+02	3.21E+02	1.7500	2.943E+09
Eu-154	9.2837E-04	73.366	146.732	0.00E+00	6.81E-02	1.36E-01	2.2500	8.417E+06
Eu-155	2.3180E-02	73.366	146.732	0.00E+00	1.70E+00	3.40E+00	2.7500	3.845E+05
Fe-55	2.9332E-03	73.366	146.732	0.00E+00	2.15E-01	4.30E-01	3.5000	4.440E+04
H-3	1.0871E-02	73.366	146.732	0.00E+00	7.98E-01	1.60E+00	5.0000	9.909E+00
I-129	1.1426E-06	73.366	146.732	0.00E+00	8.38E-05	1.68E-04	7.0000	8.572E-01
Kr-85	1.4068E-01	73.366	146.732	0.00E+00	1.03E+01	2.06E+01	11.0000	7.972E-02
Np-237	3.3099E-06	73.366	146.732	0.00E+00	2.43E-04	4.86E-04		
Pa-231	7.8640E-08	73.366	146.732	0.00E+00	5.77E-06	1.15E-05		
Pb-210	7.4277E-13	73.366	146.732	0.00E+00	5.45E-11	1.09E-10		
Pm-147	2.2856E-01	73.366	146.732	0.00E+00	1.68E+01	3.35E+01		
Pu-238	2.0095E-04	73.366	146.732	0.00E+00	1.47E-02	2.95E-02		
Pu-239	1.9481E-02	73.366	146.732	0.00E+00	1.43E+00	2.86E+00		
Pu-240	6.8056E-05	73.366	146.732	0.00E+00	4.99E-03	9.99E-03		
Pu-241	1.0939E-05	73.366	146.732	0.00E+00	8.03E-04	1.61E-03		
Pu-242	4.3751E-13	73.366	146.732	0.00E+00	3.21E-11	6.42E-11		
Ra-226	4.0428E-12	73.366	146.732	0.00E+00	2.97E-10	5.93E-10		
Ra-228	2.1032E-11	73.366	146.732	0.00E+00	1.54E-09	3.09E-09		
Ru-106	2.9077E-04	73.366	146.732	0.00E+00	2.13E-02	4.27E-02		
Se-79	1.6492E-05	73.366	146.732	0.00E+00	1.21E-03	2.42E-03		
Sn-126	3.7564E-05	73.366	146.732	0.00E+00	2.78E-03	5.51E-03		
Sr-90	1.9396E+00	73.366	146.732	0.00E+00	1.42E+02	2.85E+02		
Tc-99	4.4842E-04	73.366	146.732	0.00E+00	3.29E-02	6.58E-02		
Th-229	1.8544E-11	73.366	146.732	0.00E+00	1.36E-09	2.72E-09		
Th-230	9.0605E-10	73.366	146.732	0.00E+00	6.65E-08	1.33E-07		
Th-232	2.3674E-11	73.366	146.732	0.00E+00	1.74E-09	3.47E-09		
Tl-208	7.0323E-09	73.366	146.732	0.00E+00	5.16E-07	1.03E-06		
U-232	1.9106E-08	73.366	146.732	0.00E+00	1.40E-06	2.80E-06		
U-233	9.6774E-09	73.366	146.732	0.00E+00	7.10E-07	1.42E-06		
U-234	4.8796E-06	73.366	146.732	0.00E+00	3.58E-04	7.16E-04		
U-235	2.3191E-06	73.366	0.000	1.05E-03	8.84E-04	1.05E-03		
U-236	1.2633E-05	73.366	146.732	0.00E+00	9.27E-04	1.85E-03		
U-238	-9.5407E-08	73.366	0.000	7.47E-04	7.40E-04	7.47E-04		
Y-90	1.9396E+00	73.366	146.732	0.00E+00	1.42E+02	2.85E+02		
Other Radionuclides					1.59E+02	3.19E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.84E+00	3.67E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: FAST	Used: FAST	This Template was used for the following reasons: This template is a good approximation since it is a FAST, Uranium fuel
Fuel Cladding:	UNKNOWN	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	18.00000074	10 to 40	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD: 73.366	Estimated: 73.366	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		146.732	

Checks		
Nominal:	Burnup Multiplier: 8.66	Estimated Burnup/ Given Burnup: 1.01
Bounding:	17.32	

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: SPEC (ORME) ¹Fuel decay start date: 1958
 SNF ID #: 208 Estimates as of: 2010
 Fuel Units & Descr: 1 - FLAT PLATES IN CAN Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
 Heavy Metal Mass: BOL=2.39kg ; EOL=2.39kg ²Template Burnup(MWd): 15
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.00034251
 Template Decay Time: 50 years

Estimated
 Canister usage:
 HIC
 1.00

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	3.9527E-09	45.432	90.864	0.00E+00	1.80E-07	3.59E-07	0.0150	4.507E+12
Am-241	2.9407E-02	45.432	90.864	0.00E+00	1.34E+00	2.67E+00	0.0250	9.334E+11
Am-242m	7.7733E-06	45.432	90.864	0.00E+00	3.53E-04	7.06E-04	0.0375	8.169E+11
Am-243	6.3827E-06	45.432	90.864	0.00E+00	2.90E-04	5.80E-04	0.0575	9.049E+11
C-14	2.9513E-08	45.432	90.864	0.00E+00	1.34E-06	2.68E-06	0.0850	5.242E+11
Cl-36	5.9507E-35	45.432	90.864	0.00E+00	2.70E-33	5.41E-33	0.1250	3.421E+11
Cm-243	1.0647E-06	45.432	90.864	0.00E+00	4.84E-05	9.67E-05	0.2250	4.517E+11
Cm-244	3.4907E-05	45.432	90.864	0.00E+00	1.59E-03	3.17E-03	0.3750	1.967E+11
Co-60	3.1593E-07	45.432	90.864	0.00E+00	1.44E-05	2.87E-05	0.5750	3.416E+12
Cs-134	8.9067E-08	45.432	90.864	0.00E+00	4.05E-06	8.09E-06	0.8500	3.482E+10
Cs-135	4.8607E-06	45.432	90.864	0.00E+00	2.21E-04	4.42E-04	1.2500	1.382E+10
Cs-137	1.0113E+00	45.432	90.864	0.00E+00	4.59E+01	9.19E+01	1.7500	9.203E+08
Eu-154	1.8607E-03	45.432	90.864	0.00E+00	8.45E-02	1.69E-01	2.2500	9.166E+04
Eu-155	6.1700E-05	45.432	90.864	0.00E+00	2.80E-03	5.61E-03	2.7500	1.879E+04
Fe-55	4.7627E-07	45.432	90.864	0.00E+00	2.16E-05	4.33E-05	3.5000	3.590E+02
H-3	8.6600E-04	45.432	90.864	0.00E+00	3.93E-02	7.87E-02	5.0000	1.503E+02
I-129	7.1600E-07	45.432	90.864	0.00E+00	3.25E-05	6.51E-05	7.0000	1.687E+01
Kr-85	1.4713E-02	45.432	90.864	0.00E+00	6.68E-01	1.34E+00	11.0000	1.911E+00
Np-237	4.0773E-06	45.432	90.864	0.00E+00	1.85E-04	3.70E-04		
Pa-231	6.7867E-09	45.432	90.864	0.00E+00	3.08E-07	6.17E-07		
Pb-210	1.2127E-12	45.432	90.864	0.00E+00	5.51E-11	1.10E-10		
Pm-147	1.6720E-05	45.432	90.864	0.00E+00	7.60E-04	1.52E-03		
Pu-238	4.3627E-03	45.432	90.864	0.00E+00	1.98E-01	3.96E-01		
Pu-239	1.0307E-02	45.432	90.864	0.00E+00	4.68E-01	9.37E-01		
Pu-240	5.4007E-03	45.432	90.864	0.00E+00	2.45E-01	4.91E-01		
Pu-241	8.8667E-02	45.432	90.864	0.00E+00	4.03E+00	8.06E+00		
Pu-242	3.0713E-06	45.432	90.864	0.00E+00	1.40E-04	2.79E-04		
Ra-226	3.2767E-12	45.432	90.864	0.00E+00	1.49E-10	2.98E-10		
Ra-228	3.5827E-14	45.432	90.864	0.00E+00	1.63E-12	3.26E-12		
Ru-106	9.3133E-15	45.432	90.864	0.00E+00	4.23E-13	8.46E-13		
Se-79	1.2533E-05	45.432	90.864	0.00E+00	5.69E-04	1.14E-03		
Sn-126	1.1393E-05	45.432	90.864	0.00E+00	5.18E-04	1.04E-03		
Sr-90	9.0067E-01	45.432	90.864	0.00E+00	4.09E+01	8.18E+01		
Tc-99	4.3533E-04	45.432	90.864	0.00E+00	1.98E-02	3.96E-02		
Th-229	3.5147E-12	45.432	90.864	0.00E+00	1.60E-10	3.19E-10		
Th-230	3.2487E-10	45.432	90.864	0.00E+00	1.48E-08	2.95E-08		
Th-232	4.2020E-14	45.432	90.864	0.00E+00	1.91E-12	3.82E-12		
Tl-208	5.7620E-09	45.432	90.864	0.00E+00	2.62E-07	5.24E-07		
U-232	1.5613E-08	45.432	90.864	0.00E+00	7.09E-07	1.42E-06		
U-233	1.1207E-09	45.432	90.864	0.00E+00	5.09E-08	1.02E-07		
U-234	9.8267E-07	45.432	90.864	0.00E+00	4.46E-05	8.93E-05		
U-235	-2.5335E-06	45.432	0.000	2.66E-04	1.51E-04	2.66E-04		
U-236	1.3007E-05	45.432	90.864	0.00E+00	5.91E-04	1.18E-03		
U-238	-1.4207E-08	45.432	0.000	7.62E-04	7.61E-04	7.62E-04		
Y-90	9.0133E-01	45.432	90.864	0.00E+00	4.09E+01	8.19E+01		
Other Radionuclides					4.37E+01	8.74E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.71E-01	1.14E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	ORGANIC	HEAVY WATER	This Template was used for the following reasons: This fuel matches on cladding and BOL heavy metal, heavy water is a conservative assumption for moderator, and it is fairly close on enrichment.
Fuel Cladding:	ALUM (1100)	ALUM	
BOL HM Constituents:	U-Mo	U	
BOL Enrichment %:	5.146443515	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		45.432	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup assumed to be twice nominal burnup.
Bounding:		90.864	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.43		
Bounding:	0.87		

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: SPERT-III
 SNF ID #: 209
 Fuel Units & Descr: 3 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL= ; EOL=9.74kg
 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:
 HIC
 1.00

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	8.7758E-10	9,262.374	9,262.374	0.00E+00	8.13E-06	8.13E-06	0.0150	4.984E+14
Am-241	1.4352E-01	9,262.374	9,262.374	0.00E+00	1.33E+03	1.33E+03	0.0250	1.005E+14
Am-242m	2.8698E-04	9,262.374	9,262.374	0.00E+00	2.66E+00	2.66E+00	0.0375	9.585E+13
Am-243	6.2565E-04	9,262.374	9,262.374	0.00E+00	5.79E+00	5.79E+00	0.0575	1.107E+14
C-14	4.7901E-05	9,262.374	9,262.374	0.00E+00	4.44E-01	4.44E-01	0.0850	5.576E+13
Cl-36	8.0297E-07	9,262.374	9,262.374	0.00E+00	7.44E-03	7.44E-03	0.1250	3.870E+13
Cm-243	2.5081E-04	9,262.374	9,262.374	0.00E+00	2.32E+00	2.32E+00	0.2250	4.782E+13
Cm-244	4.9015E-02	9,262.374	9,262.374	0.00E+00	4.54E+02	4.54E+02	0.3750	2.056E+13
Co-60	2.5581E-03	9,262.374	9,262.374	0.00E+00	2.37E+01	2.37E+01	0.5750	4.782E+14
Cs-134	4.0536E-05	9,262.374	9,262.374	0.00E+00	3.75E-01	3.75E-01	0.8500	6.616E+12
Cs-135	1.4433E-05	9,262.374	9,262.374	0.00E+00	1.34E-01	1.34E-01	1.2500	6.499E+12
Cs-137	1.3979E+00	9,262.374	9,262.374	0.00E+00	1.29E+04	1.29E+04	1.7500	1.946E+11
Eu-154	2.0203E-02	9,262.374	9,262.374	0.00E+00	1.87E+02	1.87E+02	2.2500	3.134E+07
Eu-155	1.7684E-03	9,262.374	9,262.374	0.00E+00	1.64E+01	1.64E+01	2.7500	6.420E+07
Fe-55	4.3136E-05	9,262.374	9,262.374	0.00E+00	4.00E-01	4.00E-01	3.5000	6.612E+06
H-3	2.0769E-02	9,262.374	9,262.374	0.00E+00	1.92E+02	1.92E+02	5.0000	2.826E+06
I-129	9.8288E-07	9,262.374	9,262.374	0.00E+00	9.10E-03	9.10E-03	7.0000	3.258E+05
Kr-85	2.8214E-02	9,262.374	9,262.374	0.00E+00	2.61E+02	2.61E+02	11.0000	3.742E+04
Np-237	1.1218E-05	9,262.374	9,262.374	0.00E+00	1.04E-01	1.04E-01		
Pa-231	1.3036E-09	9,262.374	9,262.374	0.00E+00	1.21E-05	1.21E-05		
Pb-210	8.5078E-11	9,262.374	9,262.374	0.00E+00	7.88E-07	7.88E-07		
Pm-147	3.6531E-04	9,262.374	9,262.374	0.00E+00	3.38E+00	3.38E+00		
Pu-238	7.4564E-02	9,262.374	9,262.374	0.00E+00	6.91E+02	6.91E+02		
Pu-239	1.1623E-02	9,262.374	9,262.374	0.00E+00	1.08E+02	1.08E+02		
Pu-240	1.5132E-02	9,262.374	9,262.374	0.00E+00	1.40E+02	1.40E+02		
Pu-241	9.0036E-01	9,262.374	9,262.374	0.00E+00	8.34E+03	8.34E+03		
Pu-242	6.4260E-05	9,262.374	9,262.374	0.00E+00	5.95E-01	5.95E-01		
Ra-226	2.2804E-10	9,262.374	9,262.374	0.00E+00	2.11E-06	2.11E-06		
Ra-228	5.2713E-12	9,262.374	9,262.374	0.00E+00	4.88E-08	4.88E-08		
Ru-106	6.1160E-10	9,262.374	9,262.374	0.00E+00	5.66E-06	5.66E-06		
Se-79	1.2377E-05	9,262.374	9,262.374	0.00E+00	1.15E-01	1.15E-01		
Sn-126	2.5210E-05	9,262.374	9,262.374	0.00E+00	2.34E-01	2.34E-01		
Sr-90	9.1667E-01	9,262.374	9,262.374	0.00E+00	8.49E+03	8.49E+03		
Tc-99	3.9357E-04	9,262.374	9,262.374	0.00E+00	3.65E+00	3.65E+00		
Th-229	1.2057E-10	9,262.374	9,262.374	0.00E+00	1.12E-06	1.12E-06		
Th-230	2.1043E-08	9,262.374	9,262.374	0.00E+00	1.95E-04	1.95E-04		
Th-232	5.2972E-12	9,262.374	9,262.374	0.00E+00	4.91E-08	4.91E-08		
Tl-208	1.7474E-07	9,262.374	9,262.374	0.00E+00	1.62E-03	1.62E-03		
U-232	4.7368E-07	9,262.374	9,262.374	0.00E+00	4.39E-03	4.39E-03		
U-233	2.5097E-08	9,262.374	9,262.374	0.00E+00	2.32E-04	2.32E-04		
U-234	5.0000E-05	9,262.374	9,262.374	0.00E+00	4.63E-01	4.63E-01		
U-235	-1.4489E-06	9,262.374	0.000	1.35E-03	0.00E+00	1.35E-03		
U-236	7.5824E-06	9,262.374	9,262.374	0.00E+00	7.02E-02	7.02E-02		
U-238	-2.6129E-07	9,262.374	0.000	6.33E-03	3.91E-03	6.33E-03		
Y-90	9.1699E-01	9,262.374	9,262.374	0.00E+00	8.49E+03	8.49E+03		
Other Radionuclides					1.24E+04	1.24E+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).
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ZIRC-2	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		0 to 5	

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:		9,262.374	
Bounding:		9,262.374	

Checks			Estimated EOL HM/Given EOL HM 1.58
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	13.58		
Bounding:	13.58		

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: SPSS (SPERT)
 SNF ID #: 213
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL= .59kg ; EOL=.59kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1959
 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: 50 years

Estimated
 Canister usage:
 18"x10"
 0.08

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	3.4276E-08	1.889	3.779	0.00E+00	6.48E-08	1.30E-07	0.0150	1.971E+11
Am-241	1.1458E-04	1.889	3.779	0.00E+00	2.16E-04	4.33E-04	0.0250	4.095E+10
Am-242m	7.9468E-09	1.889	3.779	0.00E+00	1.50E-08	3.00E-08	0.0375	3.550E+10
Am-243	9.8386E-10	1.889	3.779	0.00E+00	1.86E-09	3.72E-09	0.0575	3.818E+10
C-14	2.2978E-04	1.889	3.779	0.00E+00	4.34E-04	8.68E-04	0.0850	2.307E+10
Cl-36	1.2261E-06	1.889	3.779	0.00E+00	2.32E-06	4.63E-06	0.1250	1.497E+10
Cm-243	1.7271E-10	1.889	3.779	0.00E+00	3.26E-10	6.53E-10	0.2250	1.990E+10
Cm-244	1.3058E-09	1.889	3.779	0.00E+00	2.47E-09	4.93E-09	0.3750	8.669E+09
Co-60	9.8636E-03	1.889	3.779	0.00E+00	1.86E-02	3.73E-02	0.5750	1.444E+11
Cs-134	1.9617E-08	1.889	3.779	0.00E+00	3.71E-08	7.41E-08	0.8500	1.425E+09
Cs-135	3.0316E-05	1.889	3.779	0.00E+00	5.73E-05	1.15E-04	1.2500	3.246E+09
Cs-137	1.0263E+00	1.889	3.779	0.00E+00	1.94E+00	3.88E+00	1.7500	3.671E+07
Eu-154	2.0017E-04	1.889	3.779	0.00E+00	3.78E-04	7.56E-04	2.2500	1.860E+04
Eu-155	8.5957E-05	1.889	3.779	0.00E+00	1.62E-04	3.25E-04	2.7500	2.533E+03
Fe-55	2.2646E-05	1.889	3.779	0.00E+00	4.28E-05	8.56E-05	5.0000	3.334E-01
H-3	1.0835E-03	1.889	3.779	0.00E+00	2.05E-03	4.09E-03	5.0000	1.385E-01
I-129	7.3195E-07	1.889	3.779	0.00E+00	1.38E-06	2.77E-06	7.0000	1.540E-02
Kr-85	1.5661E-02	1.889	3.779	0.00E+00	2.96E-02	5.92E-02	11.0000	1.736E-03
Np-237	1.1494E-06	1.889	3.779	0.00E+00	2.17E-06	4.34E-06		
Pa-231	5.8070E-08	1.889	3.779	0.00E+00	1.10E-07	2.19E-07		
Pb-210	1.2985E-12	1.889	3.779	0.00E+00	2.45E-12	4.91E-12		
Pm-147	2.2196E-05	1.889	3.779	0.00E+00	4.19E-05	8.39E-05		
Pu-238	2.6223E-04	1.889	3.779	0.00E+00	4.95E-04	9.91E-04		
Pu-239	6.6739E-04	1.889	3.779	0.00E+00	1.26E-03	2.52E-03		
Pu-240	8.6705E-05	1.889	3.779	0.00E+00	1.64E-04	3.28E-04		
Pu-241	3.4759E-04	1.889	3.779	0.00E+00	6.57E-04	1.31E-03		
Pu-242	1.9717E-09	1.889	3.779	0.00E+00	3.73E-09	7.45E-09		
Ra-226	3.0000E-12	1.889	3.779	0.00E+00	5.67E-12	1.13E-11		
Ra-228	8.3328E-12	1.889	3.779	0.00E+00	1.57E-11	3.15E-11		
Ru-106	6.1464E-15	1.889	3.779	0.00E+00	1.16E-14	2.32E-14		
Se-79	1.3221E-05	1.889	3.779	0.00E+00	2.50E-05	5.00E-05		
Sn-126	1.1491E-05	1.889	3.779	0.00E+00	2.17E-05	4.34E-05		
Sr-90	9.5541E-01	1.889	3.779	0.00E+00	1.81E+00	3.61E+00		
Tc-99	4.6656E-04	1.889	3.779	0.00E+00	8.81E-04	1.76E-03		
Th-229	1.9085E-11	1.889	3.779	0.00E+00	3.61E-11	7.21E-11		
Th-230	2.1913E-10	1.889	3.779	0.00E+00	4.14E-10	8.28E-10		
Th-232	8.3478E-12	1.889	3.779	0.00E+00	1.58E-11	3.15E-11		
Ti-208	1.8752E-08	1.889	3.779	0.00E+00	3.54E-08	7.09E-08		
U-232	5.0782E-08	1.889	3.779	0.00E+00	9.59E-08	1.92E-07		
U-233	3.2596E-09	1.889	3.779	0.00E+00	6.16E-09	1.23E-08		
U-234	3.9817E-07	1.889	3.779	0.00E+00	7.52E-07	1.50E-06		
U-235	-2.7761E-06	1.889	0.000	1.19E-03	1.18E-03	1.19E-03		
U-236	1.6190E-05	1.889	3.779	0.00E+00	3.06E-05	6.12E-05		
U-238	-2.8547E-09	1.889	0.000	1.38E-05	1.38E-05	1.38E-05		
Y-90	9.5557E-01	1.889	3.779	0.00E+00	1.81E+00	3.61E+00		
Other Radionuclides					2.30E+00	4.61E+00		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.21E-02	4.41E-02
Total	Total

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:	SST (304L)	SST	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	93.05084746	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		1.889	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		3.779	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.07		1.00
Bounding:	0.14		

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: THOR (TAIWAN)
 SNF ID #: 629
 Fuel Units & Descr: 35 - MTR TYPE
 Heavy Metal Mass: BOL=5.06kg ; EOL=4.10kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1997
 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: 10 years

Estimated
 Canister usage:
 18"x10"
 1.46

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	1.2892E-09	918.724	1,837.448	0.00E+00	1.18E-06	2.37E-06	0.0150	2.470E+14
Am-241	2.9429E-03	918.724	1,837.448	0.00E+00	2.70E+00	5.41E+00	0.0250	5.166E+13
Am-242m	1.9489E-06	918.724	1,837.448	0.00E+00	1.79E-03	3.58E-03	0.0375	6.101E+13
Am-243	2.3308E-07	918.724	1,837.448	0.00E+00	2.14E-04	4.28E-04	0.0575	5.045E+13
C-14	4.3278E-05	918.724	1,837.448	0.00E+00	3.98E-02	7.95E-02	0.0850	3.279E+13
Ci-36	4.3023E-08	918.724	1,837.448	0.00E+00	3.95E-05	7.91E-05	0.1250	4.538E+13
Cm-243	2.4286E-07	918.724	1,837.448	0.00E+00	2.23E-04	4.46E-04	0.2250	2.879E+13
Cm-244	2.6015E-06	918.724	1,837.448	0.00E+00	2.39E-03	4.78E-03	0.3750	1.185E+13
Co-60	1.6075E-02	918.724	1,837.448	0.00E+00	1.48E+01	2.95E+01	0.5750	1.765E+14
Cs-134	1.9323E-02	918.724	1,837.448	0.00E+00	1.78E+01	3.55E+01	0.8500	3.215E+13
Cs-135	3.1549E-05	918.724	1,837.448	0.00E+00	2.90E-02	5.80E-02	1.2500	3.535E+13
Cs-137	2.4556E+00	918.724	1,837.448	0.00E+00	2.26E+03	4.51E+03	1.7500	1.014E+12
Eu-154	9.0180E-01	918.724	1,837.448	0.00E+00	8.29E+02	1.66E+03	2.2500	2.412E+09
Eu-155	2.1820E-01	918.724	1,837.448	0.00E+00	2.00E+02	4.01E+02	2.7500	4.728E+07
Fe-55	2.2902E-03	918.724	1,837.448	0.00E+00	2.10E+00	4.21E+00	3.5000	5.770E+06
H-3	8.1609E-03	918.724	1,837.448	0.00E+00	7.50E+00	1.50E+01	5.0000	1.041E+03
I-129	7.3805E-07	918.724	1,837.448	0.00E+00	6.78E-04	1.36E-03	7.0000	1.177E+02
Kr-85	1.8256E-01	918.724	1,837.448	0.00E+00	1.68E+02	3.35E+02	11.0000	1.340E+01
Np-237	1.4505E-06	918.724	1,837.448	0.00E+00	1.33E-03	2.67E-03		
Pa-231	4.5564E-09	918.724	1,837.448	0.00E+00	4.19E-06	8.37E-06		
Pb-210	1.8842E-14	918.724	1,837.448	0.00E+00	1.73E-11	3.46E-11		
Pm-147	5.5459E-01	918.724	1,837.448	0.00E+00	5.10E+02	1.02E+03		
Pu-238	1.2992E-03	918.724	1,837.448	0.00E+00	1.19E+00	2.39E+00		
Pu-239	5.6932E-03	918.724	1,837.448	0.00E+00	5.23E+00	1.05E+01		
Pu-240	2.2632E-03	918.724	1,837.448	0.00E+00	2.08E+00	4.16E+00		
Pu-241	9.8857E-02	918.724	1,837.448	0.00E+00	9.08E+01	1.82E+02		
Pu-242	3.0602E-07	918.724	1,837.448	0.00E+00	2.81E-04	5.62E-04		
Ra-226	1.0823E-13	918.724	1,837.448	0.00E+00	9.94E-11	1.99E-10		
Ra-228	2.0406E-10	918.724	1,837.448	0.00E+00	1.87E-07	3.75E-07		
Ru-106	3.0180E-03	918.724	1,837.448	0.00E+00	2.77E+00	5.55E+00		
Se-79	1.2937E-05	918.724	1,837.448	0.00E+00	1.19E-02	2.38E-02		
Sn-126	1.2238E-05	918.724	1,837.448	0.00E+00	1.12E-02	2.25E-02		
Sr-90	2.3098E+00	918.724	1,837.448	0.00E+00	2.12E+03	4.24E+03		
Tc-99	4.4120E-04	918.724	1,837.448	0.00E+00	4.05E-01	8.11E-01		
Th-229	2.0932E-10	918.724	1,837.448	0.00E+00	1.92E-07	3.85E-07		
Th-230	2.7744E-11	918.724	1,837.448	0.00E+00	2.55E-08	5.10E-08		
Th-232	2.3744E-10	918.724	1,837.448	0.00E+00	2.18E-07	4.36E-07		
Tl-208	1.9459E-08	918.724	1,837.448	0.00E+00	1.79E-05	3.58E-05		
U-232	5.3850E-08	918.724	1,837.448	0.00E+00	4.95E-05	9.89E-05		
U-233	1.3135E-07	918.724	1,837.448	0.00E+00	1.21E-04	2.41E-04		
U-234	1.9143E-07	918.724	1,837.448	0.00E+00	1.76E-04	3.52E-04		
U-235	-2.6159E-06	918.724	0.000	1.02E-02	7.79E-03	1.02E-02		
U-236	1.2719E-05	918.724	1,837.448	0.00E+00	1.17E-02	2.34E-02		
U-238	-3.8857E-08	918.724	0.000	1.16E-04	8.06E-05	1.16E-04		
Y-90	2.3098E+00	918.724	1,837.448	0.00E+00	2.12E+03	4.24E+03		
Other Radionuclides					2.42E+03	4.85E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.41E+01	6.82E+01
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: This fuel matches on all parameters except enrichment.
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	93.16330608	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
	918.724	918.724	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		1,837.448	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup	
	4.91		1.01
Bounding:	9.83		

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: TMI-2
 SNF ID #: 228
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=.03kg ; EOL=.03kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1979
 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"
 0.06

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	6.6376E-10	0.190	0.380	0.00E+00	1.26E-10	2.52E-10	0.0150	2.587E+10
Am-241	1.3144E-01	0.190	0.380	0.00E+00	2.50E-02	5.00E-02	0.0250	5.239E+09
Am-242m	3.0039E-04	0.190	0.380	0.00E+00	5.71E-05	1.14E-04	0.0375	5.070E+09
Am-243	6.2629E-04	0.190	0.380	0.00E+00	1.19E-04	2.38E-04	0.0575	5.531E+09
C-14	4.7965E-05	0.190	0.380	0.00E+00	9.12E-06	1.82E-05	0.0850	2.931E+09
Ci-36	8.0297E-07	0.190	0.380	0.00E+00	1.53E-07	3.05E-07	0.1250	2.141E+09
Cm-243	3.1993E-04	0.190	0.380	0.00E+00	6.08E-05	1.22E-04	0.2250	2.516E+09
Cm-244	7.1851E-02	0.190	0.380	0.00E+00	1.37E-02	2.73E-02	0.3750	1.080E+09
Co-60	9.5220E-03	0.190	0.380	0.00E+00	1.81E-03	3.62E-03	0.5750	2.481E+10
Cs-134	1.1662E-03	0.190	0.380	0.00E+00	2.22E-04	4.44E-04	0.8500	4.896E+08
Cs-135	1.4433E-05	0.190	0.380	0.00E+00	2.75E-06	5.49E-06	1.2500	6.614E+08
Cs-137	1.7603E+00	0.190	0.380	0.00E+00	3.35E-01	6.70E-01	1.7500	1.449E+07
Eu-154	4.5203E-02	0.190	0.380	0.00E+00	8.60E-03	1.72E-02	2.2500	2.677E+03
Eu-155	7.1479E-03	0.190	0.380	0.00E+00	1.36E-03	2.72E-03	2.7500	3.008E+03
Fe-55	6.1919E-04	0.190	0.380	0.00E+00	1.18E-04	2.36E-04	3.5000	3.943E+02
H-3	3.6386E-02	0.190	0.380	0.00E+00	6.92E-03	1.38E-02	5.0000	1.685E+02
I-129	9.8288E-07	0.190	0.380	0.00E+00	1.87E-07	3.74E-07	7.0000	1.943E+01
Kr-85	5.3844E-02	0.190	0.380	0.00E+00	1.02E-02	2.05E-02	11.0000	2.231E+00
Np-237	1.0546E-05	0.190	0.380	0.00E+00	2.01E-06	4.01E-06		
Pa-231	1.1370E-09	0.190	0.380	0.00E+00	2.16E-10	4.32E-10		
Pb-210	3.3624E-11	0.190	0.380	0.00E+00	6.39E-12	1.28E-11		
Pm-147	5.1211E-03	0.190	0.380	0.00E+00	9.74E-04	1.95E-03		
Pu-238	8.0669E-02	0.190	0.380	0.00E+00	1.53E-02	3.07E-02		
Pu-239	1.1626E-02	0.190	0.380	0.00E+00	2.21E-03	4.42E-03		
Pu-240	1.5097E-02	0.190	0.380	0.00E+00	2.87E-03	5.74E-03		
Pu-241	1.4567E+00	0.190	0.380	0.00E+00	2.77E-01	5.54E-01		
Pu-242	6.4260E-05	0.190	0.380	0.00E+00	1.22E-05	2.44E-05		
Ra-226	1.1392E-10	0.190	0.380	0.00E+00	2.17E-11	4.33E-11		
Ra-228	5.1841E-12	0.190	0.380	0.00E+00	9.86E-13	1.97E-12		
Ru-106	5.9012E-07	0.190	0.380	0.00E+00	1.12E-07	2.24E-07		
Se-79	1.2379E-05	0.190	0.380	0.00E+00	2.35E-06	4.71E-06		
Sn-126	2.5210E-05	0.190	0.380	0.00E+00	4.79E-06	9.59E-06		
Sr-90	1.1630E+00	0.190	0.380	0.00E+00	2.21E-01	4.42E-01		
Tc-99	3.9357E-04	0.190	0.380	0.00E+00	7.49E-05	1.50E-04		
Th-229	8.5691E-11	0.190	0.380	0.00E+00	1.63E-11	3.26E-11		
Th-230	1.4493E-08	0.190	0.380	0.00E+00	2.76E-09	5.51E-09		
Th-232	5.2923E-12	0.190	0.380	0.00E+00	1.01E-12	2.01E-12		
Ti-208	1.9202E-07	0.190	0.380	0.00E+00	3.65E-08	7.30E-08		
U-232	5.2083E-07	0.190	0.380	0.00E+00	9.91E-08	1.98E-07		
U-233	2.4386E-08	0.190	0.380	0.00E+00	4.64E-09	9.28E-09		
U-234	4.7012E-05	0.190	0.380	0.00E+00	8.94E-06	1.79E-05		
U-235	-1.4492E-06	0.190	0.000	2.50E-06	2.22E-06	2.50E-06		
U-236	7.5759E-06	0.190	0.380	0.00E+00	1.44E-06	2.88E-06		
U-238	-2.6129E-07	0.190	0.000	1.04E-05	1.04E-05	1.04E-05		
Y-90	1.1631E+00	0.190	0.380	0.00E+00	2.21E-01	4.42E-01		
Other Radionuclides					3.21E-01	6.43E-01		

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-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	3.588289669	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		0.190	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		0.380	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.17		1.00
Bounding:	0.34		

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: TMI-2 CORE DEBRIS
 SNF ID #: 914
 Fuel Units & Descr: 341 - DEBRIS
 Heavy Metal Mass: BOL=82038.39kg : EOL=81749.23kg
 ROD Storage Sit: INEEL

¹Fuel decay start date: 1979
 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"x15"
 341.00

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	6.6376E-10	274,985.090	549,970.181	0.00E+00	1.83E-04	3.65E-04	Avg. MeV	
Am-241	1.3144E-01	274,985.090	549,970.181	0.00E+00	3.61E+04	7.23E+04	0.0150	3.740E+16
Am-242m	3.0039E-04	274,985.090	549,970.181	0.00E+00	8.26E+01	1.65E+02	0.0250	7.575E+15
Am-243	6.2629E-04	274,985.090	549,970.181	0.00E+00	1.72E+02	3.44E+02	0.0375	7.331E+15
C-14	4.7965E-05	274,985.090	549,970.181	0.00E+00	1.32E+01	2.64E+01	0.0575	7.997E+15
Cl-36	8.0297E-07	274,985.090	549,970.181	0.00E+00	2.21E-01	4.42E-01	0.0850	4.238E+15
Cm-243	3.1993E-04	274,985.090	549,970.181	0.00E+00	8.80E+01	1.76E+02	0.1250	3.096E+15
Cm-244	7.1851E-02	274,985.090	549,970.181	0.00E+00	1.98E+04	3.95E+04	0.2250	3.638E+15
Co-60	9.5220E-03	274,985.090	549,970.181	0.00E+00	2.62E+03	5.24E+03	0.3750	1.561E+15
Cs-134	1.1662E-03	274,985.090	549,970.181	0.00E+00	3.21E+02	6.41E+02	0.5750	3.587E+16
Cs-135	1.4433E-05	274,985.090	549,970.181	0.00E+00	3.97E+00	7.94E+00	0.8500	7.079E+14
Cs-137	1.7603E+00	274,985.090	549,970.181	0.00E+00	4.84E+05	9.68E+05	1.2500	9.563E+14
Eu-154	4.5203E-02	274,985.090	549,970.181	0.00E+00	1.24E+04	2.49E+04	1.7500	2.095E+13
Eu-155	7.1479E-03	274,985.090	549,970.181	0.00E+00	1.97E+03	3.93E+03	2.2500	3.871E+09
Fe-55	6.1919E-04	274,985.090	549,970.181	0.00E+00	1.70E+02	3.41E+02	2.7500	4.350E+09
H-3	3.6386E-02	274,985.090	549,970.181	0.00E+00	1.00E+04	2.00E+04	3.5000	5.702E+08
I-129	9.8288E-07	274,985.090	549,970.181	0.00E+00	2.70E-01	5.41E-01	5.0000	2.437E+08
Kr-85	5.3844E-02	274,985.090	549,970.181	0.00E+00	1.48E+04	2.96E+04	7.0000	2.809E+07
Np-237	1.0546E-05	274,985.090	549,970.181	0.00E+00	2.90E+00	5.80E+00	11.0000	3.226E+06
Pa-231	1.1370E-09	274,985.090	549,970.181	0.00E+00	3.13E-04	6.25E-04		
Pb-210	3.3624E-11	274,985.090	549,970.181	0.00E+00	9.25E-06	1.85E-05		
Pm-147	5.1211E-03	274,985.090	549,970.181	0.00E+00	1.41E+03	2.82E+03		
Pu-238	8.0669E-02	274,985.090	549,970.181	0.00E+00	2.22E+04	4.44E+04		
Pu-239	1.1626E-02	274,985.090	549,970.181	0.00E+00	3.20E+03	6.39E+03		
Pu-240	1.5097E-02	274,985.090	549,970.181	0.00E+00	4.15E+03	8.30E+03		
Pu-241	1.4567E+00	274,985.090	549,970.181	0.00E+00	4.01E+05	8.01E+05		
Pu-242	6.4260E-05	274,985.090	549,970.181	0.00E+00	1.77E+01	3.53E+01		
Ra-226	1.1392E-10	274,985.090	549,970.181	0.00E+00	3.13E-05	6.27E-05		
Ra-228	5.1841E-12	274,985.090	549,970.181	0.00E+00	1.43E-06	2.85E-06		
Ru-106	5.9012E-07	274,985.090	549,970.181	0.00E+00	1.62E-01	3.25E-01		
Se-79	1.2379E-05	274,985.090	549,970.181	0.00E+00	3.40E+00	6.81E+00		
Sn-126	2.5210E-05	274,985.090	549,970.181	0.00E+00	6.93E+00	1.39E+01		
Sr-90	1.1630E+00	274,985.090	549,970.181	0.00E+00	3.20E+05	6.40E+05		
Tc-99	3.9357E-04	274,985.090	549,970.181	0.00E+00	1.08E+02	2.16E+02		
Th-229	8.5691E-11	274,985.090	549,970.181	0.00E+00	2.36E-05	4.71E-05		
Th-230	1.4493E-08	274,985.090	549,970.181	0.00E+00	3.99E-03	7.97E-03		
Th-232	5.2923E-12	274,985.090	549,970.181	0.00E+00	1.46E-06	2.91E-06		
Tl-208	1.9202E-07	274,985.090	549,970.181	0.00E+00	5.28E-02	1.06E-01		
U-232	5.2083E-07	274,985.090	549,970.181	0.00E+00	1.43E-01	2.86E-01		
U-233	2.4386E-08	274,985.090	549,970.181	0.00E+00	6.71E-03	1.34E-02		
U-234	4.7012E-05	274,985.090	549,970.181	0.00E+00	1.29E+01	2.59E+01		
U-235	-1.4492E-06	274,985.090	0.000	4.50E+00	4.10E+00	4.50E+00		
U-236	7.5759E-06	274,985.090	549,970.181	0.00E+00	2.08E+00	4.17E+00		
U-238	-2.6129E-07	274,985.090	0.000	2.69E+01	2.68E+01	2.69E+01		
Y-90	1.1631E+00	274,985.090	549,970.181	0.00E+00	3.20E+05	6.40E+05		
Other Radionuclides					4.65E+05	9.29E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.54E+03	1.51E+04
Total	Total

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-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	2.539514873	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	260,471,900	274,985,090	
Bounding:	489,359,019	549,970,181	

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:	0.10	1.06	
Bounding:	0.19	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: TMI-2 CORE DEBRIS (D-153 & 388)
 SNF ID #: 229
 Fuel Units & Descr: 2 - DEBRIS
 Heavy Metal Mass: BOL=19.08kg : EOL=19.01kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1979
 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"x15"
 2.00

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	6.6376E-10	66.567	133.133	0.00E+00	4.42E-08	8.84E-08	Avg. MeV	
Am-241	1.3144E-01	66.567	133.133	0.00E+00	8.75E+00	1.75E+01	0.0150	9.053E+12
Am-242m	3.0039E-04	66.567	133.133	0.00E+00	2.00E-02	4.00E-02	0.0250	1.834E+12
Am-243	6.2629E-04	66.567	133.133	0.00E+00	4.17E-02	8.34E-02	0.0375	1.775E+12
C-14	4.7965E-05	66.567	133.133	0.00E+00	3.19E-03	6.39E-03	0.0575	1.936E+12
Cl-36	8.0297E-07	66.567	133.133	0.00E+00	5.35E-05	1.07E-04	0.0850	1.026E+12
Cm-243	3.1993E-04	66.567	133.133	0.00E+00	2.13E-02	4.26E-02	0.1250	7.494E+11
Cm-244	7.1851E-02	66.567	133.133	0.00E+00	4.78E+00	9.57E+00	0.2250	8.807E+11
Co-60	9.5220E-03	66.567	133.133	0.00E+00	6.34E-01	1.27E+00	0.3750	3.778E+11
Cs-134	1.1662E-03	66.567	133.133	0.00E+00	7.76E-02	1.55E-01	0.5750	8.683E+12
Cs-135	1.4433E-05	66.567	133.133	0.00E+00	9.61E-04	1.92E-03	0.8500	1.714E+11
Cs-137	1.7603E+00	66.567	133.133	0.00E+00	1.17E+02	2.34E+02	1.2500	2.315E+11
Eu-154	4.5203E-02	66.567	133.133	0.00E+00	3.01E+00	6.02E+00	1.7500	5.073E+09
Eu-155	7.1479E-03	66.567	133.133	0.00E+00	4.76E-01	9.52E-01	2.2500	9.370E+05
Fe-55	6.1919E-04	66.567	133.133	0.00E+00	4.12E-02	8.24E-02	2.7500	1.053E+06
H-3	3.6386E-02	66.567	133.133	0.00E+00	2.42E+00	4.84E+00	3.5000	1.380E+05
I-129	9.8288E-07	66.567	133.133	0.00E+00	6.54E-05	1.31E-04	5.0000	5.898E+04
Kr-85	5.3844E-02	66.567	133.133	0.00E+00	3.58E+00	7.17E+00	7.0000	6.800E+03
Np-237	1.0546E-05	66.567	133.133	0.00E+00	7.02E-04	1.40E-03	11.0000	7.810E+02
Pa-231	1.1370E-09	66.567	133.133	0.00E+00	7.57E-08	1.51E-07		
Pb-210	3.3624E-11	66.567	133.133	0.00E+00	2.24E-09	4.48E-09		
Pm-147	5.1211E-03	66.567	133.133	0.00E+00	3.41E-01	6.82E-01		
Pu-238	8.0669E-02	66.567	133.133	0.00E+00	5.37E+00	1.07E+01		
Pu-239	1.1626E-02	66.567	133.133	0.00E+00	7.74E-01	1.55E+00		
Pu-240	1.5097E-02	66.567	133.133	0.00E+00	1.00E+00	2.01E+00		
Pu-241	1.4567E+00	66.567	133.133	0.00E+00	9.70E+01	1.94E+02		
Pu-242	6.4260E-05	66.567	133.133	0.00E+00	4.28E-03	8.56E-03		
Ra-226	1.1392E-10	66.567	133.133	0.00E+00	7.58E-09	1.52E-08		
Ra-228	5.1841E-12	66.567	133.133	0.00E+00	3.45E-10	6.90E-10		
Ru-106	5.9012E-07	66.567	133.133	0.00E+00	3.93E-05	7.86E-05		
Se-79	1.2379E-05	66.567	133.133	0.00E+00	8.24E-04	1.65E-03		
Sn-126	2.5210E-05	66.567	133.133	0.00E+00	1.68E-03	3.36E-03		
Sr-90	1.1630E+00	66.567	133.133	0.00E+00	7.74E+01	1.55E+02		
Tc-99	3.9357E-04	66.567	133.133	0.00E+00	2.62E-02	5.24E-02		
Th-229	8.5691E-11	66.567	133.133	0.00E+00	5.70E-09	1.14E-08		
Th-230	1.4493E-08	66.567	133.133	0.00E+00	9.65E-07	1.93E-06		
Th-232	5.2923E-12	66.567	133.133	0.00E+00	3.52E-10	7.05E-10		
Tl-208	1.9202E-07	66.567	133.133	0.00E+00	1.28E-05	2.56E-05		
U-232	5.2083E-07	66.567	133.133	0.00E+00	3.47E-05	6.93E-05		
U-233	2.4386E-08	66.567	133.133	0.00E+00	1.62E-06	3.25E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	4.7012E-05	66.567	133.133	0.00E+00	3.13E-03	6.26E-03	1.83E+00	3.65E+00
U-235	-1.4492E-06	66.567	0.000	1.29E-03	1.19E-03	1.29E-03	Total	Total
U-236	7.5759E-06	66.567	133.133	0.00E+00	5.04E-04	1.01E-03		
U-238	-2.6129E-07	66.567	0.000	6.21E-03	6.19E-03	6.21E-03		
Y-90	1.1631E+00	66.567	133.133	0.00E+00	7.74E+01	1.55E+02		
Other Radionuclides					1.12E+02	2.25E+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-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	3.125	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	60.579	66.567	
Bounding:	113.812	133.133	

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:	0.10	1.10	
Bounding:	0.20	1.17	

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: TORY-11A
 SNF ID #: 230
 Fuel Units & Descr: 146 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=48.65kg : EOL=48.65kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1962
 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: 35 years

Estimated
 Canister usage:
 HIC
 3.65

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	9.5869E-10	896.182	1,792.363	0.00E+00	8.59E-07	1.72E-06	0.0150	1.324E+14
Am-241	1.0109E-02	896.182	1,792.363	0.00E+00	9.06E+00	1.81E+01	0.0250	2.720E+13
Am-242m	1.2789E-06	896.182	1,792.363	0.00E+00	1.15E-03	2.29E-03	0.0375	2.384E+13
Am-243	3.7047E-05	896.182	1,792.363	0.00E+00	3.32E-02	6.64E-02	0.0575	2.565E+13
C-14	2.6416E-08	896.182	1,792.363	0.00E+00	2.37E-05	4.73E-05	0.0850	1.535E+13
Cf-252	4.4441E-31	896.182	1,792.363	0.00E+00	3.98E-28	7.97E-28	0.1250	1.035E+13
Cm-243	3.9605E-06	896.182	1,792.363	0.00E+00	3.55E-03	7.10E-03	0.2250	1.327E+13
Cm-244	2.6227E-03	896.182	1,792.363	0.00E+00	2.35E+00	4.70E+00	0.3750	5.756E+12
Co-60	6.7740E-06	896.182	1,792.363	0.00E+00	6.07E-03	1.21E-02	0.5750	9.616E+13
Cs-134	6.8894E-05	896.182	1,792.363	0.00E+00	6.17E-02	1.23E-01	0.8500	1.424E+12
Cs-135	4.2564E-06	896.182	1,792.363	0.00E+00	3.81E-03	7.63E-03	1.2500	8.509E+11
Cs-137	1.4399E+00	896.182	1,792.363	0.00E+00	1.29E+03	2.58E+03	1.7500	4.026E+10
Eu-154	1.5522E-02	896.182	1,792.363	0.00E+00	1.39E+01	2.78E+01	2.2500	2.788E+06
Eu-155	1.7588E-03	896.182	1,792.363	0.00E+00	1.58E+00	3.15E+00	2.7500	2.801E+06
Fe-55	2.4933E-05	896.182	1,792.363	0.00E+00	2.23E-02	4.47E-02	3.5000	7.449E+04
H-3	1.9945E-03	896.182	1,792.363	0.00E+00	1.79E+00	3.57E+00	5.0000	3.165E+04
I-129	6.6403E-07	896.182	1,792.363	0.00E+00	5.95E-04	1.19E-03	7.0000	3.624E+03
Kr-85	4.1002E-02	896.182	1,792.363	0.00E+00	3.67E+01	7.35E+01	11.0000	4.147E+02
Np-237	3.1610E-05	896.182	1,792.363	0.00E+00	2.83E-02	5.67E-02		
Pa-231	1.8876E-09	896.182	1,792.363	0.00E+00	1.69E-06	3.38E-06		
Pb-210	8.3840E-11	896.182	1,792.363	0.00E+00	7.51E-08	1.50E-07		
Pm-147	4.6501E-04	896.182	1,792.363	0.00E+00	4.17E-01	8.33E-01		
Pu-238	1.3645E-01	896.182	1,792.363	0.00E+00	1.22E+02	2.45E+02		
Pu-239	6.9502E-04	896.182	1,792.363	0.00E+00	6.23E-01	1.25E+00		
Pu-240	3.8183E-04	896.182	1,792.363	0.00E+00	3.42E-01	6.84E-01		
Pu-241	6.5310E-02	896.182	1,792.363	0.00E+00	5.85E+01	1.17E+02		
Pu-242	3.0911E-06	896.182	1,792.363	0.00E+00	2.77E-03	5.54E-03		
Ra-226	2.3512E-10	896.182	1,792.363	0.00E+00	2.11E-07	4.21E-07		
Ra-228	3.3366E-14	896.182	1,792.363	0.00E+00	2.99E-11	5.98E-11		
Ru-106	2.4490E-10	896.182	1,792.363	0.00E+00	2.19E-07	4.39E-07		
Se-79	1.2333E-05	896.182	1,792.363	0.00E+00	1.11E-02	2.21E-02		
Sn-126	1.0194E-05	896.182	1,792.363	0.00E+00	9.14E-03	1.83E-02		
Sr-90	1.3348E+00	896.182	1,792.363	0.00E+00	1.20E+03	2.39E+03		
Tc-99	3.8056E-04	896.182	1,792.363	0.00E+00	3.41E-01	6.82E-01		
Th-229	1.7868E-11	896.182	1,792.363	0.00E+00	1.60E-08	3.20E-08		
Th-230	2.3348E-08	896.182	1,792.363	0.00E+00	2.09E-05	4.18E-05		
Th-232	4.1288E-14	896.182	1,792.363	0.00E+00	3.70E-11	7.40E-11		
Tl-208	4.3190E-08	896.182	1,792.363	0.00E+00	3.87E-05	7.74E-05		
U-232	1.1707E-07	896.182	1,792.363	0.00E+00	1.05E-04	2.10E-04		
U-233	7.2175E-09	896.182	1,792.363	0.00E+00	6.47E-06	1.29E-05		
U-234	6.1543E-05	896.182	1,792.363	0.00E+00	5.52E-02	1.10E-01		
U-235	-2.8661E-06	896.182	0.000	9.80E-02	9.54E-02	9.80E-02		
U-236	1.6701E-05	896.182	1,792.363	0.00E+00	1.50E-02	2.99E-02		
U-238	-9.4194E-09	896.182	0.000	1.12E-03	1.11E-03	1.12E-03		
Y-90	1.3348E+00	896.182	1,792.363	0.00E+00	1.20E+03	2.39E+03		
Other Radionuclides					1.24E+03	2.47E+03		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							1.89E+01	3.78E+01
							Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: BERYLLIUM	Used: HEAVY WATER	This Template was used for the following reasons:
Fuel Cladding:	NONE	ALUM	This fuel matches on all parameters except cladding (none) and moderator (Heavy Water is conservative)
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	93.17486044	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD: 896.182	Estimated: 896.182	Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding:		1,792.363	Bounding burnup assumed to be twice nominal burnup.

Checks		
Nominal:	Burnup Multiplier: 0.04	Estimated Burnup/ Given Burnup: 0.98
Bounding:	0.08	

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: TORY-IIC
 SNF ID #: 231
 Fuel Units & Descr: 655 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=59.08kg ; EOL=59.08kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1964
 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: 35 years

Estimated
 Canister usage:
 18"x10"
 13.10

II. Estimates

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	9.5869E-10	1,088.394	2,176.787	0.00E+00	1.04E-06	2.09E-06	0.0150	1.608E+14
Am-241	1.0109E-02	1,088.394	2,176.787	0.00E+00	1.10E+01	2.20E+01	0.0250	3.304E+13
Am-242m	1.2789E-06	1,088.394	2,176.787	0.00E+00	1.39E-03	2.78E-03	0.0375	2.896E+13
Am-243	3.7047E-05	1,088.394	2,176.787	0.00E+00	4.03E-02	8.06E-02	0.0575	3.115E+13
C-14	2.6416E-08	1,088.394	2,176.787	0.00E+00	2.88E-05	5.75E-05	0.0850	1.864E+13
Cl-36	4.4441E-31	1,088.394	2,176.787	0.00E+00	4.84E-28	9.67E-28	0.1250	1.257E+13
Cm-243	3.9605E-06	1,088.394	2,176.787	0.00E+00	4.31E-03	8.62E-03	0.2250	1.611E+13
Cm-244	2.6227E-03	1,088.394	2,176.787	0.00E+00	2.85E+00	5.71E+00	0.3750	6.991E+12
Co-60	6.7740E-06	1,088.394	2,176.787	0.00E+00	7.37E-03	1.47E-02	0.5750	1.168E+14
Cs-134	6.8894E-05	1,088.394	2,176.787	0.00E+00	7.50E-02	1.50E-01	0.8500	1.729E+12
Cs-135	4.2564E-06	1,088.394	2,176.787	0.00E+00	4.63E-03	9.27E-03	1.2500	1.033E+12
Cs-137	1.4399E+00	1,088.394	2,176.787	0.00E+00	1.57E+03	3.13E+03	1.7500	4.890E+10
Eu-154	1.5522E-02	1,088.394	2,176.787	0.00E+00	1.69E+01	3.38E+01	2.2500	3.386E+06
Eu-155	1.7588E-03	1,088.394	2,176.787	0.00E+00	1.91E+00	3.83E+00	2.7500	3.402E+06
Fe-55	2.4933E-05	1,088.394	2,176.787	0.00E+00	2.71E-02	5.43E-02	3.5000	9.047E+04
H-3	1.9945E-03	1,088.394	2,176.787	0.00E+00	2.17E+00	4.34E+00	5.0000	3.844E+04
I-129	6.6403E-07	1,088.394	2,176.787	0.00E+00	7.23E-04	1.45E-03	7.0000	4.401E+03
Kr-85	4.1002E-02	1,088.394	2,176.787	0.00E+00	4.46E+01	8.93E+01	11.0000	5.036E+02
Np-237	3.1610E-05	1,088.394	2,176.787	0.00E+00	3.44E-02	6.88E-02		
Pa-231	1.8876E-09	1,088.394	2,176.787	0.00E+00	2.05E-06	4.11E-06		
Pb-210	8.3840E-11	1,088.394	2,176.787	0.00E+00	9.13E-08	1.83E-07		
Pm-147	4.6501E-04	1,088.394	2,176.787	0.00E+00	5.06E-01	1.01E+00		
Pu-238	1.3645E-01	1,088.394	2,176.787	0.00E+00	1.49E+02	2.97E+02		
Pu-239	6.9502E-04	1,088.394	2,176.787	0.00E+00	7.56E-01	1.51E+00		
Pu-240	3.8183E-04	1,088.394	2,176.787	0.00E+00	4.16E-01	8.31E-01		
Pu-241	6.5310E-02	1,088.394	2,176.787	0.00E+00	7.11E+01	1.42E+02		
Pu-242	3.0911E-06	1,088.394	2,176.787	0.00E+00	3.36E-03	6.73E-03		
Ra-226	2.3512E-10	1,088.394	2,176.787	0.00E+00	2.56E-07	5.12E-07		
Ra-228	3.3366E-14	1,088.394	2,176.787	0.00E+00	3.63E-11	7.26E-11		
Ru-106	2.4490E-10	1,088.394	2,176.787	0.00E+00	2.67E-07	5.33E-07		
Se-79	1.2333E-05	1,088.394	2,176.787	0.00E+00	1.34E-02	2.68E-02		
Sn-126	1.0194E-05	1,088.394	2,176.787	0.00E+00	1.11E-02	2.22E-02		
Sr-90	1.3348E+00	1,088.394	2,176.787	0.00E+00	1.45E+03	2.91E+03		
Tc-99	3.8056E-04	1,088.394	2,176.787	0.00E+00	4.14E-01	8.28E-01		
Th-229	1.7868E-11	1,088.394	2,176.787	0.00E+00	1.94E-08	3.89E-08		
Th-230	2.3348E-08	1,088.394	2,176.787	0.00E+00	2.54E-05	5.08E-05		
Th-232	4.1288E-14	1,088.394	2,176.787	0.00E+00	4.49E-11	8.99E-11		
Tl-208	4.3190E-08	1,088.394	2,176.787	0.00E+00	4.70E-05	9.40E-05		
U-232	1.1707E-07	1,088.394	2,176.787	0.00E+00	1.27E-04	2.55E-04		
U-233	7.2175E-09	1,088.394	2,176.787	0.00E+00	7.86E-06	1.57E-05		
U-234	6.1543E-05	1,088.394	2,176.787	0.00E+00	6.70E-02	1.34E-01		
U-235	-2.8661E-06	1,088.394	0.000	1.19E-01	1.16E-01	1.19E-01		
U-236	1.6701E-05	1,088.394	2,176.787	0.00E+00	1.82E-02	3.64E-02		
U-238	-9.4194E-09	1,088.394	0.000	1.36E-03	1.35E-03	1.36E-03		
Y-90	1.3348E+00	1,088.394	2,176.787	0.00E+00	1.45E+03	2.91E+03		
Other Radionuclides					1.50E+03	3.00E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.30E+01	4.59E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	BERYLLIUM	HEAVY WATER	This Template was used for the following reasons: This fuel matches on all parameters except cladding (none) and moderator (Heavy Water is conservative)
Fuel Cladding:	NONE	ALUM	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	93.14703925	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		1,088.394	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup assumed to be twice nominal burnup.
Bounding:		2,176.787	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.04		0.98
Bounding:	0.08		

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: TREAT DRIVER
 SNF ID #: 232
 Fuel Units & Descr: 391 - ASSEMBLY
 Heavy Metal Mass: BOL=15.64kg : EOL=15.25kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1994
 Estimates as of: 2010
 Template: N-Reactor (Graphite, Zirc. 0 to 5%, U)
²Template Burnup(MWd): 69600
 Template BOL Heavy Metal Mass (MT): 11.6
 Template Decay Time: 15 years

Estimated
 Canister usage:
 18"x15"
 14.48

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	0.000E+00	412.488	824.976	0.00E+00	0.00E+00	0.00E+00	Avg. MeV	
Am-241	7.2313E-02	412.488	824.976	0.00E+00	2.98E+01	5.97E+01	0.0150	5.419E+13
Am-242m	6.2011E-05	412.488	824.976	0.00E+00	2.56E-02	5.12E-02	0.0250	1.112E+13
Am-243	4.6336E-05	412.488	824.976	0.00E+00	1.91E-02	3.82E-02	0.0375	1.037E+13
C-14	9.2170E-05	412.488	824.976	0.00E+00	3.80E-02	7.60E-02	0.0575	1.113E+13
Cl-36	0.000E+00	412.488	824.976	0.00E+00	0.00E+00	0.00E+00	0.0850	6.209E+12
Cm-243	0.000E+00	412.488	824.976	0.00E+00	0.00E+00	0.00E+00	0.1250	4.241E+12
Cm-244	7.4511E-04	412.488	824.976	0.00E+00	3.07E-01	6.15E-01	0.2250	5.337E+12
Co-60	3.4842E-04	412.488	824.976	0.00E+00	1.44E-01	2.87E-01	0.3750	2.302E+12
Cs-134	1.0795E-03	412.488	824.976	0.00E+00	4.45E-01	8.91E-01	0.5750	4.918E+13
Cs-135	1.0066E-05	412.488	824.976	0.00E+00	4.15E-03	8.30E-03	0.8500	6.745E+11
Cs-137	1.6092E+00	412.488	824.976	0.00E+00	6.64E+02	1.33E+03	1.2500	4.505E+11
Eu-154	1.8822E-02	412.488	824.976	0.00E+00	7.76E+00	1.55E+01	1.7500	1.865E+10
Eu-155	1.7672E-03	412.488	824.976	0.00E+00	7.29E-01	1.46E+00	2.2500	1.425E+06
Fe-55	9.0172E-05	412.488	824.976	0.00E+00	3.72E-02	7.44E-02	2.7500	5.124E+04
H-3	4.3506E-03	412.488	824.976	0.00E+00	1.79E+00	3.59E+00	3.5000	2.404E-04
I-129	8.6006E-07	412.488	824.976	0.00E+00	3.55E-04	7.10E-04	5.0000	8.635E+03
Kr-85	6.1652E-02	412.488	824.976	0.00E+00	2.54E+01	5.09E+01	7.0000	9.831E+02
Np-237	7.7672E-06	412.488	824.976	0.00E+00	3.20E-03	6.41E-03	11.0000	1.123E+02
Pa-231	0.000E+00	412.488	824.976	0.00E+00	0.00E+00	0.00E+00		
Pb-210	0.000E+00	412.488	824.976	0.00E+00	0.00E+00	0.00E+00		
Pm-147	1.8175E-02	412.488	824.976	0.00E+00	7.50E+00	1.50E+01		
Pu-238	2.2170E-02	412.488	824.976	0.00E+00	9.14E+00	1.83E+01		
Pu-239	2.8836E-02	412.488	824.976	0.00E+00	1.19E+01	2.38E+01		
Pu-240	2.2830E-02	412.488	824.976	0.00E+00	9.42E+00	1.88E+01		
Pu-241	1.1362E+00	412.488	824.976	0.00E+00	4.69E+02	9.37E+02		
Pu-242	1.4526E-05	412.488	824.976	0.00E+00	5.99E-03	1.20E-02		
Ra-226	0.000E+00	412.488	824.976	0.00E+00	0.00E+00	0.00E+00		
Ra-228	0.000E+00	412.488	824.976	0.00E+00	0.00E+00	0.00E+00		
Ru-106	4.2672E-06	412.488	824.976	0.00E+00	1.76E-03	3.52E-03		
Se-79	1.0901E-05	412.488	824.976	0.00E+00	4.50E-03	8.99E-03		
Sn-126	0.000E+00	412.488	824.976	0.00E+00	0.00E+00	0.00E+00		
Sr-90	1.1546E+00	412.488	824.976	0.00E+00	4.76E+02	9.53E+02		
Tc-99	3.6494E-04	412.488	824.976	0.00E+00	1.51E-01	3.01E-01		
Th-229	0.000E+00	412.488	824.976	0.00E+00	0.00E+00	0.00E+00		
Th-230	0.000E+00	412.488	824.976	0.00E+00	0.00E+00	0.00E+00		
Th-232	0.000E+00	412.488	824.976	0.00E+00	0.00E+00	0.00E+00		
Ti-208	0.000E+00	412.488	824.976	0.00E+00	0.00E+00	0.00E+00		
U-232	0.000E+00	412.488	824.976	0.00E+00	0.00E+00	0.00E+00		
U-233	0.000E+00	412.488	824.976	0.00E+00	0.00E+00	0.00E+00		
U-234	6.3994E-05	412.488	824.976	0.00E+00	2.64E-02	5.28E-02		
U-235	-1.2944E-06	412.488	0.000	3.13E-02	3.07E-02	3.13E-02		
U-236	1.1932E-05	412.488	824.976	0.00E+00	4.92E-03	9.84E-03		
U-238	-3.0619E-07	412.488	0.000	3.94E-04	2.68E-04	3.94E-04		
Y-90	1.1550E+00	412.488	824.976	0.00E+00	4.76E+02	9.53E+02		
Other Radionuclides					6.36E+02	1.27E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.49E+00	1.70E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: GRAPHITE	Used: GRAPHITE	This Template was used for the following reasons:
Fuel Cladding:	ZIRC-3	ZIRC	This fuel matches on all parameters except enrichment.
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	92.5	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD: 30.185	Estimated: 412.488	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		824.976	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier: 4.40	Estimated Burnup/ Given Burnup: 13.67	1.01
Bounding:	8.79		

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 FFCR (AFRRI)
 SNF ID #: 969
 Fuel Units & Descr: 3 - ELEMENT
 Heavy Metal Mass: BOL= ; EOL=26kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2019
 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							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	9.201	18.402	0.00E+00	7.84E-09	1.57E-08	Avg. MeV	
Am-241	1.8331E-03	9.201	18.402	0.00E+00	1.69E-02	3.37E-02	0.0150	2.974E+12
Am-242m	1.4129E-06	9.201	18.402	0.00E+00	1.30E-05	2.60E-05	0.0250	6.545E+11
Am-243	1.4774E-07	9.201	18.402	0.00E+00	1.36E-06	2.72E-06	0.0375	5.573E+11
C-14	1.2871E-04	9.201	18.402	0.00E+00	1.18E-03	2.37E-03	0.0575	5.721E+11
Cl-36	2.8120E-06	9.201	18.402	0.00E+00	2.59E-05	5.17E-05	0.0850	3.544E+11
Cm-243	1.7940E-07	9.201	18.402	0.00E+00	1.65E-06	3.30E-06	0.1250	2.573E+11
Cm-244	1.6962E-06	9.201	18.402	0.00E+00	1.56E-05	3.12E-05	0.2250	3.006E+11
Co-60	1.2839E+00	9.201	18.402	0.00E+00	1.18E+01	2.36E+01	0.3750	1.526E+11
Cs-134	9.0541E-02	9.201	18.402	0.00E+00	8.33E-01	1.67E+00	0.5750	2.028E+12
Cs-135	3.2195E-05	9.201	18.402	0.00E+00	2.96E-04	5.92E-04	0.8500	8.704E+10
Cs-137	2.7564E+00	9.201	18.402	0.00E+00	2.54E+01	5.07E+01	1.2500	1.788E+12
Eu-154	1.5368E-02	9.201	18.402	0.00E+00	1.41E-01	2.83E-01	1.7500	1.179E+09
Eu-155	2.9293E-02	9.201	18.402	0.00E+00	2.70E-01	5.39E-01	2.2500	1.900E+09
Fe-55	7.7158E-01	9.201	18.402	0.00E+00	7.10E+00	1.42E+01	2.7500	1.507E+07
H-3	1.1111E-02	9.201	18.402	0.00E+00	1.02E-01	2.04E-01	3.5000	1.755E+06
I-129	7.3684E-07	9.201	18.402	0.00E+00	6.78E-06	1.36E-05	5.0000	9.810E+00
Kr-85	2.5263E-01	9.201	18.402	0.00E+00	2.32E+00	4.65E+00	7.0000	1.111E+00
Np-237	1.2427E-06	9.201	18.402	0.00E+00	1.14E-05	2.29E-05	11.0000	1.285E-01
Pa-231	3.8511E-09	9.201	18.402	0.00E+00	3.54E-08	7.09E-08		
Pb-210	7.3880E-15	9.201	18.402	0.00E+00	6.80E-14	1.36E-13		
Pm-147	2.1023E+00	9.201	18.402	0.00E+00	1.93E+01	3.87E+01		
Pu-238	1.0383E-03	9.201	18.402	0.00E+00	9.55E-03	1.91E-02		
Pu-239	5.5293E-03	9.201	18.402	0.00E+00	5.09E-02	1.02E-01		
Pu-240	2.1278E-03	9.201	18.402	0.00E+00	1.96E-02	3.92E-02		
Pu-241	1.0195E-01	9.201	18.402	0.00E+00	9.38E-01	1.88E+00		
Pu-242	2.3128E-07	9.201	18.402	0.00E+00	2.13E-06	4.26E-06		
Ra-226	5.2782E-14	9.201	18.402	0.00E+00	4.86E-13	9.71E-13		
Ra-228	1.9338E-10	9.201	18.402	0.00E+00	1.78E-09	3.56E-09		
Ru-106	9.1684E-02	9.201	18.402	0.00E+00	8.44E-01	1.69E+00		
Se-79	1.3018E-05	9.201	18.402	0.00E+00	1.20E-04	2.40E-04		
Sn-126	1.2167E-05	9.201	18.402	0.00E+00	1.12E-04	2.24E-04		
Sr-90	2.6045E+00	9.201	18.402	0.00E+00	2.40E+01	4.79E+01		
Tc-99	4.4241E-04	9.201	18.402	0.00E+00	4.07E-03	8.14E-03		
Th-229	1.3713E-10	9.201	18.402	0.00E+00	1.26E-09	2.52E-09		
Th-230	1.8090E-11	9.201	18.402	0.00E+00	1.66E-10	3.33E-10		
Th-232	2.5278E-10	9.201	18.402	0.00E+00	2.33E-09	4.65E-09		
Tl-208	1.6947E-08	9.201	18.402	0.00E+00	1.56E-07	3.12E-07		
U-232	4.8737E-08	9.201	18.402	0.00E+00	4.48E-07	8.97E-07		
U-233	1.2203E-07	9.201	18.402	0.00E+00	1.12E-06	2.25E-06		
U-234	1.5925E-07	9.201	18.402	0.00E+00	1.47E-06	2.93E-06		
U-235	-2.6194E-06	9.201	0.000	1.17E-04	9.25E-05	1.17E-04		
U-236	1.2693E-05	9.201	18.402	0.00E+00	1.17E-04	2.34E-04		
U-238	-3.6331E-08	9.201	0.000	7.25E-05	7.22E-05	7.25E-05		
Y-90	2.6060E+00	9.201	18.402	0.00E+00	2.40E+01	4.80E+01		
Other Radionuclides					3.32E+01	6.63E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.35E-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	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown)
Fuel Cladding:	SST (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:		10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		9.201	Nominal burnup taken from SFD and converted to MWd using BOL=270kg Bounding burnup assumed to be twice nominal burnup.
Bounding:		18.402	

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

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 FFCR (UC-IRVINE)
 SNF ID #: 1052
 Fuel Units & Descr: 1 - ELEMENT
 Heavy Metal Mass: BOL= .18kg ; EOL= .18kg
 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
³Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.01

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	1.786	3.573	0.00E+00	1.52E-09	3.04E-09	Avg. MeV	
Am-241	1.8331E-03	1.786	3.573	0.00E+00	3.27E-03	6.55E-03	0.0150	5.775E+11
Am-242m	1.4129E-06	1.786	3.573	0.00E+00	2.52E-06	5.05E-06	0.0250	1.271E+11
Am-243	1.4774E-07	1.786	3.573	0.00E+00	2.64E-07	5.28E-07	0.0375	1.082E+11
C-14	1.2871E-04	1.786	3.573	0.00E+00	2.30E-04	4.60E-04	0.0575	1.111E+11
Ci-36	2.8120E-06	1.786	3.573	0.00E+00	5.02E-06	1.00E-05	0.0850	6.881E+10
Cm-243	1.7940E-07	1.786	3.573	0.00E+00	3.20E-07	6.41E-07	0.1250	4.977E+10
Cm-244	1.6962E-06	1.786	3.573	0.00E+00	3.03E-06	6.06E-06	0.2250	5.837E+10
Co-60	1.2839E+00	1.786	3.573	0.00E+00	2.29E+00	4.59E+00	0.3750	2.962E+10
Cs-134	9.0541E-02	1.786	3.573	0.00E+00	1.62E-01	3.23E-01	0.5750	3.938E+11
Cs-135	3.2195E-05	1.786	3.573	0.00E+00	5.75E-05	1.15E-04	0.8500	1.690E+10
Cs-137	2.7564E+00	1.786	3.573	0.00E+00	4.92E+00	9.85E+00	1.2500	3.432E+11
Eu-154	1.5368E-02	1.786	3.573	0.00E+00	2.75E-02	5.49E-02	1.7500	2.288E+08
Eu-155	2.9293E-02	1.786	3.573	0.00E+00	5.23E-02	1.05E-01	2.2500	3.688E+08
Fe-55	7.7158E-01	1.786	3.573	0.00E+00	1.38E+00	2.76E+00	2.7500	2.926E+06
H-3	1.1111E-02	1.786	3.573	0.00E+00	1.98E-02	3.97E-02	3.5000	3.407E+05
I-129	7.3684E-07	1.786	3.573	0.00E+00	1.32E-06	2.63E-06	5.0000	1.986E+00
Kr-85	2.5263E-01	1.786	3.573	0.00E+00	4.51E-01	9.03E-01	7.0000	2.250E-01
Np-237	1.2427E-06	1.786	3.573	0.00E+00	2.22E-06	4.44E-06	11.0000	2.564E-02
Pa-231	3.8511E-09	1.786	3.573	0.00E+00	6.88E-09	1.38E-08		
Pb-210	7.3880E-15	1.786	3.573	0.00E+00	1.32E-14	2.64E-14		
Pm-147	2.1023E+00	1.786	3.573	0.00E+00	3.76E+00	7.51E+00		
Pu-238	1.0383E-03	1.786	3.573	0.00E+00	1.85E-03	3.71E-03		
Pu-239	5.5293E-03	1.786	3.573	0.00E+00	9.88E-03	1.98E-02		
Pu-240	2.1278E-03	1.786	3.573	0.00E+00	3.80E-03	7.60E-03		
Pu-241	1.0195E-01	1.786	3.573	0.00E+00	1.82E-01	3.64E-01		
Pu-242	2.3128E-07	1.786	3.573	0.00E+00	4.13E-07	8.26E-07		
Ra-226	5.2782E-14	1.786	3.573	0.00E+00	9.43E-14	1.89E-13		
Ra-228	1.9338E-10	1.786	3.573	0.00E+00	3.45E-10	6.91E-10		
Ru-106	9.1684E-02	1.786	3.573	0.00E+00	1.64E-01	3.28E-01		
Se-79	1.3018E-05	1.786	3.573	0.00E+00	2.33E-05	4.65E-05		
Sn-126	1.2167E-05	1.786	3.573	0.00E+00	2.17E-05	4.35E-05		
Sr-90	2.6045E+00	1.786	3.573	0.00E+00	4.65E+00	9.31E+00		
Tc-99	4.4241E-04	1.786	3.573	0.00E+00	7.90E-04	1.58E-03		
Th-229	1.3713E-10	1.786	3.573	0.00E+00	2.45E-10	4.90E-10		
Th-230	1.8090E-11	1.786	3.573	0.00E+00	3.23E-11	6.46E-11		
Th-232	2.5278E-10	1.786	3.573	0.00E+00	4.52E-10	9.03E-10		
Ti-208	1.6947E-08	1.786	3.573	0.00E+00	3.03E-08	6.06E-08		
U-232	4.8737E-08	1.786	3.573	0.00E+00	8.71E-08	1.74E-07		
U-233	1.2203E-07	1.786	3.573	0.00E+00	2.18E-07	4.36E-07		
U-234	1.5925E-07	1.786	3.573	0.00E+00	2.84E-07	5.69E-07		
U-235	-2.6194E-06	1.786	0.000	7.92E-05	7.45E-05	7.92E-05		
U-236	1.2693E-05	1.786	3.573	0.00E+00	2.27E-05	4.54E-05		
U-238	-3.6331E-08	1.786	0.000	4.93E-05	4.92E-05	4.93E-05		
Y-90	2.6060E+00	1.786	3.573	0.00E+00	4.66E+00	9.31E+00		
Other Radionuclides					6.44E+00	1.29E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.04E-01	2.08E-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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.99996708	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	1.786		Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		3.573	Bounding burnup assumed to be twice nominal burnup.

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

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 FCCR (UC-IRVINE) ¹Fuel decay start date: 2035
 SNF ID #: 1050 Estimates as of: 2010
 Fuel Units & Descr: 2 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=38kg ; EOL=38kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.02

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	8.5173E-10	3.735	7.469	0.00E+00	3.18E-09	6.36E-09	0.0150	1.207E+12
Am-241	1.8331E-03	3.735	7.469	0.00E+00	6.85E-03	1.37E-02	0.0250	2.656E+11
Am-242m	1.4129E-06	3.735	7.469	0.00E+00	5.28E-06	1.06E-05	0.0375	2.262E+11
Am-243	1.4774E-07	3.735	7.469	0.00E+00	5.52E-07	1.10E-06	0.0575	2.322E+11
C-14	1.2871E-04	3.735	7.469	0.00E+00	4.81E-04	9.61E-04	0.0850	1.438E+11
Cf-36	2.8120E-06	3.735	7.469	0.00E+00	1.05E-05	2.10E-05	0.1250	1.045E+11
Cm-243	1.7940E-07	3.735	7.469	0.00E+00	6.70E-07	1.34E-06	0.2250	1.220E+11
Cm-244	1.6962E-06	3.735	7.469	0.00E+00	6.33E-06	1.27E-05	0.3750	6.192E+10
Co-60	1.2839E+00	3.735	7.469	0.00E+00	4.79E+00	9.59E+00	0.5750	8.233E+11
Cs-134	9.0541E-02	3.735	7.469	0.00E+00	3.38E-01	6.76E-01	0.8500	3.533E+10
Cs-135	3.2195E-05	3.735	7.469	0.00E+00	1.20E-04	2.40E-04	1.2500	7.175E+11
Cs-137	2.7564E+00	3.735	7.469	0.00E+00	1.03E+01	2.06E+01	1.7500	4.784E+08
Eu-154	1.5368E-02	3.735	7.469	0.00E+00	5.74E-02	1.15E-01	2.2500	7.710E+08
Eu-155	2.9293E-02	3.735	7.469	0.00E+00	1.09E-01	2.19E-01	2.7500	6.118E+06
Fe-55	7.7158E-01	3.735	7.469	0.00E+00	2.88E+00	5.76E+00	3.5000	7.122E+05
H-3	1.1111E-02	3.735	7.469	0.00E+00	4.15E-02	8.30E-02	5.0000	4.152E+00
I-129	7.3684E-07	3.735	7.469	0.00E+00	2.75E-06	5.50E-06	7.0000	4.704E-01
Kr-85	2.5263E-01	3.735	7.469	0.00E+00	9.43E-01	1.89E+00	11.0000	5.361E-02
Np-237	1.2427E-06	3.735	7.469	0.00E+00	4.64E-06	9.28E-06		
Pa-231	3.8511E-09	3.735	7.469	0.00E+00	1.44E-08	2.88E-08		
Pb-210	7.3880E-15	3.735	7.469	0.00E+00	2.76E-14	5.52E-14		
Pm-147	2.1023E+00	3.735	7.469	0.00E+00	7.85E+00	1.57E+01		
Pu-238	1.0383E-03	3.735	7.469	0.00E+00	3.88E-03	7.76E-03		
Pu-239	5.5293E-03	3.735	7.469	0.00E+00	2.07E-02	4.13E-02		
Pu-240	2.1278E-03	3.735	7.469	0.00E+00	7.95E-03	1.59E-02		
Pu-241	1.0195E-01	3.735	7.469	0.00E+00	3.81E-01	7.62E-01		
Pu-242	2.3128E-07	3.735	7.469	0.00E+00	8.64E-07	1.73E-06		
Ra-226	5.2782E-14	3.735	7.469	0.00E+00	1.97E-13	3.94E-13		
Ra-228	1.9338E-10	3.735	7.469	0.00E+00	7.22E-10	1.44E-09		
Ru-106	9.1684E-02	3.735	7.469	0.00E+00	3.42E-01	6.85E-01		
Sa-79	1.3018E-05	3.735	7.469	0.00E+00	4.86E-05	9.72E-05		
Sn-126	1.2167E-05	3.735	7.469	0.00E+00	4.54E-05	9.09E-05		
Sr-90	2.6045E+00	3.735	7.469	0.00E+00	9.73E+00	1.95E+01		
Tc-99	4.4241E-04	3.735	7.469	0.00E+00	1.65E-03	3.30E-03		
Th-229	1.3713E-10	3.735	7.469	0.00E+00	5.12E-10	1.02E-09		
Th-230	1.8090E-11	3.735	7.469	0.00E+00	6.76E-11	1.35E-10		
Th-232	2.5278E-10	3.735	7.469	0.00E+00	9.44E-10	1.89E-09		
Th-208	1.6947E-08	3.735	7.469	0.00E+00	6.33E-08	1.27E-07		
U-232	4.8737E-08	3.735	7.469	0.00E+00	1.82E-07	3.64E-07		
U-233	1.2203E-07	3.735	7.469	0.00E+00	4.56E-07	9.11E-07		
U-234	1.5925E-07	3.735	7.469	0.00E+00	5.95E-07	1.19E-06		
U-235	-2.6194E-06	3.735	0.000	1.66E-04	1.56E-04	1.66E-04		
U-236	1.2693E-05	3.735	7.469	0.00E+00	4.74E-05	9.48E-05		
U-238	-3.6331E-08	3.735	0.000	1.03E-04	1.03E-04	1.03E-04		
Y-90	2.6060E+00	3.735	7.469	0.00E+00	9.73E+00	1.95E+01		
Other Radionuclides					1.35E+01	2.69E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.17E-01	4.35E-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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20.00002088	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	3.735	2.864	
Bounding:		7.469	

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	0.77	
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 (HANFORD) ¹Fuel decay start date: 1989
 SNF ID #: 316 Estimates as of: 2010
 Fuel Units & Descr: 33 - ELEMENT Template: TRIGA-SS (LW/U-ZrX, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=6.34kg ; EOL=6.32kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: HANFORD Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 20 years

Estimated
 Canister usage:
 18"x10"
 0.30

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	2.6436E-09	30.875	61.751	0.00E+00	8.16E-08	1.63E-07	0.0150	6.188E+12
Am-241	3.1429E-03	30.875	61.751	0.00E+00	9.70E-02	1.94E-01	0.0250	1.288E+12
Am-242m	1.3195E-06	30.875	61.751	0.00E+00	4.07E-05	8.15E-05	0.0375	1.116E+12
Am-243	1.4753E-07	30.875	61.751	0.00E+00	4.56E-06	9.11E-06	0.0575	1.201E+12
C-14	1.2847E-04	30.875	61.751	0.00E+00	3.97E-03	7.93E-03	0.0850	7.248E+11
Ci-36	2.8120E-06	30.875	61.751	0.00E+00	8.68E-05	1.74E-04	0.1250	4.737E+11
Cm-243	1.2465E-07	30.875	61.751	0.00E+00	3.85E-06	7.70E-06	0.2250	6.223E+11
Cm-244	9.5564E-07	30.875	61.751	0.00E+00	2.95E-05	5.90E-05	0.3750	2.727E+11
Co-60	1.7880E-01	30.875	61.751	0.00E+00	5.52E+00	1.10E+01	0.5750	4.486E+12
Cs-134	5.8692E-04	30.875	61.751	0.00E+00	1.81E-02	3.62E-02	0.8500	5.056E+10
Cs-135	3.2195E-05	30.875	61.751	0.00E+00	9.94E-04	1.99E-03	1.2500	8.379E+11
Cs-137	1.9489E+00	30.875	61.751	0.00E+00	6.02E+01	1.20E+02	1.7500	1.299E+09
Eu-154	4.5895E-03	30.875	61.751	0.00E+00	1.42E-01	2.83E-01	2.2500	4.475E+06
Eu-155	3.6045E-03	30.875	61.751	0.00E+00	1.11E-01	2.23E-01	2.7500	4.931E+04
Fe-55	1.4185E-02	30.875	61.751	0.00E+00	4.38E-01	8.76E-01	3.5000	2.818E+02
H-3	4.7895E-03	30.875	61.751	0.00E+00	1.48E-01	2.96E-01	5.0000	3.602E+01
I-129	7.3684E-07	30.875	61.751	0.00E+00	2.28E-05	4.55E-05	7.0000	4.076E+00
Kr-85	9.5820E-02	30.875	61.751	0.00E+00	2.96E+00	5.92E+00	11.0000	4.643E-01
Np-237	1.2552E-06	30.875	61.751	0.00E+00	3.88E-05	7.75E-05		
Pa-231	7.0406E-09	30.875	61.751	0.00E+00	2.17E-07	4.35E-07		
Pb-210	5.8000E-14	30.875	61.751	0.00E+00	1.79E-12	3.58E-12		
Pm-147	4.0075E-02	30.875	61.751	0.00E+00	1.24E+00	2.47E+00		
Pu-238	9.2256E-04	30.875	61.751	0.00E+00	2.85E-02	5.70E-02		
Pu-239	5.5278E-03	30.875	61.751	0.00E+00	1.71E-01	3.41E-01		
Pu-240	2.1248E-03	30.875	61.751	0.00E+00	6.56E-02	1.31E-01		
Pu-241	4.9549E-02	30.875	61.751	0.00E+00	1.53E+00	3.06E+00		
Pu-242	2.3128E-07	30.875	61.751	0.00E+00	7.14E-06	1.43E-05		
Ra-226	2.4526E-13	30.875	61.751	0.00E+00	7.57E-12	1.51E-11		
Ra-228	2.4015E-10	30.875	61.751	0.00E+00	7.41E-09	1.48E-08		
Ru-106	3.0602E-06	30.875	61.751	0.00E+00	9.45E-05	1.89E-04		
Se-79	1.3015E-05	30.875	61.751	0.00E+00	4.02E-04	8.04E-04		
Sn-126	1.2165E-05	30.875	61.751	0.00E+00	3.76E-04	7.51E-04		
Sr-90	1.8226E+00	30.875	61.751	0.00E+00	5.63E+01	1.13E+02		
Tc-99	4.4241E-04	30.875	61.751	0.00E+00	1.37E-02	2.73E-02		
Th-229	3.0962E-10	30.875	61.751	0.00E+00	9.56E-09	1.91E-08		
Th-230	4.2346E-11	30.875	61.751	0.00E+00	1.31E-09	2.61E-09		
Th-232	2.5278E-10	30.875	61.751	0.00E+00	7.80E-09	1.56E-08		
Ti-208	1.5820E-08	30.875	61.751	0.00E+00	4.88E-07	9.77E-07		
U-232	4.2647E-08	30.875	61.751	0.00E+00	1.32E-06	2.63E-06		
U-233	1.2211E-07	30.875	61.751	0.00E+00	3.77E-06	7.54E-06		
U-234	1.9955E-07	30.875	61.751	0.00E+00	6.16E-06	1.23E-05		
U-235	-2.6194E-06	30.875	0.000	2.72E-03	2.64E-03	2.72E-03		
U-236	1.2693E-05	30.875	61.751	0.00E+00	3.92E-04	7.84E-04		
U-238	-3.6331E-08	30.875	0.000	1.71E-03	1.70E-03	1.71E-03		
Y-90	1.8241E+00	30.875	61.751	0.00E+00	5.63E+01	1.13E+02		
Other Radionuclides					5.95E+01	1.19E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.73E-01	1.54E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.89583333	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	30.875	18.901	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		61.751	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.14	0.61	1.00
Bounding:	0.29		

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 (DEMOUNTABLE) (U OF AZ)
 SNF ID #: 971
 Fuel Units & Descr: 1 - ELEMENT
 Heavy Metal Mass: BOL=20kg ; EOL=.18kg
 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	
							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	13.460	26.920	0.00E+00	1.15E-08	2.29E-08	0.0150	4.351E+12
Am-241	1.8331E-03	13.460	26.920	0.00E+00	2.47E-02	4.93E-02	0.0250	9.574E+11
Am-242m	1.4129E-06	13.460	26.920	0.00E+00	1.90E-05	3.80E-05	0.0375	8.153E+11
Am-243	1.4774E-07	13.460	26.920	0.00E+00	1.99E-06	3.98E-06	0.0575	8.368E+11
C-14	1.2871E-04	13.460	26.920	0.00E+00	1.73E-03	3.46E-03	0.0850	5.184E+11
Ci-36	2.8120E-06	13.460	26.920	0.00E+00	3.78E-05	7.57E-05	0.1250	3.765E+11
Cm-243	1.7940E-07	13.460	26.920	0.00E+00	2.41E-06	4.83E-06	0.2250	4.398E+11
Cm-244	1.6962E-06	13.460	26.920	0.00E+00	2.28E-05	4.57E-05	0.3750	2.232E+11
Co-60	1.2839E+00	13.460	26.920	0.00E+00	1.73E+01	3.46E+01	0.5750	2.967E+12
Cs-134	9.0541E-02	13.460	26.920	0.00E+00	1.22E+00	2.44E+00	0.8500	1.273E+11
Cs-135	3.2195E-05	13.460	26.920	0.00E+00	4.33E-04	8.67E-04	1.2500	2.586E+12
Cs-137	2.7564E+00	13.460	26.920	0.00E+00	3.71E+01	7.42E+01	1.7500	1.724E+09
Eu-154	1.5368E-02	13.460	26.920	0.00E+00	2.07E-01	4.14E-01	2.2500	2.779E+09
Eu-155	2.9293E-02	13.460	26.920	0.00E+00	3.94E-01	7.89E-01	2.7500	2.205E+07
Fe-55	7.7158E-01	13.460	26.920	0.00E+00	1.04E+01	2.08E+01	3.5000	2.567E+06
H-3	1.1111E-02	13.460	26.920	0.00E+00	1.50E-01	2.99E-01	5.0000	1.423E+01
I-129	7.3684E-07	13.460	26.920	0.00E+00	9.92E-06	1.98E-05	7.0000	1.610E+00
Kr-85	2.5263E-01	13.460	26.920	0.00E+00	3.40E+00	6.80E+00	11.0000	1.835E-01
Np-237	1.2427E-06	13.460	26.920	0.00E+00	1.67E-05	3.35E-05		
Pa-231	3.8511E-09	13.460	26.920	0.00E+00	5.18E-08	1.04E-07		
Pb-210	7.3880E-15	13.460	26.920	0.00E+00	9.94E-14	1.99E-13		
Pm-147	2.1023E+00	13.460	26.920	0.00E+00	2.83E+01	5.66E+01		
Pu-238	1.0383E-03	13.460	26.920	0.00E+00	1.40E-02	2.80E-02		
Pu-239	5.5293E-03	13.460	26.920	0.00E+00	7.44E-02	1.49E-01		
Pu-240	2.1278E-03	13.460	26.920	0.00E+00	2.86E-02	5.73E-02		
Pu-241	1.0195E-01	13.460	26.920	0.00E+00	1.37E+00	2.74E+00		
Pu-242	2.3128E-07	13.460	26.920	0.00E+00	3.11E-06	6.23E-06		
Ra-226	5.2782E-14	13.460	26.920	0.00E+00	7.10E-13	1.42E-12		
Ra-228	1.9338E-10	13.460	26.920	0.00E+00	2.60E-09	5.21E-09		
Ru-106	9.1684E-02	13.460	26.920	0.00E+00	1.23E+00	2.47E+00		
Se-79	1.3018E-05	13.460	26.920	0.00E+00	1.75E-04	3.50E-04		
Sn-126	1.2167E-05	13.460	26.920	0.00E+00	1.64E-04	3.28E-04		
Sr-90	2.6045E+00	13.460	26.920	0.00E+00	3.51E+01	7.01E+01		
Tc-99	4.4241E-04	13.460	26.920	0.00E+00	5.95E-03	1.19E-02		
Th-229	1.3713E-10	13.460	26.920	0.00E+00	1.85E-09	3.69E-09		
Th-230	1.8090E-11	13.460	26.920	0.00E+00	2.43E-10	4.87E-10		
Th-232	2.5278E-10	13.460	26.920	0.00E+00	3.40E-09	6.80E-09		
Ti-208	1.6947E-08	13.460	26.920	0.00E+00	2.28E-07	4.56E-07		
U-232	4.8737E-08	13.460	26.920	0.00E+00	6.56E-07	1.31E-06		
U-233	1.2203E-07	13.460	26.920	0.00E+00	1.64E-06	3.29E-06		
U-234	1.5925E-07	13.460	26.920	0.00E+00	2.14E-06	4.29E-06		
U-235	-2.6194E-06	13.460	0.000	8.21E-05	4.69E-05	8.21E-05		
U-236	1.2693E-05	13.460	26.920	0.00E+00	1.71E-04	3.42E-04		
U-238	-3.6331E-08	13.460	0.000	5.28E-05	5.23E-05	5.28E-05		
Y-90	2.6060E+00	13.460	26.920	0.00E+00	3.51E+01	7.02E+01		
Other Radionuclides					4.85E+01	9.71E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.83E-01	1.57E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.48717949	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	2.851	13.460	
Bounding:		26.920	

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:	2.02	4.72	
Bounding:	4.05		

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 20/30 (GA)	¹ Fuel decay start date: 2035	Estimated Canister usage: 18"x10" 0.20
SNF ID #: 995	Estimates as of: 2010	
Fuel Units & Descr: 22 - ELEMENT	Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)	
Heavy Metal Mass: BOL=17.00kg : EOL=16.68kg	² Template Burnup(MWd): 6.65	
ROD Storage Site: INEEL	Template BOL Heavy Metal Mass (MT): 0.000195	
	Template Decay Time: 5 years	

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	8.5173E-10	308.720	617.440	0.00E+00	2.63E-07	5.26E-07	0.0150	9.979E+13
Am-241	1.8331E-03	308.720	617.440	0.00E+00	5.66E-01	1.13E+00	0.0250	2.196E+13
Am-242m	1.4129E-06	308.720	617.440	0.00E+00	4.36E-04	8.72E-04	0.0375	1.870E+13
Am-243	1.4774E-07	308.720	617.440	0.00E+00	4.56E-05	9.12E-05	0.0575	1.919E+13
C-14	1.2871E-04	308.720	617.440	0.00E+00	3.97E-02	7.95E-02	0.0850	1.189E+13
Cl-36	2.8120E-06	308.720	617.440	0.00E+00	8.68E-04	1.74E-03	0.1250	8.635E+12
Cm-243	1.7940E-07	308.720	617.440	0.00E+00	5.54E-05	1.11E-04	0.2250	1.009E+13
Cm-244	1.6962E-06	308.720	617.440	0.00E+00	5.24E-04	1.05E-03	0.3750	5.119E+12
Co-60	1.2839E+00	308.720	617.440	0.00E+00	3.96E+02	7.93E+02	0.5750	6.805E+13
Cs-134	9.0541E-02	308.720	617.440	0.00E+00	2.80E+01	5.59E+01	0.8500	2.920E+12
Cs-135	3.2195E-05	308.720	617.440	0.00E+00	9.94E-03	1.99E-02	1.2500	5.932E+12
Cs-137	2.7564E+00	308.720	617.440	0.00E+00	8.51E+02	1.70E+03	1.7500	3.954E+10
Eu-154	1.5368E-02	308.720	617.440	0.00E+00	4.74E+00	9.49E+00	2.2500	6.374E+10
Eu-155	2.9293E-02	308.720	617.440	0.00E+00	9.04E+00	1.81E+01	2.7500	5.057E+08
Fe-55	7.7158E-01	308.720	617.440	0.00E+00	2.38E+02	4.76E+02	3.5000	5.887E+07
H-3	1.1111E-02	308.720	617.440	0.00E+00	3.43E+00	6.86E+00	5.0000	3.345E+02
I-129	7.3684E-07	308.720	617.440	0.00E+00	2.27E-04	4.55E-04	7.0000	3.787E+01
Kr-85	2.5263E-01	308.720	617.440	0.00E+00	7.80E+01	1.56E+02	11.0000	4.316E+00
Np-237	1.2427E-06	308.720	617.440	0.00E+00	3.84E-04	7.67E-04		
Pa-231	3.8511E-09	308.720	617.440	0.00E+00	1.19E-06	2.38E-06		
Pb-210	7.3880E-15	308.720	617.440	0.00E+00	2.28E-12	4.56E-12		
Pm-147	2.1023E+00	308.720	617.440	0.00E+00	6.49E+02	1.30E+03		
Pu-238	1.0383E-03	308.720	617.440	0.00E+00	3.21E-01	6.41E-01		
Pu-239	5.5293E-03	308.720	617.440	0.00E+00	1.71E+00	3.41E+00		
Pu-240	2.1278E-03	308.720	617.440	0.00E+00	6.57E-01	1.31E+00		
Pu-241	1.0195E-01	308.720	617.440	0.00E+00	3.15E+01	6.30E+01		
Pu-242	2.3128E-07	308.720	617.440	0.00E+00	7.14E-05	1.43E-04		
Ra-226	5.2782E-14	308.720	617.440	0.00E+00	1.63E-11	3.26E-11		
Ra-228	1.9338E-10	308.720	617.440	0.00E+00	5.97E-08	1.19E-07		
Ru-106	9.1684E-02	308.720	617.440	0.00E+00	2.83E+01	5.66E+01		
Se-79	1.3018E-05	308.720	617.440	0.00E+00	4.02E-03	8.04E-03		
Sn-126	1.2167E-05	308.720	617.440	0.00E+00	3.76E-03	7.51E-03		
Sr-90	2.6045E+00	308.720	617.440	0.00E+00	8.04E+02	1.61E+03		
Tc-99	4.4241E-04	308.720	617.440	0.00E+00	1.37E-01	2.73E-01		
Th-229	1.3713E-10	308.720	617.440	0.00E+00	4.23E-08	8.47E-08		
Th-230	1.8090E-11	308.720	617.440	0.00E+00	5.58E-09	1.12E-08		
Th-232	2.5278E-10	308.720	617.440	0.00E+00	7.80E-08	1.56E-07		
Tl-208	1.6947E-08	308.720	617.440	0.00E+00	5.23E-06	1.05E-05		
U-232	4.8737E-08	308.720	617.440	0.00E+00	1.50E-05	3.01E-05		
U-233	1.2203E-07	308.720	617.440	0.00E+00	3.77E-05	7.53E-05		
U-234	1.5925E-07	308.720	617.440	0.00E+00	4.92E-05	9.83E-05		
U-235	-2.6194E-06	308.720	0.000	6.29E-03	5.48E-03	6.29E-03		
U-236	1.2693E-05	308.720	617.440	0.00E+00	3.92E-03	7.84E-03		
U-238	-3.6331E-08	308.720	0.000	4.74E-03	4.73E-03	4.74E-03		
Y-90	2.6060E+00	308.720	617.440	0.00E+00	8.05E+02	1.61E+03		
Other Radionuclides					1.11E+03	2.23E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.80E+01	3.59E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	17.1174446	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		308.720	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		617.440	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.53		1.00
Bounding:	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: TRIGA ACPR (SLOVENIA) ¹Fuel decay start date: 1999
 SNF ID #: 932 Estimates as of: 2010
 Fuel Units & Descr: 1 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=28kg ; EOL=28kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 10 years

Estimated
 Canister usage:
 18"x10"
 0.01

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	1.3731E-09	5.262	10.524	0.00E+00	7.22E-09	1.44E-08	Avg. MeV	
Am-241	2.3865E-03	5.262	10.524	0.00E+00	1.26E-02	2.51E-02	0.0150	1.360E+12
Am-242m	1.3812E-06	5.262	10.524	0.00E+00	7.27E-06	1.45E-05	0.0250	2.880E+11
Am-243	1.4767E-07	5.262	10.524	0.00E+00	7.77E-07	1.55E-06	0.0375	2.460E+11
C-14	1.2863E-04	5.262	10.524	0.00E+00	6.77E-04	1.35E-03	0.0575	2.622E+11
Cl-36	2.8120E-06	5.262	10.524	0.00E+00	1.48E-05	2.96E-05	0.0850	1.591E+11
Cm-243	1.5895E-07	5.262	10.524	0.00E+00	8.36E-07	1.67E-06	0.1250	1.046E+11
Cm-244	1.4008E-06	5.262	10.524	0.00E+00	7.37E-06	1.47E-05	0.2250	1.357E+11
Co-60	6.6541E-01	5.262	10.524	0.00E+00	3.50E+00	7.00E+00	0.3750	6.231E+10
Cs-134	1.6887E-02	5.262	10.524	0.00E+00	8.89E-02	1.78E-01	0.5750	9.763E+11
Cs-135	3.2195E-05	5.262	10.524	0.00E+00	1.69E-04	3.39E-04	0.8500	1.743E+10
Cs-137	2.4556E+00	5.262	10.524	0.00E+00	1.29E+01	2.58E+01	1.2500	5.241E+11
Eu-154	1.0268E-02	5.262	10.524	0.00E+00	5.40E-02	1.08E-01	1.7500	3.154E+08
Eu-155	1.4570E-02	5.262	10.524	0.00E+00	7.67E-02	1.53E-01	2.2500	1.647E+07
Fe-55	2.0361E-01	5.262	10.524	0.00E+00	1.07E+00	2.14E+00	2.7500	2.727E+05
H-3	8.3940E-03	5.262	10.524	0.00E+00	4.42E-02	8.83E-02	3.5000	3.232E+04
I-129	7.3684E-07	5.262	10.524	0.00E+00	3.88E-06	7.75E-06	5.0000	5.662E+00
Kr-85	1.8286E-01	5.262	10.524	0.00E+00	9.62E-01	1.92E+00	7.0000	6.406E-01
Np-237	1.2462E-06	5.262	10.524	0.00E+00	6.56E-06	1.31E-05	11.0000	7.295E-02
Pa-231	4.9143E-09	5.262	10.524	0.00E+00	2.59E-08	5.17E-08		
Pb-210	1.7173E-14	5.262	10.524	0.00E+00	9.04E-14	1.81E-13		
Pm-147	5.6165E-01	5.262	10.524	0.00E+00	2.96E+00	5.91E+00		
Pu-238	9.9820E-04	5.262	10.524	0.00E+00	5.25E-03	1.05E-02		
Pu-239	5.5293E-03	5.262	10.524	0.00E+00	2.91E-02	5.82E-02		
Pu-240	2.1263E-03	5.262	10.524	0.00E+00	1.12E-02	2.24E-02		
Pu-241	8.0165E-02	5.262	10.524	0.00E+00	4.22E-01	8.44E-01		
Pu-242	2.3128E-07	5.262	10.524	0.00E+00	1.22E-06	2.43E-06		
Ra-226	9.9774E-14	5.262	10.524	0.00E+00	5.25E-13	1.05E-12		
Ra-228	2.1729E-10	5.262	10.524	0.00E+00	1.14E-09	2.29E-09		
Ru-106	2.9519E-03	5.262	10.524	0.00E+00	1.55E-02	3.11E-02		
Se-79	1.3017E-05	5.262	10.524	0.00E+00	6.85E-05	1.37E-04		
Sn-126	1.2167E-05	5.262	10.524	0.00E+00	6.40E-05	1.28E-04		
Sr-90	2.3128E+00	5.262	10.524	0.00E+00	1.22E+01	2.43E+01		
Tc-99	4.4241E-04	5.262	10.524	0.00E+00	2.33E-03	4.66E-03		
Th-229	1.9459E-10	5.262	10.524	0.00E+00	1.02E-09	2.05E-09		
Th-230	2.5564E-11	5.262	10.524	0.00E+00	1.35E-10	2.69E-10		
Th-232	2.5278E-10	5.262	10.524	0.00E+00	1.33E-09	2.66E-09		
Tl-208	1.6947E-08	5.262	10.524	0.00E+00	8.92E-08	1.78E-07		
U-232	4.6812E-08	5.262	10.524	0.00E+00	2.46E-07	4.93E-07		
U-233	1.2206E-07	5.262	10.524	0.00E+00	6.42E-07	1.28E-06		
U-234	1.7323E-07	5.262	10.524	0.00E+00	9.12E-07	1.82E-06		
U-235	-2.6194E-06	5.262	0.000	1.18E-04	1.05E-04	1.18E-04		
U-236	1.2693E-05	5.262	10.524	0.00E+00	6.68E-05	1.34E-04		
U-238	-3.6331E-08	5.262	0.000	7.42E-05	7.40E-05	7.42E-05		
Y-90	2.3128E+00	5.262	10.524	0.00E+00	1.22E+01	2.43E+01		
Other Radionuclides							1.29E+01	2.58E+01
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							2.06E-01	4.12E-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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.88316824	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		5.262	Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding:		10.524	Bounding burnup assumed to be twice nominal burnup.

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

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: TRIGA ACPD (JAPAN) 1 Fuel decay start date: 2010
 SNF ID #: 480 Estimates as of: 2010
 Fuel Units & Descr: 182 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=48.36kg ; EOL=48.23kg 2 Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18" x 10"
1.64

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	8.5173E-10	455.865	911.730	0.00E+00	3.88E-07	7.77E-07	0.0150	1.474E+14
Am-241	1.8331E-03	455.865	911.730	0.00E+00	8.36E-01	1.67E+00	0.0250	3.242E+13
Am-242m	1.4129E-06	455.865	911.730	0.00E+00	6.44E-04	1.29E-03	0.0375	2.761E+13
Am-243	1.4774E-07	455.865	911.730	0.00E+00	6.74E-05	1.35E-04	0.0575	2.834E+13
C-14	1.2871E-04	455.865	911.730	0.00E+00	5.87E-02	1.17E-01	0.0850	1.756E+13
Cl-36	2.8120E-06	455.865	911.730	0.00E+00	1.28E-03	2.56E-03	0.1250	1.275E+13
Cm-243	1.7940E-07	455.865	911.730	0.00E+00	8.18E-05	1.64E-04	0.2250	1.490E+13
Cm-244	1.6962E-06	455.865	911.730	0.00E+00	7.73E-04	1.55E-03	0.3750	7.559E+12
Co-60	1.2839E+00	455.865	911.730	0.00E+00	5.85E+02	1.17E+03	0.5750	1.005E+14
Cs-134	9.0541E-02	455.865	911.730	0.00E+00	4.13E+01	8.25E+01	0.8500	4.312E+12
Cs-135	3.2195E-05	455.865	911.730	0.00E+00	1.47E-02	2.94E-02	1.2500	8.759E+13
Cs-137	2.7564E+00	455.865	911.730	0.00E+00	1.26E+03	2.51E+03	1.7500	5.839E+10
Eu-154	1.5368E-02	455.865	911.730	0.00E+00	7.01E+00	1.40E+01	2.2500	9.412E+10
Eu-155	2.9293E-02	455.865	911.730	0.00E+00	1.34E+01	2.67E+01	2.7500	7.468E+08
Fe-55	7.7158E-01	455.865	911.730	0.00E+00	3.52E+02	7.03E+02	3.5000	8.694E+07
H-3	1.1111E-02	455.865	911.730	0.00E+00	5.07E+00	1.01E+01	5.0000	5.078E+02
I-129	7.3684E-07	455.865	911.730	0.00E+00	3.36E-04	6.72E-04	7.0000	5.753E+01
Kr-85	2.5263E-01	455.865	911.730	0.00E+00	1.15E+02	2.30E+02	11.0000	6.557E+00
Np-237	1.2427E-06	455.865	911.730	0.00E+00	5.67E-04	1.13E-03		
Pa-231	3.8511E-09	455.865	911.730	0.00E+00	1.76E-06	3.51E-06		
Pb-210	7.3880E-15	455.865	911.730	0.00E+00	3.37E-12	6.74E-12		
Pm-147	2.1023E+00	455.865	911.730	0.00E+00	9.58E+02	1.92E+03		
Pu-238	1.0383E-03	455.865	911.730	0.00E+00	4.73E-01	9.47E-01		
Pu-239	5.5293E-03	455.865	911.730	0.00E+00	2.52E+00	5.04E+00		
Pu-240	2.1278E-03	455.865	911.730	0.00E+00	9.70E-01	1.94E+00		
Pu-241	1.0195E-01	455.865	911.730	0.00E+00	4.65E+01	9.30E+01		
Pu-242	2.3128E-07	455.865	911.730	0.00E+00	1.05E-04	2.11E-04		
Ra-226	5.2782E-14	455.865	911.730	0.00E+00	2.41E-11	4.81E-11		
Ra-228	1.9338E-10	455.865	911.730	0.00E+00	8.82E-08	1.76E-07		
Ru-106	9.1684E-02	455.865	911.730	0.00E+00	4.18E+01	8.36E+01		
Se-79	1.3018E-05	455.865	911.730	0.00E+00	5.93E-03	1.19E-02		
Sn-126	1.2167E-05	455.865	911.730	0.00E+00	5.55E-03	1.11E-02		
Sr-90	2.6045E+00	455.865	911.730	0.00E+00	1.19E+03	2.37E+03		
Tc-99	4.4241E-04	455.865	911.730	0.00E+00	2.02E-01	4.03E-01		
Th-229	1.3713E-10	455.865	911.730	0.00E+00	6.25E-08	1.25E-07		
Th-230	1.8090E-11	455.865	911.730	0.00E+00	8.25E-09	1.65E-08		
Th-232	2.5278E-10	455.865	911.730	0.00E+00	1.15E-07	2.30E-07		
Tl-208	1.6947E-08	455.865	911.730	0.00E+00	7.73E-06	1.55E-05		
U-232	4.8737E-08	455.865	911.730	0.00E+00	2.22E-05	4.44E-05		
U-233	1.2203E-07	455.865	911.730	0.00E+00	5.56E-05	1.11E-04		
U-234	1.5925E-07	455.865	911.730	0.00E+00	7.26E-05	1.45E-04		
U-235	-2.6194E-06	455.865	0.000	2.08E-02	1.97E-02	2.08E-02		
U-236	1.2693E-05	455.865	911.730	0.00E+00	5.79E-03	1.16E-02		
U-238	-3.6331E-08	455.865	0.000	1.30E-02	1.30E-02	1.30E-02		
Y-90	2.6060E+00	455.865	911.730	0.00E+00	1.19E+03	2.38E+03		
Other Radionuclides					1.64E+03	3.29E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.65E+01	5.31E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.95031243	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	455.865	121.617	
Bounding:		911.730	

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:	0.28	0.27	
Bounding:	0.55		

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 ACPR (ROMANIA)
 SNF ID #: 1077
 Fuel Units & Descr: 75 - ELEMENT
 Heavy Metal Mass: BOL=14.70kg ; EOL=14.45kg
 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"
 0.68

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	1.3731E-09	243.425	486.850	0.00E+00	3.34E-07	6.68E-07	0.0150	6.290E+13
Am-241	2.3865E-03	243.425	486.850	0.00E+00	5.81E-01	1.16E+00	0.0250	1.332E+13
Am-242m	1.3812E-06	243.425	486.850	0.00E+00	3.36E-04	6.72E-04	0.0375	1.138E+13
Am-243	1.4767E-07	243.425	486.850	0.00E+00	3.59E-05	7.19E-05	0.0575	1.213E+13
C-14	1.2863E-04	243.425	486.850	0.00E+00	3.13E-02	6.26E-02	0.0850	7.359E+12
Cl-36	2.8120E-06	243.425	486.850	0.00E+00	6.85E-04	1.37E-03	0.1250	4.837E+12
Cm-243	1.5895E-07	243.425	486.850	0.00E+00	3.87E-05	7.74E-05	0.2250	6.277E+12
Cm-244	1.4008E-06	243.425	486.850	0.00E+00	3.41E-04	6.82E-04	0.3750	2.883E+12
Co-60	6.6541E-01	243.425	486.850	0.00E+00	1.62E+02	3.24E+02	0.5750	4.517E+13
Cs-134	1.6887E-02	243.425	486.850	0.00E+00	4.11E+00	8.22E+00	0.8500	8.063E+11
Cs-135	3.2195E-05	243.425	486.850	0.00E+00	7.84E-03	1.57E-02	1.2500	2.424E+13
Cs-137	2.4556E+00	243.425	486.850	0.00E+00	5.98E+02	1.20E+03	1.7500	1.459E+10
Eu-154	1.0268E-02	243.425	486.850	0.00E+00	2.50E+00	5.00E+00	2.2500	7.621E+08
Eu-155	1.4570E-02	243.425	486.850	0.00E+00	3.55E+00	7.09E+00	2.7500	1.261E+07
Fe-55	2.0361E-01	243.425	486.850	0.00E+00	4.96E+01	9.91E+01	3.5000	1.495E+06
H-3	8.3940E-03	243.425	486.850	0.00E+00	2.04E+00	4.09E+00	5.0000	2.632E+02
I-129	7.3684E-07	243.425	486.850	0.00E+00	1.79E-04	3.59E-04	7.0000	2.978E+01
Kr-85	1.8286E-01	243.425	486.850	0.00E+00	4.45E+01	8.90E+01	11.0000	3.391E+00
Np-237	1.2462E-06	243.425	486.850	0.00E+00	3.03E-04	6.07E-04		
Pa-231	4.9143E-09	243.425	486.850	0.00E+00	1.20E-06	2.39E-06		
Pb-210	1.7173E-14	243.425	486.850	0.00E+00	4.18E-12	8.36E-12		
Pm-147	5.6165E-01	243.425	486.850	0.00E+00	1.37E+02	2.73E+02		
Pu-238	9.9820E-04	243.425	486.850	0.00E+00	2.43E-01	4.86E-01		
Pu-239	5.5293E-03	243.425	486.850	0.00E+00	1.35E+00	2.69E+00		
Pu-240	2.1263E-03	243.425	486.850	0.00E+00	5.18E-01	1.04E+00		
Pu-241	8.0165E-02	243.425	486.850	0.00E+00	1.95E+01	3.90E+01		
Pu-242	2.3128E-07	243.425	486.850	0.00E+00	5.63E-05	1.13E-04		
Ra-226	9.9774E-14	243.425	486.850	0.00E+00	2.43E-11	4.86E-11		
Ra-228	2.1729E-10	243.425	486.850	0.00E+00	5.29E-08	1.06E-07		
Ru-106	2.9519E-03	243.425	486.850	0.00E+00	7.19E-01	1.44E+00		
Se-79	1.3017E-05	243.425	486.850	0.00E+00	3.17E-03	6.34E-03		
Sn-126	1.2167E-05	243.425	486.850	0.00E+00	2.96E-03	5.92E-03		
Sr-90	2.3128E+00	243.425	486.850	0.00E+00	5.63E+02	1.13E+03		
Tc-99	4.4241E-04	243.425	486.850	0.00E+00	1.08E-01	2.15E-01		
Th-229	1.9459E-10	243.425	486.850	0.00E+00	4.74E-08	9.47E-08		
Th-230	2.5564E-11	243.425	486.850	0.00E+00	6.22E-09	1.24E-08		
Th-232	2.5278E-10	243.425	486.850	0.00E+00	6.15E-08	1.23E-07		
Tl-208	1.6947E-08	243.425	486.850	0.00E+00	4.13E-06	8.25E-06		
U-232	4.6812E-08	243.425	486.850	0.00E+00	1.14E-05	2.28E-05		
U-233	1.2206E-07	243.425	486.850	0.00E+00	2.97E-05	5.94E-05		
U-234	1.7323E-07	243.425	486.850	0.00E+00	4.22E-05	8.43E-05		
U-235	-2.6194E-06	243.425	0.000	6.32E-03	5.68E-03	6.32E-03		
U-236	1.2693E-05	243.425	486.850	0.00E+00	3.09E-03	6.18E-03		
U-238	-3.6331E-08	243.425	0.000	3.96E-03	3.95E-03	3.96E-03		
Y-90	2.3128E+00	243.425	486.850	0.00E+00	5.63E+02	1.13E+03		
Other Radionuclides					5.97E+02	1.19E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.53E+00	1.91E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.89795918	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		243.425	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		486.850	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Bumup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.49		
Bounding:	0.97		

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 ACPR PENN. STATE UNIV.
 SNF ID #: 1002
 Fuel Units & Descr: 46 - ELEMENT
 Heavy Metal Mass: BOL=12.78kg ; EOL=12.01kg
 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"
 0.41

Radionuclide	II. Estimates		Gamma Sources					
	m	x _n	x _b	b	y _n	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	8.5173E-10	737.721	1,475.441	0.00E+00	6.28E-07	1.26E-06	0.0150	2.385E+14
Am-241	1.8331E-03	737.721	1,475.441	0.00E+00	1.35E+00	2.70E+00	0.0250	5.247E+13
Am-242m	1.4129E-06	737.721	1,475.441	0.00E+00	1.04E-03	2.08E-03	0.0375	4.469E+13
Am-243	1.4774E-07	737.721	1,475.441	0.00E+00	1.09E-04	2.18E-04	0.0575	4.587E+13
C-14	1.2871E-04	737.721	1,475.441	0.00E+00	9.49E-02	1.90E-01	0.0850	2.841E+13
Cl-36	2.8120E-06	737.721	1,475.441	0.00E+00	2.07E-03	4.15E-03	0.1250	2.063E+13
Cm-243	1.7940E-07	737.721	1,475.441	0.00E+00	1.32E-04	2.65E-04	0.2250	2.410E+13
Cm-244	1.6962E-06	737.721	1,475.441	0.00E+00	1.25E-03	2.50E-03	0.3750	1.223E+13
Co-60	1.2839E+00	737.721	1,475.441	0.00E+00	9.47E+02	1.89E+03	0.5750	1.626E+14
Cs-134	9.0541E-02	737.721	1,475.441	0.00E+00	6.68E+01	1.34E+02	0.8500	6.979E+12
Cs-135	3.2195E-05	737.721	1,475.441	0.00E+00	2.38E-02	4.75E-02	1.2500	1.417E+14
Cs-137	2.7564E+00	737.721	1,475.441	0.00E+00	2.03E+03	4.07E+03	1.7500	9.449E+10
Eu-154	1.5368E-02	737.721	1,475.441	0.00E+00	1.13E+01	2.27E+01	2.2500	1.523E+11
Eu-155	2.9293E-02	737.721	1,475.441	0.00E+00	2.16E+01	4.32E+01	2.7500	1.208E+09
Fe-55	7.7158E-01	737.721	1,475.441	0.00E+00	5.69E+02	1.14E+03	3.5000	1.407E+08
H-3	1.1111E-02	737.721	1,475.441	0.00E+00	8.20E+00	1.64E+01	5.0000	7.811E+02
I-129	7.3684E-07	737.721	1,475.441	0.00E+00	5.44E-04	1.09E-03	7.0000	8.841E+01
Kr-85	2.5263E-01	737.721	1,475.441	0.00E+00	1.86E+02	3.73E+02	11.0000	1.007E+01
Np-237	1.2427E-06	737.721	1,475.441	0.00E+00	9.17E-04	1.83E-03		
Pa-231	3.8511E-09	737.721	1,475.441	0.00E+00	2.84E-06	5.68E-06		
Pb-210	7.3880E-15	737.721	1,475.441	0.00E+00	5.45E-12	1.09E-11		
Pm-147	2.1023E+00	737.721	1,475.441	0.00E+00	1.55E+03	3.10E+03		
Pu-238	1.0383E-03	737.721	1,475.441	0.00E+00	7.66E-01	1.53E+00		
Pu-239	5.5293E-03	737.721	1,475.441	0.00E+00	4.08E+00	8.16E+00		
Pu-240	2.1278E-03	737.721	1,475.441	0.00E+00	1.57E+00	3.14E+00		
Pu-241	1.0195E-01	737.721	1,475.441	0.00E+00	7.52E+01	1.50E+02		
Pu-242	2.3128E-07	737.721	1,475.441	0.00E+00	1.71E-04	3.41E-04		
Ra-226	5.2782E-14	737.721	1,475.441	0.00E+00	3.89E-11	7.79E-11		
Ra-228	1.9338E-10	737.721	1,475.441	0.00E+00	1.43E-07	2.85E-07		
Ru-106	9.1684E-02	737.721	1,475.441	0.00E+00	6.78E+01	1.35E+02		
Se-79	1.3018E-05	737.721	1,475.441	0.00E+00	9.60E-03	1.92E-02		
Sn-126	1.2167E-05	737.721	1,475.441	0.00E+00	8.98E-03	1.80E-02		
Sr-90	2.6045E+00	737.721	1,475.441	0.00E+00	1.92E+03	3.84E+03		
Tc-99	4.4241E-04	737.721	1,475.441	0.00E+00	3.26E-01	6.53E-01		
Th-229	1.3713E-10	737.721	1,475.441	0.00E+00	1.01E-07	2.02E-07		
Th-230	1.8090E-11	737.721	1,475.441	0.00E+00	1.33E-08	2.67E-08		
Th-232	2.5278E-10	737.721	1,475.441	0.00E+00	1.86E-07	3.73E-07		
Tl-208	1.6947E-08	737.721	1,475.441	0.00E+00	1.25E-05	2.50E-05		
U-232	4.8737E-08	737.721	1,475.441	0.00E+00	3.60E-05	7.19E-05		
U-233	1.2203E-07	737.721	1,475.441	0.00E+00	9.00E-05	1.80E-04		
U-234	1.5925E-07	737.721	1,475.441	0.00E+00	1.17E-04	2.35E-04		
U-235	-2.6194E-06	737.721	0.000	5.47E-03	3.54E-03	5.47E-03		
U-236	1.2693E-05	737.721	1,475.441	0.00E+00	9.36E-03	1.87E-02		
U-238	-3.6331E-08	737.721	0.000	3.44E-03	3.42E-03	3.44E-03		
Y-90	2.6060E+00	737.721	1,475.441	0.00E+00	1.92E+03	3.85E+03		
Other Radionuclides					2.66E+03	5.32E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.79999842	10 to 20	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	240.931	737.721	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,475.441	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.69	3.06	1.00
Bounding:	3.39		

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 FFCR
 SNF ID #: 448
 Fuel Units & Descr: 4 - ELEMENT
 Heavy Metal Mass: BOL=63kg ; EOL=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"
 0.05

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	8.5173E-10	15.350	30.700	0.00E+00	1.31E-08	2.61E-08	0.0150	4.962E+12
Am-241	1.8331E-03	15.350	30.700	0.00E+00	2.81E-02	5.63E-02	0.0250	1.092E+12
Am-242m	1.4129E-06	15.350	30.700	0.00E+00	2.17E-05	4.34E-05	0.0375	9.298E+11
Am-243	1.4774E-07	15.350	30.700	0.00E+00	2.27E-06	4.54E-06	0.0575	9.543E+11
C-14	1.2871E-04	15.350	30.700	0.00E+00	1.98E-03	3.95E-03	0.0850	5.912E+11
Cl-36	2.8120E-06	15.350	30.700	0.00E+00	4.32E-05	8.63E-05	0.1250	4.293E+11
Cm-243	1.7940E-07	15.350	30.700	0.00E+00	2.75E-06	5.51E-06	0.2250	5.016E+11
Cm-244	1.6962E-06	15.350	30.700	0.00E+00	2.60E-05	5.21E-05	0.3750	2.545E+11
Co-60	1.2839E+00	15.350	30.700	0.00E+00	1.97E+01	3.94E+01	0.5750	3.384E+12
Cs-134	9.0541E-02	15.350	30.700	0.00E+00	1.39E+00	2.78E+00	0.8500	1.452E+11
Cs-135	3.2195E-05	15.350	30.700	0.00E+00	4.94E-04	9.88E-04	1.2500	2.949E+12
Cs-137	2.7564E+00	15.350	30.700	0.00E+00	4.23E+01	8.46E+01	1.7500	1.966E+09
Eu-154	1.5368E-02	15.350	30.700	0.00E+00	2.36E-01	4.72E-01	2.2500	3.169E+09
Eu-155	2.9233E-02	15.350	30.700	0.00E+00	4.50E-01	8.99E-01	2.7500	2.515E+07
Fe-55	7.7158E-01	15.350	30.700	0.00E+00	1.18E+01	2.37E+01	3.5000	2.927E+06
H-3	1.1111E-02	15.350	30.700	0.00E+00	1.71E-01	3.41E-01	5.0000	1.648E+01
I-129	7.3684E-07	15.350	30.700	0.00E+00	1.13E-05	2.26E-05	7.0000	1.866E+00
Kr-85	2.5263E-01	15.350	30.700	0.00E+00	3.88E+00	7.76E+00	11.0000	2.126E-01
Np-237	1.2427E-06	15.350	30.700	0.00E+00	1.91E-05	3.82E-05		
Pa-231	3.8511E-09	15.350	30.700	0.00E+00	5.91E-08	1.18E-07		
Pb-210	7.3880E-15	15.350	30.700	0.00E+00	1.13E-13	2.27E-13		
Pm-147	2.1023E+00	15.350	30.700	0.00E+00	3.23E+01	6.45E+01		
Pu-238	1.0383E-03	15.350	30.700	0.00E+00	1.59E-02	3.19E-02		
Pu-239	5.5293E-03	15.350	30.700	0.00E+00	8.49E-02	1.70E-01		
Pu-240	2.1278E-03	15.350	30.700	0.00E+00	3.27E-02	6.53E-02		
Pu-241	1.0195E-01	15.350	30.700	0.00E+00	1.57E+00	3.13E+00		
Pu-242	2.3128E-07	15.350	30.700	0.00E+00	3.55E-06	7.10E-06		
Ra-226	5.2782E-14	15.350	30.700	0.00E+00	8.10E-13	1.62E-12		
Ra-228	1.9338E-10	15.350	30.700	0.00E+00	2.97E-09	5.94E-09		
Ru-106	9.1684E-02	15.350	30.700	0.00E+00	1.41E+00	2.81E+00		
Se-79	1.3018E-05	15.350	30.700	0.00E+00	2.00E-04	4.00E-04		
Sn-126	1.2167E-05	15.350	30.700	0.00E+00	1.87E-04	3.74E-04		
Sr-90	2.6045E+00	15.350	30.700	0.00E+00	4.00E+01	8.00E+01		
Tc-99	4.4241E-04	15.350	30.700	0.00E+00	6.79E-03	1.36E-02		
Th-229	1.3713E-10	15.350	30.700	0.00E+00	2.10E-09	4.21E-09		
Th-230	1.8090E-11	15.350	30.700	0.00E+00	2.78E-10	5.55E-10		
Th-232	2.5278E-10	15.350	30.700	0.00E+00	3.88E-09	7.76E-09		
Tl-208	1.6947E-08	15.350	30.700	0.00E+00	2.60E-07	5.20E-07		
U-232	4.8737E-08	15.350	30.700	0.00E+00	7.48E-07	1.50E-06		
U-233	1.2203E-07	15.350	30.700	0.00E+00	1.87E-06	3.75E-06		
U-234	1.5925E-07	15.350	30.700	0.00E+00	2.44E-06	4.89E-06		
U-235	-2.6194E-06	15.350	0.000	2.71E-04	2.31E-04	2.71E-04		
U-236	1.2693E-05	15.350	30.700	0.00E+00	1.95E-04	3.90E-04		
U-238	-3.6331E-08	15.350	0.000	1.70E-04	1.69E-04	1.70E-04		
Y-90	2.6060E+00	15.350	30.700	0.00E+00	4.00E+01	8.00E+01		
Other Radionuclides					5.53E+01	1.11E+02		

Thermal Power
 Nominal Heat Output (Watts): 8.93E-01
 Bounding Heat Output (Watts): 1.79E+00
 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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.93650794	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	15.350	2.673	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		30.700	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.71	0.17	0.98
Bounding:	1.43		

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 FFCR (DORF)
 SNF ID #: 315
 Fuel Units & Descr: 2 - ELEMENT
 Heavy Metal Mass: BOL=38kg ; EOL=38kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1989
 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: 20 years

Estimated
 Canister usage:
 18"x10"
 0.03

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	2.6436E-09	3.742	7.485	0.00E+00	9.89E-09	1.98E-08	0.0150	7.501E+11
Am-241	3.1429E-03	3.742	7.485	0.00E+00	1.18E-02	2.35E-02	0.0250	1.561E+11
Am-242m	1.3195E-06	3.742	7.485	0.00E+00	4.94E-06	9.88E-06	0.0375	1.353E+11
Am-243	1.4753E-07	3.742	7.485	0.00E+00	5.52E-07	1.10E-06	0.0575	1.455E+11
C-14	1.2847E-04	3.742	7.485	0.00E+00	4.81E-04	9.62E-04	0.0850	8.785E+10
Cl-36	2.8120E-06	3.742	7.485	0.00E+00	1.05E-05	2.10E-05	0.1250	5.741E+10
Cm-243	1.2465E-07	3.742	7.485	0.00E+00	4.66E-07	9.33E-07	0.2250	7.543E+10
Cm-244	9.5564E-07	3.742	7.485	0.00E+00	3.58E-06	7.15E-06	0.3750	3.306E+10
Co-60	1.7880E-01	3.742	7.485	0.00E+00	6.69E-01	1.34E+00	0.5750	5.437E+11
Cs-134	5.8692E-04	3.742	7.485	0.00E+00	2.20E-03	4.39E-03	0.8500	6.129E+09
Cs-135	3.2195E-05	3.742	7.485	0.00E+00	1.20E-04	2.41E-04	1.2500	1.016E+11
Cs-137	1.9489E+00	3.742	7.485	0.00E+00	7.29E+00	1.46E+01	1.7500	1.575E+08
Eu-154	4.5895E-03	3.742	7.485	0.00E+00	1.72E-02	3.44E-02	2.2500	5.424E+05
Eu-155	3.6045E-03	3.742	7.485	0.00E+00	1.35E-02	2.70E-02	2.7500	5.976E+03
Fe-55	1.4185E-02	3.742	7.485	0.00E+00	5.31E-02	1.06E-01	3.5000	3.361E+01
H-3	4.7895E-03	3.742	7.485	0.00E+00	1.79E-02	3.58E-02	5.0000	4.127E+00
I-129	7.3684E-07	3.742	7.485	0.00E+00	2.76E-06	5.52E-06	7.0000	4.666E-01
Kr-85	9.5820E-02	3.742	7.485	0.00E+00	3.59E-01	7.17E-01	11.0000	5.312E-02
Np-237	1.2552E-06	3.742	7.485	0.00E+00	4.70E-06	9.39E-06		
Pa-231	7.0406E-09	3.742	7.485	0.00E+00	2.63E-08	5.27E-08		
Pb-210	5.8000E-14	3.742	7.485	0.00E+00	2.17E-13	4.34E-13		
Pm-147	4.0075E-02	3.742	7.485	0.00E+00	1.50E-01	3.00E-01		
Pu-238	9.2256E-04	3.742	7.485	0.00E+00	3.45E-03	6.91E-03		
Pu-239	5.5278E-03	3.742	7.485	0.00E+00	2.07E-02	4.14E-02		
Pu-240	2.1248E-03	3.742	7.485	0.00E+00	7.95E-03	1.59E-02		
Pu-241	4.9549E-02	3.742	7.485	0.00E+00	1.85E-01	3.71E-01		
Pu-242	2.3128E-07	3.742	7.485	0.00E+00	8.66E-07	1.73E-06		
Ra-226	2.4526E-13	3.742	7.485	0.00E+00	9.18E-13	1.84E-12		
Ra-228	2.4015E-10	3.742	7.485	0.00E+00	8.99E-10	1.80E-09		
Ru-106	3.0602E-06	3.742	7.485	0.00E+00	1.15E-05	2.29E-05		
Se-79	1.3015E-05	3.742	7.485	0.00E+00	4.87E-05	9.74E-05		
Sn-126	1.2165E-05	3.742	7.485	0.00E+00	4.55E-05	9.11E-05		
Sr-90	1.8226E+00	3.742	7.485	0.00E+00	6.82E+00	1.36E+01		
Tc-99	4.4241E-04	3.742	7.485	0.00E+00	1.66E-03	3.31E-03		
Th-229	3.0962E-10	3.742	7.485	0.00E+00	1.16E-09	2.32E-09		
Th-230	4.2346E-11	3.742	7.485	0.00E+00	1.58E-10	3.17E-10		
Th-232	2.5278E-10	3.742	7.485	0.00E+00	9.46E-10	1.89E-09		
Tl-208	1.5820E-08	3.742	7.485	0.00E+00	5.92E-08	1.18E-07		
U-232	4.2647E-08	3.742	7.485	0.00E+00	1.60E-07	3.19E-07		
U-233	1.2211E-07	3.742	7.485	0.00E+00	4.57E-07	9.14E-07		
U-234	1.9955E-07	3.742	7.485	0.00E+00	7.47E-07	1.49E-06		
U-235	-2.6194E-06	3.742	0.000	1.64E-04	1.54E-04	1.64E-04		
U-236	1.2693E-05	3.742	7.485	0.00E+00	4.75E-05	9.50E-05		
U-238	-3.6331E-08	3.742	0.000	1.04E-04	1.03E-04	1.04E-04		
Y-90	1.8241E+00	3.742	7.485	0.00E+00	6.83E+00	1.37E+01		
Other Radionuclides					7.21E+00	1.44E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.36E-02	1.87E-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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.79166667	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	3.742	1.146	
Bounding:		7.485	

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	0.31	
Bounding:	0.57		

0.99

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 FFCR (ENGLAND)
 SNF ID #: 987
 Fuel Units & Descr: 4 - ELEMENT
 Heavy Metal Mass: BOL=.64kg ; EOL=.62kg
 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"
 0.04

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	18.747	37.495	0.00E+00	1.60E-08	3.19E-08	Avg. MeV	
Am-241	1.8331E-03	18.747	37.495	0.00E+00	3.44E-02	6.87E-02	0.0150	6.060E+12
Am-242m	1.4129E-06	18.747	37.495	0.00E+00	2.65E-05	5.30E-05	0.0250	1.333E+12
Am-243	1.4774E-07	18.747	37.495	0.00E+00	2.77E-06	5.54E-06	0.0375	1.136E+12
C-14	1.2871E-04	18.747	37.495	0.00E+00	2.41E-03	4.83E-03	0.0575	1.166E+12
Cl-36	2.8120E-06	18.747	37.495	0.00E+00	5.27E-05	1.05E-04	0.0850	7.221E+11
Cm-243	1.7940E-07	18.747	37.495	0.00E+00	3.36E-06	6.73E-06	0.1250	5.244E+11
Cm-244	1.6962E-06	18.747	37.495	0.00E+00	3.18E-05	6.36E-05	0.2250	6.126E+11
Co-60	1.2839E+00	18.747	37.495	0.00E+00	2.41E+01	4.81E+01	0.3750	3.109E+11
Cs-134	9.0541E-02	18.747	37.495	0.00E+00	1.70E+00	3.39E+00	0.5750	4.133E+12
Cs-135	3.2195E-05	18.747	37.495	0.00E+00	6.04E-04	1.21E-03	0.8500	1.773E+11
Cs-137	2.7564E+00	18.747	37.495	0.00E+00	5.17E+01	1.03E+02	1.2500	3.602E+12
Eu-154	1.5368E-02	18.747	37.495	0.00E+00	2.88E-01	5.76E-01	1.7500	2.401E+09
Eu-155	2.9293E-02	18.747	37.495	0.00E+00	5.49E-01	1.10E+00	2.2500	3.870E+09
Fe-55	7.7158E-01	18.747	37.495	0.00E+00	1.45E+01	2.89E+01	2.7500	3.071E+07
H-3	1.1111E-02	18.747	37.495	0.00E+00	2.08E-01	4.17E-01	3.5000	3.575E+06
I-129	7.3684E-07	18.747	37.495	0.00E+00	1.38E-05	2.76E-05	5.0000	2.005E+01
Kr-85	2.5263E-01	18.747	37.495	0.00E+00	4.74E+00	9.47E+00	7.0000	2.269E+00
Np-237	1.2427E-06	18.747	37.495	0.00E+00	2.33E-05	4.66E-05	11.0000	2.586E-01
Pa-231	3.8511E-09	18.747	37.495	0.00E+00	7.22E-08	1.44E-07		
Pb-210	7.3880E-15	18.747	37.495	0.00E+00	1.39E-13	2.77E-13		
Pm-147	2.1023E+00	18.747	37.495	0.00E+00	3.94E+01	7.88E+01		
Pu-238	1.0383E-03	18.747	37.495	0.00E+00	1.95E-02	3.89E-02		
Pu-239	5.5293E-03	18.747	37.495	0.00E+00	1.04E-01	2.07E-01		
Pu-240	2.1278E-03	18.747	37.495	0.00E+00	3.99E-02	7.98E-02		
Pu-241	1.0195E-01	18.747	37.495	0.00E+00	1.91E+00	3.82E+00		
Pu-242	2.3128E-07	18.747	37.495	0.00E+00	4.34E-06	8.67E-06		
Ra-226	5.2782E-14	18.747	37.495	0.00E+00	9.90E-13	1.98E-12		
Ra-228	1.9338E-10	18.747	37.495	0.00E+00	3.63E-09	7.25E-09		
Ru-106	9.1684E-02	18.747	37.495	0.00E+00	1.72E+00	3.44E+00		
Se-79	1.3018E-05	18.747	37.495	0.00E+00	2.44E-04	4.88E-04		
Sn-126	1.2167E-05	18.747	37.495	0.00E+00	2.28E-04	4.56E-04		
Sr-90	2.6045E+00	18.747	37.495	0.00E+00	4.88E+01	9.77E+01		
Tc-99	4.4241E-04	18.747	37.495	0.00E+00	8.29E-03	1.66E-02		
Th-229	1.3713E-10	18.747	37.495	0.00E+00	2.57E-09	5.14E-09		
Th-230	1.8090E-11	18.747	37.495	0.00E+00	3.39E-10	6.78E-10		
Th-232	2.5278E-10	18.747	37.495	0.00E+00	4.74E-09	9.48E-09		
Th-238	1.6947E-08	18.747	37.495	0.00E+00	3.18E-07	6.35E-07		
U-232	4.8737E-08	18.747	37.495	0.00E+00	9.14E-07	1.83E-06		
U-233	1.2203E-07	18.747	37.495	0.00E+00	2.29E-06	4.58E-06		
U-234	1.5925E-07	18.747	37.495	0.00E+00	2.99E-06	5.97E-06		
U-235	-2.6194E-06	18.747	0.000	2.77E-04	2.28E-04	2.77E-04		
U-236	1.2693E-05	18.747	37.495	0.00E+00	2.38E-04	4.76E-04		
U-238	-3.6331E-08	18.747	0.000	1.72E-04	1.72E-04	1.72E-04		
Y-90	2.6060E+00	18.747	37.495	0.00E+00	4.89E+01	9.77E+01		
Other Radionuclides					6.76E+01	1.35E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.09E+00	2.18E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.96879875	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	18.747	16.801	
Bounding:		37.495	

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		

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 FFCR (GA) 1 Fuel decay start date: 2035
 SNF ID #: 1003 Estimates as of: 2010
 Fuel Units & Descr: 10 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=1.60kg ; EOL=1.54kg 2 Template Burnup(MWd): 6.65
 ROD Storage Sit: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.14

Radionuclide	II. Estimates		Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
	m	x _n						Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	60.140	60.140	120.281	0.00E+00	5.12E-08	1.02E-07	Avg. MeV	
Am-241	1.8331E-03	60.140	60.140	120.281	0.00E+00	1.10E-01	2.20E-01	0.0150	1.944E+13
Am-242m	1.4129E-06	60.140	60.140	120.281	0.00E+00	8.50E-05	1.70E-04	0.0250	4.278E+12
Am-243	1.4774E-07	60.140	60.140	120.281	0.00E+00	8.89E-06	1.78E-05	0.0375	3.643E+12
C-14	1.2871E-04	60.140	60.140	120.281	0.00E+00	7.74E-03	1.55E-02	0.0575	3.739E+12
Cl-36	2.8120E-07	60.140	60.140	120.281	0.00E+00	1.69E-04	3.38E-04	0.0850	2.316E+12
Cm-243	1.7940E-06	60.140	60.140	120.281	0.00E+00	1.08E-05	2.16E-05	0.1250	1.682E+12
Cm-244	1.6962E-06	60.140	60.140	120.281	0.00E+00	1.02E-04	2.04E-04	0.2250	1.965E+12
Co-60	1.2839E+00	60.140	60.140	120.281	0.00E+00	7.72E+01	1.54E+02	0.3750	9.972E+11
Cs-134	9.0541E-02	60.140	60.140	120.281	0.00E+00	5.45E+00	1.09E+01	0.5750	1.326E+13
Cs-135	3.2195E-05	60.140	60.140	120.281	0.00E+00	1.94E-03	3.87E-03	0.8500	5.689E+11
Cs-137	2.7564E+00	60.140	60.140	120.281	0.00E+00	1.66E+02	3.32E+02	1.2500	1.155E+13
Eu-154	1.5368E-02	60.140	60.140	120.281	0.00E+00	9.24E+01	1.85E+00	1.7500	7.703E+09
Eu-155	2.9293E-02	60.140	60.140	120.281	0.00E+00	1.76E+00	3.52E+00	2.2500	1.242E+10
Fe-55	7.7158E-01	60.140	60.140	120.281	0.00E+00	4.64E+01	9.28E+01	2.7500	9.852E+07
H-3	1.1111E-02	60.140	60.140	120.281	0.00E+00	6.68E-01	1.34E+00	3.5000	1.147E+07
I-129	7.3684E-07	60.140	60.140	120.281	0.00E+00	4.43E-05	8.86E-05	5.0000	6.403E+01
Kr-85	2.5263E-01	60.140	60.140	120.281	0.00E+00	1.52E+01	3.04E+01	7.0000	7.249E+09
Np-237	1.2427E-06	60.140	60.140	120.281	0.00E+00	7.47E-05	1.49E-04	11.0000	8.258E-01
Pa-231	3.8511E-09	60.140	60.140	120.281	0.00E+00	2.32E-07	4.63E-07		
Pb-210	7.3880E-15	60.140	60.140	120.281	0.00E+00	4.44E-13	8.89E-13		
Pm-147	2.1023E+00	60.140	60.140	120.281	0.00E+00	1.26E+02	2.53E+02		
Pu-238	1.0383E-03	60.140	60.140	120.281	0.00E+00	6.24E-02	1.25E-01		
Pu-239	5.5293E-03	60.140	60.140	120.281	0.00E+00	3.33E-01	6.65E-01		
Pu-240	2.1278E-03	60.140	60.140	120.281	0.00E+00	1.28E-01	2.56E-01		
Pu-241	1.0195E-01	60.140	60.140	120.281	0.00E+00	6.13E+00	1.23E+01		
Pu-242	2.3128E-07	60.140	60.140	120.281	0.00E+00	1.39E-05	2.78E-05		
Ra-226	5.2782E-14	60.140	60.140	120.281	0.00E+00	3.17E-12	6.35E-12		
Ra-228	1.9338E-10	60.140	60.140	120.281	0.00E+00	1.16E-08	2.33E-08		
Ru-106	9.1684E-02	60.140	60.140	120.281	0.00E+00	5.51E+00	1.10E+01		
Sa-79	1.3018E-05	60.140	60.140	120.281	0.00E+00	7.83E-04	1.57E-03		
Sn-126	1.2167E-05	60.140	60.140	120.281	0.00E+00	7.32E-04	1.46E-03		
Sr-90	2.6045E+00	60.140	60.140	120.281	0.00E+00	1.57E+02	3.13E+02		
Tc-99	4.4241E-04	60.140	60.140	120.281	0.00E+00	2.66E-02	5.32E-02		
Th-229	1.3713E-10	60.140	60.140	120.281	0.00E+00	8.25E-09	1.65E-08		
Th-230	1.8090E-11	60.140	60.140	120.281	0.00E+00	1.09E-09	2.18E-09		
Th-232	2.5278E-10	60.140	60.140	120.281	0.00E+00	1.52E-08	3.04E-08		
Tl-208	1.6947E-08	60.140	60.140	120.281	0.00E+00	1.02E-06	2.04E-06		
U-232	4.8737E-08	60.140	60.140	120.281	0.00E+00	2.93E-06	5.86E-06		
U-233	1.2203E-07	60.140	60.140	120.281	0.00E+00	7.34E-06	1.47E-05		
U-234	1.5925E-07	60.140	60.140	120.281	0.00E+00	9.58E-06	1.92E-05		
U-235	-2.6194E-06	60.140	0.000	0.000	6.68E-04	5.10E-04	6.68E-04		
U-236	1.2693E-05	60.140	60.140	120.281	0.00E+00	7.63E-04	1.53E-03		
U-238	-3.6331E-08	60.140	0.000	0.000	4.35E-04	4.33E-04	4.35E-04		
Y-90	2.6060E+00	60.140	60.140	120.281	0.00E+00	1.57E+02	3.13E+02		
Other Radionuclides						2.17E+02	4.34E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.50E+00	7.00E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.26433915	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	54.714	60.140	
Bounding:		120.281	

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:	1.10	1.10	
Bounding:	2.20		

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 FFCR (HEIDELBERG) ¹Fuel decay start date: 2010
 SNF ID #: 1045 Estimates as of: 2010
 Fuel Units & Descr: 5 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL= 80kg ; EOL=.79kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.05

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	8.5173E-10	15.613	31.226	0.00E+00	1.33E-08	2.66E-08		
Am-241	1.8331E-03	15.613	31.226	0.00E+00	2.86E-02	5.72E-02	0.0150	5.047E+12
Am-242m	1.4129E-06	15.613	31.226	0.00E+00	2.21E-05	4.41E-05	0.0250	1.111E+12
Am-243	1.4774E-07	15.613	31.226	0.00E+00	2.31E-06	4.61E-06	0.0375	9.457E+11
C-14	1.2871E-04	15.613	31.226	0.00E+00	2.01E-03	4.02E-03	0.0575	9.707E+11
Cl-36	2.8120E-06	15.613	31.226	0.00E+00	4.39E-05	8.78E-05	0.0850	6.014E+11
Cm-243	1.7940E-07	15.613	31.226	0.00E+00	2.80E-06	5.60E-06	0.1250	4.367E+11
Cm-244	1.6962E-06	15.613	31.226	0.00E+00	2.65E-05	5.30E-05	0.2250	5.101E+11
Co-60	1.2839E+00	15.613	31.226	0.00E+00	2.00E+01	4.01E+01	0.3750	2.589E+11
Cs-134	9.0541E-02	15.613	31.226	0.00E+00	1.41E+00	2.83E+00	0.5750	3.442E+11
Cs-135	3.2195E-05	15.613	31.226	0.00E+00	5.03E-04	1.01E-03	0.8500	1.477E+12
Cs-137	2.7564E+00	15.613	31.226	0.00E+00	4.30E+01	8.61E+01	1.2500	3.000E+12
Eu-154	1.5368E-02	15.613	31.226	0.00E+00	2.40E-01	4.80E-01	1.7500	2.000E+09
Eu-155	2.9293E-02	15.613	31.226	0.00E+00	4.57E-01	9.15E-01	2.2500	3.223E+09
Fe-55	7.7158E-01	15.613	31.226	0.00E+00	1.20E+01	2.41E+01	2.7500	2.558E+07
H-3	1.1111E-02	15.613	31.226	0.00E+00	1.73E-01	3.47E-01	3.5000	2.978E+06
I-129	7.3684E-07	15.613	31.226	0.00E+00	1.15E-05	2.30E-05	5.0000	1.686E+01
Kr-85	2.5263E-01	15.613	31.226	0.00E+00	3.94E+00	7.89E+00	7.0000	1.909E+09
Np-237	1.2427E-06	15.613	31.226	0.00E+00	1.94E-05	3.88E-05	11.0000	2.175E-01
Pa-231	3.8511E-09	15.613	31.226	0.00E+00	6.01E-08	1.20E-07		
Pb-210	7.3880E-15	15.613	31.226	0.00E+00	1.15E-13	2.31E-13		
Pm-147	2.1023E+00	15.613	31.226	0.00E+00	3.28E+01	6.56E+01		
Pu-238	1.0383E-03	15.613	31.226	0.00E+00	1.62E-02	3.24E-02		
Pu-239	5.5293E-03	15.613	31.226	0.00E+00	8.63E-02	1.73E-01		
Pu-240	2.1278E-03	15.613	31.226	0.00E+00	3.32E-02	6.64E-02		
Pu-241	1.0195E-01	15.613	31.226	0.00E+00	1.59E+00	3.18E+00		
Pu-242	2.3128E-07	15.613	31.226	0.00E+00	3.61E-06	7.22E-06		
Ra-226	5.2782E-14	15.613	31.226	0.00E+00	8.24E-13	1.65E-12		
Ra-228	1.9338E-10	15.613	31.226	0.00E+00	3.02E-09	6.04E-09		
Ru-106	9.1684E-02	15.613	31.226	0.00E+00	1.43E+00	2.86E+00		
Se-79	1.3018E-05	15.613	31.226	0.00E+00	2.03E-04	4.07E-04		
Sn-126	1.2167E-05	15.613	31.226	0.00E+00	1.90E-04	3.80E-04		
Sr-90	2.6045E+00	15.613	31.226	0.00E+00	4.07E+01	8.13E+01		
Tc-99	4.4241E-04	15.613	31.226	0.00E+00	6.91E-03	1.38E-02		
Th-229	1.3713E-10	15.613	31.226	0.00E+00	2.14E-09	4.28E-09		
Th-230	1.8090E-11	15.613	31.226	0.00E+00	2.82E-10	5.65E-10		
Th-232	2.5278E-10	15.613	31.226	0.00E+00	3.95E-09	7.89E-09		
Tl-208	1.6947E-08	15.613	31.226	0.00E+00	2.65E-07	5.29E-07		
U-232	4.8737E-08	15.613	31.226	0.00E+00	7.61E-07	1.52E-06		
U-233	1.2203E-07	15.613	31.226	0.00E+00	1.91E-06	3.81E-06		
U-234	1.5925E-07	15.613	31.226	0.00E+00	2.49E-06	4.97E-06		
U-235	-2.6194E-06	15.613	0.000	3.44E-04	3.03E-04	3.44E-04		
U-236	1.2693E-05	15.613	31.226	0.00E+00	1.98E-04	3.96E-04		
U-238	-3.6331E-08	15.613	0.000	2.16E-04	2.15E-04	2.16E-04		
Y-90	2.6060E+00	15.613	31.226	0.00E+00	4.07E+01	8.14E+01		
Other Radionuclides					5.63E+01	1.13E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.09E-01	1.82E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.85018727	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	15.613	10.023	
Bounding:		31.226	

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	0.64
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 FFCR (ITALY)

SNF ID #: 730

Fuel Units & Descr: 3 - ELEMENT

Heavy Metal Mass: BOL= 48kg ; EOL= 46kg

ROD Storage Site: INEEL

¹Fuel decay start date: 1959

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: 50 years

Estimated

Canister usage:

18"x10"

0.04

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	9.4992E-09	24.342	48.685	0.00E+00	2.31E-07	4.62E-07	Avg. MeV	
Am-241	4.0120E-03	24.342	48.685	0.00E+00	9.77E-02	1.95E-01	0.0150	2.377E+12
Am-242m	1.1510E-06	24.342	48.685	0.00E+00	2.80E-05	5.60E-05	0.0250	4.937E+11
Am-243	1.4713E-07	24.342	48.685	0.00E+00	3.58E-06	7.16E-06	0.0375	4.297E+11
C-14	1.2800E-04	24.342	48.685	0.00E+00	3.12E-03	6.23E-03	0.0575	4.629E+11
Ci-36	2.8120E-06	24.342	48.685	0.00E+00	6.85E-05	1.37E-04	0.0850	2.780E+11
Cm-243	6.0120E-08	24.342	48.685	0.00E+00	1.46E-06	2.93E-06	0.1250	1.805E+11
Cm-244	3.0331E-07	24.342	48.685	0.00E+00	7.38E-06	1.48E-05	0.2250	2.395E+11
Co-60	3.4647E-03	24.342	48.685	0.00E+00	8.43E-02	1.69E-01	0.3750	1.049E+11
Cs-134	2.4632E-08	24.342	48.685	0.00E+00	6.00E-07	1.20E-06	0.5750	1.766E+12
Cs-135	3.2195E-05	24.342	48.685	0.00E+00	7.84E-04	1.57E-03	0.8500	1.738E+10
Cs-137	9.7519E-01	24.342	48.685	0.00E+00	2.37E+01	4.75E+01	1.2500	1.859E+10
Eu-154	4.0947E-04	24.342	48.685	0.00E+00	9.97E-03	1.99E-02	1.7500	4.486E+08
Eu-155	5.4586E-05	24.342	48.685	0.00E+00	1.33E-03	2.66E-03	2.2500	1.142E+05
Fe-55	4.7955E-06	24.342	48.685	0.00E+00	1.17E-04	2.33E-04	2.7500	2.060E+04
H-3	8.9038E-04	24.342	48.685	0.00E+00	2.17E-02	4.33E-02	3.5000	6.010E+01
I-129	7.3684E-07	24.342	48.685	0.00E+00	1.79E-05	3.59E-05	5.0000	2.530E+01
Kr-85	1.3791E-02	24.342	48.685	0.00E+00	3.36E-01	6.71E-01	7.0000	2.854E+00
Np-237	1.3038E-06	24.342	48.685	0.00E+00	3.17E-05	6.35E-05	11.0000	3.245E-01
Pa-231	1.5534E-08	24.342	48.685	0.00E+00	3.78E-07	7.56E-07		
Pb-210	7.1759E-13	24.342	48.685	0.00E+00	1.75E-11	3.49E-11		
Pm-147	1.4547E-05	24.342	48.685	0.00E+00	3.54E-04	7.08E-04		
Pu-238	7.2827E-04	24.342	48.685	0.00E+00	1.77E-02	3.55E-02		
Pu-239	5.5218E-03	24.342	48.685	0.00E+00	1.34E-01	2.69E-01		
Pu-240	2.1173E-03	24.342	48.685	0.00E+00	5.15E-02	1.03E-01		
Pu-241	1.1702E-02	24.342	48.685	0.00E+00	2.85E-01	5.70E-01		
Pu-242	2.3128E-07	24.342	48.685	0.00E+00	5.63E-06	1.13E-05		
Ra-226	1.6827E-12	24.342	48.685	0.00E+00	4.10E-11	8.19E-11		
Ra-228	2.5263E-10	24.342	48.685	0.00E+00	6.15E-09	1.23E-08		
Ru-106	3.4090E-15	24.342	48.685	0.00E+00	8.30E-14	1.66E-13		
Se-79	1.3012E-05	24.342	48.685	0.00E+00	3.17E-04	6.33E-04		
Sn-126	1.2162E-05	24.342	48.685	0.00E+00	2.96E-04	5.92E-04		
Sr-90	8.9323E-01	24.342	48.685	0.00E+00	2.17E+01	4.35E+01		
Tc-99	4.4241E-04	24.342	48.685	0.00E+00	1.08E-02	2.15E-02		
Th-229	7.6902E-10	24.342	48.685	0.00E+00	1.87E-08	3.74E-08		
Th-230	1.3059E-10	24.342	48.685	0.00E+00	3.18E-09	6.36E-09		
Th-232	2.5278E-10	24.342	48.685	0.00E+00	6.15E-09	1.23E-08		
Ti-208	1.1892E-08	24.342	48.685	0.00E+00	2.89E-07	5.79E-07		
U-232	3.1970E-08	24.342	48.685	0.00E+00	7.78E-07	1.56E-06		
U-233	1.2232E-07	24.342	48.685	0.00E+00	2.98E-06	5.95E-06		
U-234	2.8662E-07	24.342	48.685	0.00E+00	6.98E-06	1.40E-05		
U-235	-2.6194E-06	24.342	0.000	2.10E-04	1.46E-04	2.10E-04		
U-236	1.2696E-05	24.342	48.685	0.00E+00	3.09E-04	6.18E-04		
U-238	-3.6331E-08	24.342	0.000	1.30E-04	1.29E-04	1.30E-04		
Y-90	8.9338E-01	24.342	48.685	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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20.04130579	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	16.506	24.342	
Bounding:		48.685	

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		

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 FFCR (MNRC)
 SNF ID #: 703
 Fuel Units & Descr: 5 - ELEMENT
 Heavy Metal Mass: BOL=.80kg ; EOL=.76kg
 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							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	8.5173E-10	39.139	78.278	0.00E+00	3.33E-08	6.67E-08	0.0150	1.265E+13
Am-241	1.8331E-03	39.139	78.278	0.00E+00	7.17E-02	1.43E-01	0.0250	2.784E+12
Am-242m	1.4129E-06	39.139	78.278	0.00E+00	5.53E-05	1.11E-04	0.0375	2.371E+12
Am-243	1.4774E-07	39.139	78.278	0.00E+00	5.78E-06	1.16E-05	0.0575	2.433E+12
C-14	1.2871E-04	39.139	78.278	0.00E+00	5.04E-03	1.01E-02	0.0850	1.508E+12
Cl-36	2.8120E-06	39.139	78.278	0.00E+00	1.10E-04	2.20E-04	0.1250	1.095E+12
Cm-243	1.7940E-07	39.139	78.278	0.00E+00	7.02E-06	1.40E-05	0.2250	1.279E+12
Cm-244	1.6962E-06	39.139	78.278	0.00E+00	6.64E-05	1.33E-04	0.3750	6.490E+11
Co-60	1.2839E+00	39.139	78.278	0.00E+00	5.03E+01	1.01E+02	0.5750	8.628E+12
Cs-134	9.0541E-02	39.139	78.278	0.00E+00	3.54E+00	7.09E+00	0.8500	3.703E+11
Cs-135	3.2195E-05	39.139	78.278	0.00E+00	1.26E-03	2.52E-03	1.2500	7.520E+12
Cs-137	2.7564E+00	39.139	78.278	0.00E+00	1.08E+02	2.16E+02	1.7500	5.013E+09
Eu-154	1.5368E-02	39.139	78.278	0.00E+00	6.02E-01	1.20E+00	2.2500	8.080E+09
Eu-155	2.9293E-02	39.139	78.278	0.00E+00	1.15E+00	2.29E+00	2.7500	6.411E+07
Fe-55	7.7158E-01	39.139	78.278	0.00E+00	3.02E+01	6.04E+01	3.5000	7.464E+06
H-3	1.1111E-02	39.139	78.278	0.00E+00	4.35E-01	8.70E-01	5.0000	4.152E+01
I-129	7.3684E-07	39.139	78.278	0.00E+00	2.88E-05	5.77E-05	7.0000	4.700E+00
Kr-85	2.5263E-01	39.139	78.278	0.00E+00	9.89E+00	1.98E+01	11.0000	5.354E-01
Np-237	1.2427E-06	39.139	78.278	0.00E+00	4.86E-05	9.73E-05		
Pa-231	3.8511E-09	39.139	78.278	0.00E+00	1.51E-07	3.01E-07		
Pb-210	7.3880E-15	39.139	78.278	0.00E+00	2.89E-13	5.78E-13		
Pm-147	2.1023E+00	39.139	78.278	0.00E+00	8.23E+01	1.65E+02		
Pu-238	1.0383E-03	39.139	78.278	0.00E+00	4.06E-02	8.13E-02		
Pu-239	5.5293E-03	39.139	78.278	0.00E+00	2.16E-01	4.33E-01		
Pu-240	2.1278E-03	39.139	78.278	0.00E+00	8.33E-02	1.67E-01		
Pu-241	1.0195E-01	39.139	78.278	0.00E+00	3.99E+00	7.98E+00		
Pu-242	2.3128E-07	39.139	78.278	0.00E+00	9.05E-06	1.81E-05		
Ra-226	5.2782E-14	39.139	78.278	0.00E+00	2.07E-12	4.13E-12		
Ra-228	1.9338E-10	39.139	78.278	0.00E+00	7.57E-09	1.51E-08		
Ru-106	9.1684E-02	39.139	78.278	0.00E+00	3.59E+00	7.18E+00		
Se-79	1.3018E-05	39.139	78.278	0.00E+00	5.10E-04	1.02E-03		
Sn-126	1.2167E-05	39.139	78.278	0.00E+00	4.76E-04	9.52E-04		
Sr-90	2.6045E+00	39.139	78.278	0.00E+00	1.02E+02	2.04E+02		
Tc-99	4.4241E-04	39.139	78.278	0.00E+00	1.73E-02	3.46E-02		
Th-229	1.3713E-10	39.139	78.278	0.00E+00	5.37E-09	1.07E-08		
Th-230	1.8090E-11	39.139	78.278	0.00E+00	7.08E-10	1.42E-09		
Th-232	2.5278E-10	39.139	78.278	0.00E+00	9.89E-09	1.98E-08		
Tl-208	1.6947E-08	39.139	78.278	0.00E+00	6.63E-07	1.33E-06		
U-232	4.8737E-08	39.139	78.278	0.00E+00	1.91E-06	3.82E-06		
U-233	1.2203E-07	39.139	78.278	0.00E+00	4.78E-06	9.55E-06		
U-234	1.5925E-07	39.139	78.278	0.00E+00	6.23E-06	1.25E-05		
U-235	-2.6194E-06	39.139	0.000	3.35E-04	2.32E-04	3.35E-04		
U-236	1.2693E-05	39.139	78.278	0.00E+00	4.97E-04	9.94E-04		
U-238	-3.6331E-08	39.139	0.000	2.17E-04	2.16E-04	2.17E-04		
Y-90	2.6060E+00	39.139	78.278	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			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.34235977	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	27.340	39.139	
Bounding:		78.278	

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:	1.43	1.43	1.00
Bounding:	2.86		

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: TRIGA FFCR (MNRG)
SNF ID #: 737

Fuel Units & Descr: 6 - ELEMENT
Heavy Metal Mass: BOL=2.46kg : EOL=2.46kg
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"
0.08

Radionuclide	II. Estimates		x _b	b	y _n	y _b	Gamma Sources	
	m	x _n					Photon Energy Group	Total Photons/sec (bounding)
	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	47.013	232.332	0.00E+00	4.00E-08	1.98E-07	0.0150	3.755E+13
Am-241	1.8331E-03	47.013	232.332	0.00E+00	8.62E-02	4.26E-01	0.0250	8.263E+12
Am-242m	1.4129E-06	47.013	232.332	0.00E+00	6.64E-05	3.28E-04	0.0375	7.037E+12
Am-243	1.4774E-07	47.013	232.332	0.00E+00	6.95E-06	3.43E-05	0.0575	7.222E+12
C-14	1.2871E-04	47.013	232.332	0.00E+00	6.05E-03	2.99E-02	0.0850	4.474E+12
Cl-36	2.8120E-06	47.013	232.332	0.00E+00	1.32E-04	6.53E-04	0.1250	3.249E+12
Cm-243	1.7940E-07	47.013	232.332	0.00E+00	8.43E-06	4.17E-05	0.2250	3.796E+12
Cm-244	1.6962E-06	47.013	232.332	0.00E+00	7.97E-05	3.94E-04	0.3750	1.926E+12
Co-60	1.2839E+00	47.013	232.332	0.00E+00	6.04E+01	2.98E+02	0.5750	2.561E+13
Cs-134	9.0541E-02	47.013	232.332	0.00E+00	4.26E+00	2.10E+01	0.8500	1.099E+12
Cs-135	3.2195E-05	47.013	232.332	0.00E+00	1.51E-03	7.48E-03	1.2500	2.232E+13
Cs-137	2.7564E+00	47.013	232.332	0.00E+00	1.30E+02	6.40E+02	1.7500	1.488E+10
Eu-154	1.5368E-02	47.013	232.332	0.00E+00	7.23E-01	3.57E+00	2.2500	2.398E+10
Eu-155	2.9293E-02	47.013	232.332	0.00E+00	1.38E+00	6.81E+00	2.7500	1.903E+08
Fe-55	7.7158E-01	47.013	232.332	0.00E+00	3.63E+01	1.79E+02	3.5000	2.215E+07
H-3	1.1111E-02	47.013	232.332	0.00E+00	5.22E-01	2.58E+00	5.0000	1.233E+02
I-129	7.3684E-07	47.013	232.332	0.00E+00	3.46E-05	1.71E-04	7.0000	1.395E+01
Kr-85	2.5263E-01	47.013	232.332	0.00E+00	1.19E+01	5.87E+01	11.0000	1.590E+00
Np-237	1.2427E-06	47.013	232.332	0.00E+00	5.84E-05	2.89E-04		
Pa-231	3.8511E-09	47.013	232.332	0.00E+00	1.81E-07	8.95E-07		
Pb-210	7.3880E-15	47.013	232.332	0.00E+00	3.47E-13	1.72E-12		
Pm-147	2.1023E+00	47.013	232.332	0.00E+00	9.88E+01	4.88E+02		
Pu-238	1.0383E-03	47.013	232.332	0.00E+00	4.88E-02	2.41E-01		
Pu-239	5.5293E-03	47.013	232.332	0.00E+00	2.60E-01	1.28E+00		
Pu-240	2.1278E-03	47.013	232.332	0.00E+00	1.00E-01	4.94E-01		
Pu-241	1.0195E-01	47.013	232.332	0.00E+00	4.79E+00	2.37E+01		
Pu-242	2.3128E-07	47.013	232.332	0.00E+00	1.09E-05	5.37E-05		
Ra-226	5.2782E-14	47.013	232.332	0.00E+00	2.48E-12	1.23E-11		
Ra-228	1.9338E-10	47.013	232.332	0.00E+00	9.09E-09	4.49E-08		
Ru-106	9.1684E-02	47.013	232.332	0.00E+00	4.31E+00	2.13E+01		
Se-79	1.3018E-05	47.013	232.332	0.00E+00	6.12E-04	3.02E-03		
Sn-126	1.2167E-05	47.013	232.332	0.00E+00	5.72E-04	2.83E-03		
Sr-90	2.6045E+00	47.013	232.332	0.00E+00	1.22E+02	6.05E+02		
Tc-99	4.4241E-04	47.013	232.332	0.00E+00	2.08E-02	1.03E-01		
Th-229	1.3713E-10	47.013	232.332	0.00E+00	6.45E-09	3.19E-08		
Th-230	1.8090E-11	47.013	232.332	0.00E+00	8.50E-10	4.20E-09		
Th-232	2.5278E-10	47.013	232.332	0.00E+00	1.19E-08	5.87E-08		
Th-208	1.6947E-08	47.013	232.332	0.00E+00	7.97E-07	3.94E-06		
U-232	4.8737E-08	47.013	232.332	0.00E+00	2.29E-06	1.13E-05		
U-233	1.2203E-07	47.013	232.332	0.00E+00	5.74E-06	2.84E-05		
U-234	1.5925E-07	47.013	232.332	0.00E+00	7.49E-06	3.70E-05		
U-235	-2.6194E-06	47.013	0.000	1.05E-03	9.29E-04	1.05E-03		
U-236	1.2693E-05	47.013	232.332	0.00E+00	5.97E-04	2.95E-03		
U-238	-3.6331E-08	47.013	0.000	6.64E-04	6.62E-04	6.64E-04		
Y-90	2.6060E+00	47.013	232.332	0.00E+00	1.23E+02	6.05E+02		
Other Radionuclides					1.69E+02	8.38E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.74E+00	1.35E+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 (304)	SST	
BOL HM Constituents:	U-Zr/HX	U	
BOL Enrichment %:	19.76779631	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		47.013	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup taken directly from SFD (converted to MWd).
Bounding:	232.332	94.025	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.56		0.98
Bounding:	2.77	0.40	

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 FFCC (MNRG)
 SNF ID #: 1055
 Fuel Units & Descr: 1 - ELEMENT
 Heavy Metal Mass: BOL=.67kg ; EOL=.67kg
 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"
 0.01

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	12.881	63.594	0.00E+00	1.10E-08	5.42E-08	Avg. MeV	
Am-241	1.8331E-03	12.881	63.594	0.00E+00	2.36E-02	1.17E-01	0.0150	1.028E+13
Am-242m	1.4129E-06	12.881	63.594	0.00E+00	1.82E-05	8.99E-05	0.0250	2.262E+12
Am-243	1.4774E-07	12.881	63.594	0.00E+00	1.90E-06	9.40E-06	0.0375	1.926E+12
C-14	1.2871E-04	12.881	63.594	0.00E+00	1.66E-03	8.18E-03	0.0575	1.977E+12
Cl-36	2.8120E-06	12.881	63.594	0.00E+00	3.62E-05	1.79E-04	0.0850	1.225E+12
Cm-243	1.7940E-07	12.881	63.594	0.00E+00	2.31E-06	1.14E-05	0.1250	8.893E+11
Cm-244	1.6962E-06	12.881	63.594	0.00E+00	2.19E-05	1.08E-04	0.2250	1.039E+12
Co-60	1.2839E+00	12.881	63.594	0.00E+00	1.65E+01	8.16E+01	0.3750	5.272E+12
Cs-134	9.0541E-02	12.881	63.594	0.00E+00	1.17E+00	5.76E+00	0.5750	7.009E+11
Cs-135	3.2195E-05	12.881	63.594	0.00E+00	4.15E-04	2.05E-03	0.8500	3.008E+11
Cs-137	2.7564E+00	12.881	63.594	0.00E+00	3.55E+01	1.75E+02	1.2500	6.109E+12
Eu-154	1.5368E-02	12.881	63.594	0.00E+00	1.98E-01	9.77E-01	1.7500	4.073E+09
Eu-155	2.9293E-02	12.881	63.594	0.00E+00	3.77E-01	1.86E+00	2.2500	6.565E+09
Fe-55	7.7158E-01	12.881	63.594	0.00E+00	9.94E+00	4.91E+01	2.7500	5.209E+07
H-3	1.1111E-02	12.881	63.594	0.00E+00	1.43E-01	7.07E-01	3.5000	6.064E+06
I-129	7.3684E-07	12.881	63.594	0.00E+00	9.49E-06	4.69E-05	5.0000	3.374E+01
Kr-85	2.5263E-01	12.881	63.594	0.00E+00	3.25E+00	1.61E+01	7.0000	3.820E+00
Np-237	1.2427E-06	12.881	63.594	0.00E+00	1.60E-05	7.90E-05	11.0000	4.352E-01
Pa-231	3.8511E-09	12.881	63.594	0.00E+00	4.96E-08	2.45E-07		
Pb-210	7.3880E-15	12.881	63.594	0.00E+00	9.52E-14	4.70E-13		
Pm-147	2.1023E+00	12.881	63.594	0.00E+00	2.71E+01	1.34E+02		
Pu-238	1.0383E-03	12.881	63.594	0.00E+00	1.34E-02	6.60E-02		
Pu-239	5.5293E-03	12.881	63.594	0.00E+00	7.12E-02	3.52E-01		
Pu-240	2.1278E-03	12.881	63.594	0.00E+00	2.74E-02	1.35E-01		
Pu-241	1.0195E-01	12.881	63.594	0.00E+00	1.31E+00	6.48E+00		
Pu-242	2.3128E-07	12.881	63.594	0.00E+00	2.98E-06	1.47E-05		
Ra-226	5.2782E-14	12.881	63.594	0.00E+00	6.80E-13	3.36E-12		
Ra-228	1.9338E-10	12.881	63.594	0.00E+00	2.49E-09	1.23E-08		
Ru-106	9.1684E-02	12.881	63.594	0.00E+00	1.18E+00	5.83E+00		
Se-79	1.3018E-05	12.881	63.594	0.00E+00	1.68E-04	8.28E-04		
Sn-126	1.2167E-05	12.881	63.594	0.00E+00	1.57E-04	7.74E-04		
Sr-90	2.6045E+00	12.881	63.594	0.00E+00	3.35E+01	1.66E+02		
Tc-99	4.4241E-04	12.881	63.594	0.00E+00	5.70E-03	2.81E-02		
Th-229	1.3713E-10	12.881	63.594	0.00E+00	1.77E-09	8.72E-09		
Th-230	1.8090E-11	12.881	63.594	0.00E+00	2.33E-10	1.15E-09		
Th-232	2.5278E-10	12.881	63.594	0.00E+00	3.26E-09	1.61E-08		
Tl-208	1.6947E-08	12.881	63.594	0.00E+00	2.18E-07	1.08E-06		
U-232	4.8737E-08	12.881	63.594	0.00E+00	6.28E-07	3.10E-06		
U-233	1.2203E-07	12.881	63.594	0.00E+00	1.57E-06	7.76E-06		
U-234	1.5925E-07	12.881	63.594	0.00E+00	2.05E-06	1.01E-05		
U-235	-2.6194E-06	12.881	0.000	2.88E-04	2.54E-04	2.88E-04		
U-236	1.2693E-05	12.881	63.594	0.00E+00	1.64E-04	8.07E-04		
U-238	-3.6331E-08	12.881	0.000	1.82E-04	1.82E-04	1.82E-04		
Y-90	2.6060E+00	12.881	63.594	0.00E+00	3.36E+01	1.66E+02		
Other Radionuclides					4.64E+01	2.29E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.50E-01	3.70E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.74748006	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		12.881	
Bounding:	63.594	25.763	

Nominal burnup assumed to be 2% of BOL heavy metal mass.
 Bounding burnup taken directly from SFD (converted to MWd).

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.56		
Bounding:	2.76	0.41	

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 FFCR (OSU)
 SNF ID #: 1041
 Fuel Units & Descr: 2 - ELEMENT
 Heavy Metal Mass: BOL=.39kg : EOL=.37kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2025
 Estimates as of: 2010
 Template: TRIGA-FLIP (LW/U-Zrx, 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"
 0.02

Radionuclide	II. Estimates		x _b	b	y _n	y _b	Gamma Sources	
	m	x _n					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	2.8488E-10	20.909	41.818	0.00E+00	5.96E-09	1.19E-08	0.0150	6.747E+12
Am-241	7.5767E-03	20.909	41.818	0.00E+00	1.58E-01	3.17E-01	0.0250	1.481E+12
Am-242m	2.4459E-05	20.909	41.818	0.00E+00	5.11E-04	1.02E-03	0.0375	1.310E+12
Am-243	3.0983E-05	20.909	41.818	0.00E+00	6.48E-04	1.30E-03	0.0575	1.307E+12
C-14	1.2590E-04	20.909	41.818	0.00E+00	2.63E-03	5.27E-03	0.0850	8.134E+11
Cl-36	2.6624E-06	20.909	41.818	0.00E+00	5.57E-05	1.11E-04	0.1250	6.531E+11
Cm-243	3.8244E-05	20.909	41.818	0.00E+00	8.00E-04	1.60E-03	0.2250	6.913E+11
Cm-244	4.1010E-03	20.909	41.818	0.00E+00	8.57E-02	1.71E-01	0.3750	3.449E+11
Co-60	1.2410E+00	20.909	41.818	0.00E+00	2.59E+01	5.19E+01	0.5750	5.709E+12
Cs-134	6.5454E-01	20.909	41.818	0.00E+00	1.37E+01	2.74E+01	0.8500	1.047E+12
Cs-135	1.9753E-05	20.909	41.818	0.00E+00	4.13E-04	8.26E-04	1.2500	4.023E+12
Cs-137	2.7375E+00	20.909	41.818	0.00E+00	5.72E+01	1.14E+02	1.7500	5.381E+09
Eu-154	1.2324E-01	20.909	41.818	0.00E+00	2.55E+00	5.15E+00	2.2500	4.218E+09
Eu-155	5.3037E-02	20.909	41.818	0.00E+00	1.11E+00	2.22E+00	2.7500	3.823E+07
Fe-55	7.9555E-01	20.909	41.818	0.00E+00	1.66E+01	3.33E+01	3.5000	4.501E+06
H-3	1.0531E-02	20.909	41.818	0.00E+00	2.20E-01	4.40E-01	5.0000	1.078E+03
I-129	7.1287E-07	20.909	41.818	0.00E+00	1.49E-05	2.98E-05	7.0000	1.241E+02
Kr-85	2.4955E-01	20.909	41.818	0.00E+00	5.22E+00	1.04E+01	11.0000	1.424E+01
Np-237	1.2121E-05	20.909	41.818	0.00E+00	2.53E-04	5.07E-04		
Pa-231	1.1230E-09	20.909	41.818	0.00E+00	2.35E-08	4.70E-08		
Pb-210	6.1636E-14	20.909	41.818	0.00E+00	1.29E-12	2.58E-12		
Pm-147	1.1302E+00	20.909	41.818	0.00E+00	2.36E+01	4.73E+01		
Pu-238	5.4826E-02	20.909	41.818	0.00E+00	1.15E+00	2.29E+00		
Pu-239	1.4056E-03	20.909	41.818	0.00E+00	2.94E-02	5.88E-02		
Pu-240	1.1536E-03	20.909	41.818	0.00E+00	2.41E-02	4.82E-02		
Pu-241	4.2995E-01	20.909	41.818	0.00E+00	8.99E+00	1.80E+01		
Pu-242	4.9910E-06	20.909	41.818	0.00E+00	1.04E-04	2.09E-04		
Ra-226	2.4008E-13	20.909	41.818	0.00E+00	5.02E-12	1.00E-11		
Ra-228	1.8220E-11	20.909	41.818	0.00E+00	3.81E-10	7.62E-10		
Ru-106	1.0343E-01	20.909	41.818	0.00E+00	2.16E+00	4.33E+00		
Se-79	1.2832E-05	20.909	41.818	0.00E+00	2.68E-04	5.37E-04		
Sn-126	1.2090E-05	20.909	41.818	0.00E+00	2.53E-04	5.06E-04		
Sr-90	2.5646E+00	20.909	41.818	0.00E+00	5.36E+01	1.07E+02		
Tc-99	4.0319E-04	20.909	41.818	0.00E+00	8.43E-03	1.69E-02		
Th-229	7.7375E-11	20.909	41.818	0.00E+00	1.62E-09	3.24E-09		
Th-230	1.2211E-10	20.909	41.818	0.00E+00	2.55E-09	5.11E-09		
Th-232	2.3842E-11	20.909	41.818	0.00E+00	4.99E-10	9.97E-10		
Tl-208	1.4313E-07	20.909	41.818	0.00E+00	2.99E-06	5.99E-06		
U-232	4.1927E-07	20.909	41.818	0.00E+00	8.77E-06	1.75E-05		
U-233	6.8491E-08	20.909	41.818	0.00E+00	1.43E-06	2.86E-06		
U-234	2.0189E-06	20.909	41.818	0.00E+00	4.22E-05	8.44E-05		
U-235	-2.6572E-06	20.909	0.000	5.92E-04	5.37E-04	5.92E-04		
U-236	1.3575E-05	20.909	41.818	0.00E+00	2.84E-04	5.68E-04		
U-238	-2.2698E-08	20.909	0.000	3.97E-05	3.92E-05	3.97E-05		
Y-90	2.5646E+00	20.909	41.818	0.00E+00	5.36E+01	1.07E+02		
Other Radionuclides					7.45E+01	1.49E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.37E+00	2.74E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX-Er	U	
BOL Enrichment %:	69.89795918	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	5.731	20.909	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		41.818	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.16	3.65	1.00
Bounding:	0.31		

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 FFCR (OSU) 1Fuel decay start date: 2025
 SNF ID #: 1039 Estimates as of: 2010
 Fuel Units & Descr: 3 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=48kg ; EOL=.47kg 2Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL 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)	Avg. MeV
Ac-227	8.5173E-10	7.732	15.465	0.00E+00	6.59E-09	1.32E-08			
Am-241	1.8331E-03	7.732	15.465	0.00E+00	1.42E-02	2.83E-02		0.0150	2.499E+12
Am-242m	1.4129E-06	7.732	15.465	0.00E+00	1.09E-05	2.19E-05		0.0250	5.500E+11
Am-243	1.4774E-07	7.732	15.465	0.00E+00	1.14E-06	2.28E-06		0.0375	4.684E+11
C-14	1.2871E-04	7.732	15.465	0.00E+00	9.95E-04	1.99E-03		0.0575	4.807E+11
Cl-36	2.8120E-06	7.732	15.465	0.00E+00	2.17E-05	4.35E-05		0.0850	2.978E+11
Cm-243	1.7940E-07	7.732	15.465	0.00E+00	1.39E-06	2.77E-06		0.1250	2.163E+11
Cm-244	1.6962E-06	7.732	15.465	0.00E+00	1.31E-05	2.62E-05		0.2250	2.527E+11
Co-60	1.2839E+00	7.732	15.465	0.00E+00	9.93E+00	1.99E+01		0.3750	1.282E+11
Cs-134	9.0541E-02	7.732	15.465	0.00E+00	7.00E-01	1.40E+00		0.5750	1.705E+12
Cs-135	3.2195E-05	7.732	15.465	0.00E+00	2.49E-04	4.98E-04		0.8500	7.315E+10
Cs-137	2.7564E+00	7.732	15.465	0.00E+00	2.13E+01	4.26E+01		1.2500	1.486E+12
Eu-154	1.5368E-02	7.732	15.465	0.00E+00	1.19E-01	2.38E-01		1.7500	9.904E+08
Eu-155	2.9293E-02	7.732	15.465	0.00E+00	2.27E-01	4.53E-01		2.2500	1.596E+09
Fa-55	7.7158E-01	7.732	15.465	0.00E+00	5.97E+00	1.19E+01		2.7500	1.267E+07
H-3	1.1111E-02	7.732	15.465	0.00E+00	8.59E-02	1.72E-01		3.5000	1.475E+06
I-129	7.3684E-07	7.732	15.465	0.00E+00	5.70E-06	1.14E-05		5.0000	8.402E+00
Kr-85	2.5263E-01	7.732	15.465	0.00E+00	1.95E+00	3.91E+00		7.0000	9.515E-01
Np-237	1.2427E-06	7.732	15.465	0.00E+00	9.61E-06	1.92E-05		11.0000	1.084E-01
Pa-231	3.8511E-09	7.732	15.465	0.00E+00	2.98E-08	5.96E-08			
Pb-210	7.3880E-15	7.732	15.465	0.00E+00	5.71E-14	1.14E-13			
Pm-147	2.1023E+00	7.732	15.465	0.00E+00	1.63E+01	3.25E+01			
Pu-238	1.0383E-03	7.732	15.465	0.00E+00	8.03E-03	1.61E-02			
Pu-239	5.5293E-03	7.732	15.465	0.00E+00	4.28E-02	8.55E-02			
Pu-240	2.1278E-03	7.732	15.465	0.00E+00	1.65E-02	3.29E-02			
Pu-241	1.0195E-01	7.732	15.465	0.00E+00	7.88E-01	1.58E+00			
Pu-242	2.3128E-07	7.732	15.465	0.00E+00	1.79E-06	3.58E-06			
Ra-226	5.2782E-14	7.732	15.465	0.00E+00	4.08E-13	8.16E-13			
Ra-228	1.9338E-10	7.732	15.465	0.00E+00	1.50E-09	2.99E-09			
Ru-106	9.1684E-02	7.732	15.465	0.00E+00	7.09E-01	1.42E+00			
Se-79	1.3018E-05	7.732	15.465	0.00E+00	1.01E-04	2.01E-04			
Sn-126	1.2167E-05	7.732	15.465	0.00E+00	9.41E-05	1.88E-04			
Sr-90	2.6045E+00	7.732	15.465	0.00E+00	2.01E+01	4.03E+01			
Tc-99	4.4241E-04	7.732	15.465	0.00E+00	3.42E-03	6.84E-03			
Th-229	1.3713E-10	7.732	15.465	0.00E+00	1.06E-09	2.12E-09			
Th-230	1.8090E-11	7.732	15.465	0.00E+00	1.40E-10	2.80E-10			
Th-232	2.5278E-10	7.732	15.465	0.00E+00	1.95E-09	3.91E-09			
Tl-208	1.6947E-08	7.732	15.465	0.00E+00	1.31E-07	2.62E-07			
U-232	4.8737E-08	7.732	15.465	0.00E+00	3.77E-07	7.54E-07			
U-233	1.2203E-07	7.732	15.465	0.00E+00	9.44E-07	1.89E-06			
U-234	1.5925E-07	7.732	15.465	0.00E+00	1.23E-06	2.46E-06			
U-235	-2.6194E-06	7.732	0.000	2.06E-04	1.86E-04	2.06E-04			
U-236	1.2693E-05	7.732	15.465	0.00E+00	9.81E-05	1.96E-04			
U-238	-3.6331E-08	7.732	0.000	1.29E-04	1.29E-04	1.29E-04			
Y-90	2.6060E+00	7.732	15.465	0.00E+00	2.02E+01	4.03E+01			
Other Radionuclides					2.79E+01	5.58E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.9	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	4.678	7.732	
Bounding:		15.465	

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:	0.47	1.65
Bounding:	0.94	

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 FFCOR (PENN. STATE UNIV.) ¹Fuel decay start date: 2035
 SNF ID #: 815 Estimates as of: 2010
 Fuel Units & Descr: 7 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=1.38kg ; EOL=1.32kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.09

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	8.5173E-10	60.140	120.281	0.00E+00	5.12E-08	1.02E-07	0.0150	1.944E+13
Am-241	1.8331E-03	60.140	120.281	0.00E+00	1.10E-01	2.20E-01	0.0250	4.278E+12
Am-242m	1.4129E-06	60.140	120.281	0.00E+00	8.50E-05	1.70E-04	0.0375	3.643E+12
Am-243	1.4774E-07	60.140	120.281	0.00E+00	8.89E-06	1.78E-05	0.0575	3.739E+12
C-14	1.2871E-04	60.140	120.281	0.00E+00	7.74E-03	1.55E-02	0.0850	2.316E+12
Cl-36	2.8120E-06	60.140	120.281	0.00E+00	1.69E-04	3.38E-04	0.1250	1.682E+12
Cm-243	1.7940E-07	60.140	120.281	0.00E+00	1.08E-05	2.16E-05	0.2250	1.965E+12
Cm-244	1.6962E-06	60.140	120.281	0.00E+00	1.02E-04	2.04E-04	0.3750	9.972E+11
Co-60	1.2839E+00	60.140	120.281	0.00E+00	7.72E+01	1.54E+02	0.5750	1.326E+13
Cs-134	9.0541E-02	60.140	120.281	0.00E+00	5.45E+00	1.09E+01	0.8500	5.689E+11
Cs-135	3.2195E-05	60.140	120.281	0.00E+00	1.94E-03	3.87E-03	1.2500	1.155E+13
Cs-137	2.7564E+00	60.140	120.281	0.00E+00	1.66E+02	3.32E+02	1.7500	7.703E+09
Eu-154	1.5368E-02	60.140	120.281	0.00E+00	9.24E-01	1.85E+00	2.2500	1.242E+10
Eu-155	2.9293E-02	60.140	120.281	0.00E+00	1.76E+00	3.52E+00	2.7500	9.852E+07
Fe-55	7.7158E-01	60.140	120.281	0.00E+00	4.64E+01	9.28E+01	3.5000	1.147E+07
H-3	1.1111E-02	60.140	120.281	0.00E+00	6.68E-01	1.34E+00	5.0000	6.388E+01
I-129	7.3684E-07	60.140	120.281	0.00E+00	4.43E-05	8.86E-05	7.0000	7.232E+00
Kr-85	2.5263E-01	60.140	120.281	0.00E+00	1.52E+01	3.04E+01	11.0000	8.239E-01
Np-237	1.2427E-06	60.140	120.281	0.00E+00	7.47E-05	1.49E-04		
Pa-231	3.8511E-09	60.140	120.281	0.00E+00	2.32E-07	4.63E-07		
Pb-210	7.3880E-15	60.140	120.281	0.00E+00	4.44E-13	8.89E-13		
Pm-147	2.1023E+00	60.140	120.281	0.00E+00	1.26E+02	2.53E+02		
Pu-238	1.0383E-03	60.140	120.281	0.00E+00	6.24E-02	1.25E-01		
Pu-239	5.5293E-03	60.140	120.281	0.00E+00	3.33E-01	6.65E-01		
Pu-240	2.1278E-03	60.140	120.281	0.00E+00	1.28E-01	2.56E-01		
Pu-241	1.0195E-01	60.140	120.281	0.00E+00	6.13E+00	1.23E+01		
Pu-242	2.3128E-07	60.140	120.281	0.00E+00	1.39E-05	2.78E-05		
Ra-226	5.2782E-14	60.140	120.281	0.00E+00	3.17E-12	6.35E-12		
Ra-228	1.9338E-10	60.140	120.281	0.00E+00	1.16E-08	2.33E-08		
Ru-106	9.1684E-02	60.140	120.281	0.00E+00	5.51E+00	1.10E+01		
Se-79	1.3018E-05	60.140	120.281	0.00E+00	7.83E-04	1.57E-03		
Sn-126	1.2167E-05	60.140	120.281	0.00E+00	7.32E-04	1.46E-03		
Sr-90	2.6045E+00	60.140	120.281	0.00E+00	1.57E+02	3.13E+02		
Tc-99	4.4241E-04	60.140	120.281	0.00E+00	2.66E-02	5.32E-02		
Th-229	1.3713E-10	60.140	120.281	0.00E+00	8.25E-09	1.65E-08		
Th-230	1.8090E-11	60.140	120.281	0.00E+00	1.09E-09	2.18E-09		
Th-232	2.5278E-10	60.140	120.281	0.00E+00	1.52E-08	3.04E-08		
Ti-208	1.6947E-08	60.140	120.281	0.00E+00	1.02E-06	2.04E-06		
U-232	4.8737E-08	60.140	120.281	0.00E+00	2.93E-06	5.86E-06		
U-233	1.2203E-07	60.140	120.281	0.00E+00	7.34E-06	1.47E-05		
U-234	1.5925E-07	60.140	120.281	0.00E+00	9.58E-06	1.92E-05		
U-235	-2.6194E-06	60.140	0.000	5.90E-04	4.32E-04	5.90E-04		
U-236	1.2693E-05	60.140	120.281	0.00E+00	7.63E-04	1.53E-03		
U-238	-3.6331E-08	60.140	0.000	3.72E-04	3.70E-04	3.72E-04		
Y-90	2.6060E+00	60.140	120.281	0.00E+00	1.57E+02	3.13E+02		
Other Radionuclides					2.17E+02	4.34E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.50E+00	7.00E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.79695431	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	40.319	60.140	
Bounding:		120.281	

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		

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 FFCR (SLOVENIA) ¹Fuel decay start date: 1959
 SNF ID #: 941 Estimates as of: 2010
 Fuel Units & Descr: 3 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL= 47kg ; EOL= 46kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 50 years

Estimated
Canister usage:
18"x10"
0.04

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	9.4992E-09	16.138	32.276	0.00E+00	1.53E-07	3.07E-07	0.0150	1.576E+12
Am-241	4.0120E-03	16.138	32.276	0.00E+00	6.47E-02	1.29E-01	0.0250	3.273E+11
Am-242m	1.1510E-06	16.138	32.276	0.00E+00	1.86E-05	3.71E-05	0.0375	2.849E+11
Am-243	1.4713E-07	16.138	32.276	0.00E+00	2.37E-06	4.75E-06	0.0575	3.069E+11
C-14	1.2800E-04	16.138	32.276	0.00E+00	2.07E-03	4.13E-03	0.0850	1.843E+11
Cl-36	2.8120E-06	16.138	32.276	0.00E+00	4.54E-05	9.08E-05	0.1250	1.197E+11
Cm-243	6.0120E-08	16.138	32.276	0.00E+00	9.70E-07	1.94E-06	0.2250	1.588E+11
Cm-244	3.0331E-07	16.138	32.276	0.00E+00	4.89E-06	9.79E-06	0.3750	6.925E+10
Co-60	3.4647E-03	16.138	32.276	0.00E+00	5.59E-02	1.12E-01	0.5750	1.171E+12
Cs-134	2.4632E-08	16.138	32.276	0.00E+00	3.98E-07	7.95E-07	0.8500	1.152E+10
Cs-135	3.2195E-05	16.138	32.276	0.00E+00	5.20E-04	1.04E-03	1.2500	1.232E+10
Cs-137	9.7519E-01	16.138	32.276	0.00E+00	1.57E+01	3.15E+01	1.7500	2.974E+08
Eu-154	4.0947E-04	16.138	32.276	0.00E+00	6.61E-03	1.32E-02	2.2500	7.574E+04
Eu-155	5.4586E-05	16.138	32.276	0.00E+00	8.81E-04	1.76E-03	2.7500	1.366E+04
Fe-55	4.7955E-06	16.138	32.276	0.00E+00	7.74E-05	1.55E-04	3.5000	4.007E+01
H-3	8.9038E-04	16.138	32.276	0.00E+00	1.44E-02	2.87E-02	5.0000	1.687E+01
I-129	7.3684E-07	16.138	32.276	0.00E+00	1.19E-05	2.38E-05	7.0000	1.903E+00
Kr-85	1.3791E-02	16.138	32.276	0.00E+00	2.23E-01	4.45E-01	11.0000	2.164E-01
Np-237	1.3038E-06	16.138	32.276	0.00E+00	2.10E-05	4.21E-05		
Pa-231	1.5534E-08	16.138	32.276	0.00E+00	2.51E-07	5.01E-07		
Pb-210	7.1759E-13	16.138	32.276	0.00E+00	1.16E-11	2.32E-11		
Pm-147	1.4547E-05	16.138	32.276	0.00E+00	2.35E-04	4.70E-04		
Pu-238	7.2827E-04	16.138	32.276	0.00E+00	1.18E-02	2.35E-02		
Pu-239	5.5218E-03	16.138	32.276	0.00E+00	8.91E-02	1.78E-01		
Pu-240	2.1173E-03	16.138	32.276	0.00E+00	3.42E-02	6.83E-02		
Pu-241	1.1702E-02	16.138	32.276	0.00E+00	1.89E-01	3.78E-01		
Pu-242	2.3128E-07	16.138	32.276	0.00E+00	3.73E-06	7.46E-06		
Ra-226	1.6827E-12	16.138	32.276	0.00E+00	2.72E-11	5.43E-11		
Ra-228	2.5263E-10	16.138	32.276	0.00E+00	4.08E-09	8.15E-09		
Ru-106	3.4090E-15	16.138	32.276	0.00E+00	5.50E-14	1.10E-13		
Se-79	1.3012E-05	16.138	32.276	0.00E+00	2.10E-04	4.20E-04		
Sn-126	1.2162E-05	16.138	32.276	0.00E+00	1.96E-04	3.93E-04		
Sr-90	8.9323E-01	16.138	32.276	0.00E+00	1.44E+01	2.88E+01		
Tc-99	4.4241E-04	16.138	32.276	0.00E+00	7.14E-03	1.43E-02		
Th-229	7.6902E-10	16.138	32.276	0.00E+00	1.24E-08	2.48E-08		
Th-230	1.3059E-10	16.138	32.276	0.00E+00	2.11E-09	4.21E-09		
Th-232	2.5278E-10	16.138	32.276	0.00E+00	4.08E-09	8.16E-09		
Tl-208	1.1892E-08	16.138	32.276	0.00E+00	1.92E-07	3.84E-07		
U-232	3.1970E-08	16.138	32.276	0.00E+00	5.16E-07	1.03E-06		
U-233	1.2232E-07	16.138	32.276	0.00E+00	1.97E-06	3.95E-06		
U-234	2.8662E-07	16.138	32.276	0.00E+00	4.63E-06	9.25E-06		
U-235	2.6194E-06	16.138	0.000	2.03E-04	1.61E-04	2.03E-04		
U-236	1.2696E-05	16.138	32.276	0.00E+00	2.05E-04	4.10E-04		
U-238	-3.6331E-08	16.138	0.000	1.27E-04	1.27E-04	1.27E-04		
Y-90	8.9338E-01	16.138	32.276	0.00E+00	1.44E+01	2.88E+01		
Other Radionuclides					1.59E+01	3.18E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.81E-01	3.61E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary		Basis for Parameter Differences:
	From SFD	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST (304)	SST
BOL HM Constituents:	U-ZrHX	U
BOL Enrichment %:	19.87312476	10 to 20

Burnup Summary (MWd) ²		Basis for burnup used in estimate:
	From SFD	
Nominal:	16.138	15.465
Bounding:		32.276

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	
Nominal:	1.00	0.96
Bounding:	2.00	

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 FFCR (SO. KOREA)
 SNF ID #: 734
 Fuel Units & Descr: 3 - ELEMENT
 Heavy Metal Mass: BOL=48kg : EOL=47kg
 ROD Storage Sits: INEEL

¹Fuel decay start date: 1996
 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"
 0.04

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	1.3731E-09	11.695	23.390	0.00E+00	1.61E-08	3.21E-08	0.0150	3.022E+12
Am-241	2.3865E-03	11.695	23.390	0.00E+00	2.79E-02	5.58E-02	0.0250	6.402E+11
Am-242m	1.3812E-06	11.695	23.390	0.00E+00	1.62E-05	3.23E-05	0.0375	5.468E+11
Am-243	1.4767E-07	11.695	23.390	0.00E+00	1.73E-06	3.45E-06	0.0575	5.828E+11
C-14	1.2863E-04	11.695	23.390	0.00E+00	1.50E-03	3.01E-03	0.0850	3.536E+11
Cl-36	2.8120E-06	11.695	23.390	0.00E+00	3.29E-05	6.58E-05	0.1250	1.324E+12
Cm-243	1.5895E-07	11.695	23.390	0.00E+00	1.86E-06	3.72E-06	0.2250	3.016E+11
Cm-244	1.4008E-06	11.695	23.390	0.00E+00	1.64E-05	3.28E-05	0.3750	1.385E+11
Co-60	6.6541E-01	11.695	23.390	0.00E+00	7.78E+00	1.56E+01	0.5750	2.170E+12
Cs-134	1.6887E-02	11.695	23.390	0.00E+00	1.97E-01	3.95E-01	0.8500	3.874E+10
Cs-135	3.2195E-05	11.695	23.390	0.00E+00	3.77E-04	7.53E-04	1.2500	1.165E+12
Cs-137	2.4556E+00	11.695	23.390	0.00E+00	2.87E+01	5.74E+01	1.7500	7.011E+08
Eu-154	1.0268E-02	11.695	23.390	0.00E+00	1.20E-01	2.40E-01	2.2500	3.661E+07
Eu-155	1.4570E-02	11.695	23.390	0.00E+00	1.70E-01	3.41E-01	2.7500	6.060E+05
Fe-55	2.0361E-01	11.695	23.390	0.00E+00	2.38E+00	4.76E+00	3.5000	7.184E+04
H-3	8.3940E-03	11.695	23.390	0.00E+00	9.82E-02	1.96E-01	5.0000	1.250E+01
I-129	7.3684E-07	11.695	23.390	0.00E+00	8.62E-06	1.72E-05	7.0000	1.414E+00
Kr-85	1.8286E-01	11.695	23.390	0.00E+00	2.14E+00	4.28E+00	11.0000	1.611E-01
Np-237	1.2462E-06	11.695	23.390	0.00E+00	1.46E-05	2.91E-05		
Pa-231	4.9143E-09	11.695	23.390	0.00E+00	5.75E-08	1.15E-07		
Pb-210	1.7173E-14	11.695	23.390	0.00E+00	2.01E-13	4.02E-13		
Pm-147	5.6165E-01	11.695	23.390	0.00E+00	6.57E+00	1.31E+01		
Pu-238	9.9820E-04	11.695	23.390	0.00E+00	1.17E-02	2.33E-02		
Pu-239	5.5293E-03	11.695	23.390	0.00E+00	6.47E-02	1.29E-01		
Pu-240	2.1263E-03	11.695	23.390	0.00E+00	2.49E-02	4.97E-02		
Pu-241	8.0165E-02	11.695	23.390	0.00E+00	9.38E-01	1.88E+00		
Pu-242	2.3128E-07	11.695	23.390	0.00E+00	2.70E-06	5.41E-06		
Ra-226	9.9774E-14	11.695	23.390	0.00E+00	1.17E-12	2.33E-12		
Ra-228	2.1729E-10	11.695	23.390	0.00E+00	2.54E-09	5.08E-09		
Ru-106	2.9519E-03	11.695	23.390	0.00E+00	3.45E-02	6.90E-02		
Se-79	1.3017E-05	11.695	23.390	0.00E+00	1.52E-04	3.04E-04		
Sn-126	1.2167E-05	11.695	23.390	0.00E+00	1.42E-04	2.85E-04		
Sr-90	2.3128E+00	11.695	23.390	0.00E+00	2.70E+01	5.41E+01		
Tc-99	4.4241E-04	11.695	23.390	0.00E+00	5.17E-03	1.03E-02		
Th-229	1.9459E-10	11.695	23.390	0.00E+00	2.28E-09	4.55E-09		
Th-230	2.5564E-11	11.695	23.390	0.00E+00	2.99E-10	5.98E-10		
Th-232	2.5278E-10	11.695	23.390	0.00E+00	2.96E-09	5.91E-09		
Tl-208	1.6947E-08	11.695	23.390	0.00E+00	1.98E-07	3.96E-07		
U-232	4.6812E-08	11.695	23.390	0.00E+00	5.47E-07	1.09E-06		
U-233	1.2206E-07	11.695	23.390	0.00E+00	1.43E-06	2.86E-06		
U-234	1.7323E-07	11.695	23.390	0.00E+00	2.03E-06	4.05E-06		
U-235	-2.6194E-06	11.695	0.000	2.07E-04	1.77E-04	2.07E-04		
U-236	1.2693E-05	11.695	23.390	0.00E+00	1.48E-04	2.97E-04		
U-238	-3.6331E-08	11.695	0.000	1.29E-04	1.29E-04	1.29E-04		
Y-90	2.3128E+00	11.695	23.390	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:	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD 11.695	Estimated 7.446	
Bounding:		23.390	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.

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

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 FFCR (U OF AZ) ¹Fuel decay start date: 2035
 SNF ID #: 974 Estimates as of: 2010
 Fuel Units & Descr: 2 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=.32kg ; EOL=.32kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.03

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	0.955	1.909	0.00E+00	8.13E-10	1.63E-09	Avg. MeV	
Am-241	1.8331E-03	0.955	1.909	0.00E+00	1.75E-03	3.50E-03	0.0150	3.086E+11
Am-242m	1.4129E-06	0.955	1.909	0.00E+00	1.35E-06	2.70E-06	0.0250	6.790E+10
Am-243	1.4774E-07	0.955	1.909	0.00E+00	1.41E-07	2.82E-07	0.0375	5.782E+10
C-14	1.2871E-04	0.955	1.909	0.00E+00	1.23E-04	2.46E-04	0.0575	5.935E+10
Cl-36	2.8120E-06	0.955	1.909	0.00E+00	2.68E-06	5.37E-06	0.0850	3.677E+10
Cm-243	1.7940E-07	0.955	1.909	0.00E+00	1.71E-07	3.43E-07	0.1250	2.670E+10
Cm-244	1.6962E-06	0.955	1.909	0.00E+00	1.62E-06	3.24E-06	0.2250	3.119E+10
Co-60	1.2839E+00	0.955	1.909	0.00E+00	1.23E+00	2.45E+00	0.3750	1.583E+11
Cs-134	9.0541E-02	0.955	1.909	0.00E+00	8.64E-02	1.73E-01	0.5750	2.104E+11
Cs-135	3.2195E-05	0.955	1.909	0.00E+00	3.07E-05	6.15E-05	0.8500	9.031E+09
Cs-137	2.7564E+00	0.955	1.909	0.00E+00	2.63E+00	5.26E+00	1.2500	1.834E+11
Eu-154	1.5368E-02	0.955	1.909	0.00E+00	1.47E-02	2.93E-02	1.7500	1.223E+08
Eu-155	2.9293E-02	0.955	1.909	0.00E+00	2.80E-02	5.59E-02	2.2500	1.971E+08
Fe-55	7.7158E-01	0.955	1.909	0.00E+00	7.37E-01	1.47E+00	2.7500	1.564E+06
H-3	1.1111E-02	0.955	1.909	0.00E+00	1.06E-02	2.12E-02	3.5000	1.820E+05
I-129	7.3684E-07	0.955	1.909	0.00E+00	7.03E-07	1.41E-06	5.0000	1.200E+00
Kr-85	2.5263E-01	0.955	1.909	0.00E+00	2.41E-01	4.82E-01	7.0000	1.362E-01
Np-237	1.2427E-06	0.955	1.909	0.00E+00	1.19E-06	2.37E-06	11.0000	1.553E-02
Pa-231	3.8511E-09	0.955	1.909	0.00E+00	3.68E-09	7.35E-09		
Pb-210	7.3880E-15	0.955	1.909	0.00E+00	7.05E-15	1.41E-14		
Pm-147	2.1023E+00	0.955	1.909	0.00E+00	2.01E+00	4.01E+00		
Pu-238	1.0383E-03	0.955	1.909	0.00E+00	9.91E-04	1.98E-03		
Pu-239	5.5293E-03	0.955	1.909	0.00E+00	5.28E-03	1.06E-02		
Pu-240	2.1278E-03	0.955	1.909	0.00E+00	2.03E-03	4.06E-03		
Pu-241	1.0195E-01	0.955	1.909	0.00E+00	9.73E-02	1.95E-01		
Pu-242	2.3128E-07	0.955	1.909	0.00E+00	2.21E-07	4.42E-07		
Ra-226	5.2782E-14	0.955	1.909	0.00E+00	5.04E-14	1.01E-13		
Ra-228	1.9338E-10	0.955	1.909	0.00E+00	1.85E-10	3.69E-10		
Ru-106	9.1684E-02	0.955	1.909	0.00E+00	8.75E-02	1.75E-01		
Se-79	1.3018E-05	0.955	1.909	0.00E+00	1.24E-05	2.49E-05		
Sn-126	1.2167E-05	0.955	1.909	0.00E+00	1.16E-05	2.32E-05		
Sr-90	2.6045E+00	0.955	1.909	0.00E+00	2.49E+00	4.97E+00		
Tc-99	4.4241E-04	0.955	1.909	0.00E+00	4.22E-04	8.45E-04		
Th-229	1.3713E-10	0.955	1.909	0.00E+00	1.31E-10	2.62E-10		
Th-230	1.8090E-11	0.955	1.909	0.00E+00	1.73E-11	3.45E-11		
Th-232	2.5278E-10	0.955	1.909	0.00E+00	2.41E-10	4.83E-10		
Tl-208	1.6947E-08	0.955	1.909	0.00E+00	1.62E-08	3.24E-08		
U-232	4.8737E-08	0.955	1.909	0.00E+00	4.65E-08	9.30E-08		
U-233	1.2203E-07	0.955	1.909	0.00E+00	1.16E-07	2.33E-07		
U-234	1.5925E-07	0.955	1.909	0.00E+00	1.52E-07	3.04E-07		
U-235	-2.6194E-06	0.955	0.000	1.37E-04	1.35E-04	1.37E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.2693E-05	0.955	1.909	0.00E+00	1.21E-05	2.42E-05	5.56E-02	1.11E-01
U-238	-3.6331E-08	0.955	0.000	8.62E-05	8.61E-05	8.62E-05	Total	Total
Y-90	2.6060E+00	0.955	1.909	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			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.875	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	0.780	0.955	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		1.909	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.09	1.22	
Bounding:	0.17		

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 FFCR (U OF TX AUSTIN)
 SNF ID #: 825
 Fuel Units & Descr: 3 - ELEMENT
 Heavy Metal Mass: BOL= .48kg ; EOL=.48kg
 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"
 0.04

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	8.5173E-10	2.339	4.678	0.00E+00	1.99E-09	3.98E-09		
Am-241	1.8331E-03	2.339	4.678	0.00E+00	4.29E-03	8.58E-03	0.0150	7.561E+11
Am-242m	1.4129E-06	2.339	4.678	0.00E+00	3.30E-06	6.61E-06	0.0250	1.664E+11
Am-243	1.4774E-07	2.339	4.678	0.00E+00	3.46E-07	6.91E-07	0.0375	1.417E+11
C-14	1.2871E-04	2.339	4.678	0.00E+00	3.01E-04	6.02E-04	0.0575	1.454E+11
Cl-36	2.8120E-06	2.339	4.678	0.00E+00	6.58E-06	1.32E-05	0.0850	9.009E+10
Cm-243	1.7940E-07	2.339	4.678	0.00E+00	4.20E-07	8.39E-07	0.1250	6.542E+10
Cm-244	1.6962E-06	2.339	4.678	0.00E+00	3.97E-06	7.94E-06	0.2250	7.643E+10
Co-60	1.2839E+00	2.339	4.678	0.00E+00	3.00E+00	6.01E+00	0.3750	3.878E+10
Cs-134	9.0541E-02	2.339	4.678	0.00E+00	2.12E-01	4.24E-01	0.5750	5.156E+11
Cs-135	3.2195E-05	2.339	4.678	0.00E+00	7.53E-05	1.51E-04	0.8500	2.213E+10
Cs-137	2.7564E+00	2.339	4.678	0.00E+00	6.45E+00	1.29E+01	1.2500	4.494E+11
Eu-154	1.5368E-02	2.339	4.678	0.00E+00	3.59E-02	7.19E-02	1.7500	2.996E+08
Eu-155	2.9293E-02	2.339	4.678	0.00E+00	6.85E-02	1.37E-01	2.2500	4.829E+08
Fe-55	7.7158E-01	2.339	4.678	0.00E+00	1.80E+00	3.61E+00	2.7500	3.832E+06
H-3	1.1111E-02	2.339	4.678	0.00E+00	2.60E-02	5.20E-02	3.5000	4.461E+05
I-129	7.3684E-07	2.339	4.678	0.00E+00	1.72E-06	3.45E-06	5.0000	2.750E+00
Kr-85	2.5263E-01	2.339	4.678	0.00E+00	5.91E-01	1.18E+00	7.0000	3.119E-01
Np-237	1.2427E-06	2.339	4.678	0.00E+00	2.91E-06	5.81E-06	11.0000	3.556E-02
Pa-231	3.8511E-09	2.339	4.678	0.00E+00	9.01E-09	1.80E-08		
Pb-210	7.3880E-15	2.339	4.678	0.00E+00	1.73E-14	3.46E-14		
Pm-147	2.1023E+00	2.339	4.678	0.00E+00	4.92E+00	9.83E+00		
Pu-238	1.0383E-03	2.339	4.678	0.00E+00	2.43E-03	4.86E-03		
Pu-239	5.5293E-03	2.339	4.678	0.00E+00	1.29E-02	2.59E-02		
Pu-240	2.1278E-03	2.339	4.678	0.00E+00	4.98E-03	9.95E-03		
Pu-241	1.0195E-01	2.339	4.678	0.00E+00	2.38E-01	4.77E-01		
Pu-242	2.3128E-07	2.339	4.678	0.00E+00	5.41E-07	1.08E-06		
Ra-226	5.2782E-14	2.339	4.678	0.00E+00	1.23E-13	2.47E-13		
Ra-228	1.9338E-10	2.339	4.678	0.00E+00	4.52E-10	9.05E-10		
Ru-106	9.1684E-02	2.339	4.678	0.00E+00	2.14E-01	4.29E-01		
Se-79	1.3018E-05	2.339	4.678	0.00E+00	3.04E-05	6.09E-05		
Sn-126	1.2167E-05	2.339	4.678	0.00E+00	2.85E-05	5.69E-05		
Sr-90	2.6045E+00	2.339	4.678	0.00E+00	6.09E+00	1.22E+01		
Tc-99	4.4241E-04	2.339	4.678	0.00E+00	1.03E-03	2.07E-03		
Th-229	1.3713E-10	2.339	4.678	0.00E+00	3.21E-10	6.41E-10		
Th-230	1.8090E-11	2.339	4.678	0.00E+00	4.23E-11	8.46E-11		
Th-232	2.5278E-10	2.339	4.678	0.00E+00	5.91E-10	1.18E-09		
Tl-208	1.6947E-08	2.339	4.678	0.00E+00	3.96E-08	7.93E-08		
U-232	4.8737E-08	2.339	4.678	0.00E+00	1.14E-07	2.28E-07		
U-233	1.2203E-07	2.339	4.678	0.00E+00	2.85E-07	5.71E-07		
U-234	1.5925E-07	2.339	4.678	0.00E+00	3.72E-07	7.45E-07		
U-235	-2.6194E-06	2.339	0.000	2.05E-04	1.99E-04	2.05E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.2693E-05	2.339	4.678	0.00E+00	2.97E-05	5.94E-05	1.36E-01	2.72E-01
U-238	-3.6331E-08	2.339	0.000	1.29E-04	1.29E-04	1.29E-04	Total	Total
Y-90	2.6060E+00	2.339	4.678	0.00E+00	6.10E+00	1.22E+01		
Other Radionuclides					8.43E+00	1.69E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.7916875	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	2.339		Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.
Bounding:		4.678	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.14	0.00	1.00
Bounding:	0.29		

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 FFCR (ZAIRE) *Fuel decay start date: 2010
 SNF ID #: 735 Estimates as of: 2010
 Fuel Units & Descr: 4 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=64kg ; EOL=64kg *Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.04

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	6.218	12.436	0.00E+00	5.30E-09	1.06E-08	Avg. MeV	
Am-241	1.8331E-03	6.218	12.436	0.00E+00	1.14E-02	2.28E-02	0.0150	2.010E+12
Am-242m	1.4129E-06	6.218	12.436	0.00E+00	8.79E-06	1.76E-05	0.0250	4.423E+11
Am-243	1.4774E-07	6.218	12.436	0.00E+00	9.19E-07	1.84E-06	0.0375	3.766E+11
C-14	1.2871E-04	6.218	12.436	0.00E+00	8.00E-04	1.60E-03	0.0975	3.866E+11
Cl-36	2.8120E-06	6.218	12.436	0.00E+00	1.75E-05	3.50E-05	0.0850	2.395E+11
Cm-243	1.7940E-07	6.218	12.436	0.00E+00	1.12E-06	2.23E-06	0.1250	1.739E+11
Cm-244	1.6962E-06	6.218	12.436	0.00E+00	1.05E-05	2.11E-05	0.2250	2.032E+11
Co-60	1.2839E+00	6.218	12.436	0.00E+00	7.98E+00	1.60E+01	0.3750	1.031E+11
Cs-134	9.0541E-02	6.218	12.436	0.00E+00	5.63E-01	1.13E+00	0.5750	1.371E+12
Cs-135	3.2195E-05	6.218	12.436	0.00E+00	2.00E-04	4.00E-04	0.8500	5.882E+10
Cs-137	2.7564E+00	6.218	12.436	0.00E+00	1.71E+01	3.43E+01	1.2500	1.195E+12
Eu-154	1.5368E-02	6.218	12.436	0.00E+00	9.56E-02	1.91E-01	1.7500	7.965E+08
Eu-155	2.9293E-02	6.218	12.436	0.00E+00	1.82E-01	3.64E-01	2.2500	1.284E+09
Fe-55	7.7158E-01	6.218	12.436	0.00E+00	4.80E+00	9.60E+00	2.7500	1.019E+07
H-3	1.1111E-02	6.218	12.436	0.00E+00	6.91E-02	1.38E-01	3.5000	1.186E+06
I-129	7.3684E-07	6.218	12.436	0.00E+00	4.58E-06	9.16E-06	5.0000	6.913E+00
Kr-85	2.5263E-01	6.218	12.436	0.00E+00	1.57E+00	3.14E+00	7.0000	7.831E-01
Np-237	1.2427E-06	6.218	12.436	0.00E+00	7.73E-06	1.55E-05	11.0000	8.926E-02
Pa-231	3.8511E-09	6.218	12.436	0.00E+00	2.39E-08	4.79E-08		
Pb-210	7.3880E-15	6.218	12.436	0.00E+00	4.59E-14	9.19E-14		
Pm-147	2.1023E+00	6.218	12.436	0.00E+00	1.31E+01	2.61E+01		
Pu-238	1.0383E-03	6.218	12.436	0.00E+00	6.46E-03	1.29E-02		
Pu-239	5.5293E-03	6.218	12.436	0.00E+00	3.44E-02	6.88E-02		
Pu-240	2.1278E-03	6.218	12.436	0.00E+00	1.32E-02	2.65E-02		
Pu-241	1.0195E-01	6.218	12.436	0.00E+00	6.34E-01	1.27E+00		
Pu-242	2.3128E-07	6.218	12.436	0.00E+00	1.44E-06	2.88E-06		
Ra-226	5.2782E-14	6.218	12.436	0.00E+00	3.28E-13	6.56E-13		
Ra-228	1.9338E-10	6.218	12.436	0.00E+00	1.20E-09	2.40E-09		
Ru-106	9.1684E-02	6.218	12.436	0.00E+00	5.70E-01	1.14E+00		
Se-79	1.3018E-05	6.218	12.436	0.00E+00	8.09E-05	1.62E-04		
Sn-126	1.2167E-05	6.218	12.436	0.00E+00	7.57E-05	1.51E-04		
Sr-90	2.6045E+00	6.218	12.436	0.00E+00	1.62E+01	3.24E+01		
Tc-99	4.4241E-04	6.218	12.436	0.00E+00	2.75E-03	5.50E-03		
Th-229	1.3713E-10	6.218	12.436	0.00E+00	8.53E-10	1.71E-09		
Th-230	1.8090E-11	6.218	12.436	0.00E+00	1.12E-10	2.25E-10		
Th-232	2.5278E-10	6.218	12.436	0.00E+00	1.57E-09	3.14E-09		
Tl-208	1.6947E-08	6.218	12.436	0.00E+00	1.05E-07	2.11E-07		
U-232	4.8737E-08	6.218	12.436	0.00E+00	3.03E-07	6.06E-07		
U-233	1.2203E-07	6.218	12.436	0.00E+00	7.59E-07	1.52E-06		
U-234	1.5925E-07	6.218	12.436	0.00E+00	9.90E-07	1.98E-06		
U-235	-2.6194E-06	6.218	0.000	2.76E-04	2.59E-04	2.76E-04		
U-236	1.2693E-05	6.218	12.436	0.00E+00	7.89E-05	1.58E-04		
U-238	-3.6331E-08	6.218	0.000	1.72E-04	1.71E-04	1.72E-04		
Y-90	2.6060E+00	6.218	12.436	0.00E+00	1.62E+01	3.24E+01		
Other Radionuclides					2.24E+01	4.48E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.62E-01	7.24E-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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20.00000041	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	6.218		
Bounding:		12.436	

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		

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 FLIP
 SNF ID #: 242
 Fuel Units & Desc: 92 - ELEMENT
 Heavy Metal Mass: BOL=18.03kg ; EOL=15.53kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 Estimates as of: 2010
 Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
²Template Burnup(MWd): 66.52
 Template BOL Heavy Metal Mass (MT): 0.000196
³Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.83

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	2.8488E-10	2,378.332	4,756.663	0.00E+00	6.78E-07	1.36E-06	Avg. MeV	
Am-241	7.5767E-03	2,378.332	4,756.663	0.00E+00	1.80E+01	3.60E+01	0.0150	7.675E+14
Am-242m	2.4459E-05	2,378.332	4,756.663	0.00E+00	5.82E-02	1.16E-01	0.0250	1.684E+14
Am-243	3.0983E-05	2,378.332	4,756.663	0.00E+00	7.37E-02	1.47E-01	0.0375	1.490E+14
C-14	1.2590E-04	2,378.332	4,756.663	0.00E+00	2.99E-01	5.99E-01	0.0575	1.487E+14
Cl-36	2.6624E-06	2,378.332	4,756.663	0.00E+00	6.33E-03	1.27E-02	0.0850	9.252E+13
Co-243	3.8244E-05	2,378.332	4,756.663	0.00E+00	9.10E-02	1.82E-01	0.1250	7.429E+13
Co-244	4.1010E-03	2,378.332	4,756.663	0.00E+00	9.75E+00	1.95E+01	0.2250	7.863E+13
Co-60	1.2410E+00	2,378.332	4,756.663	0.00E+00	2.95E+03	5.90E+03	0.3750	3.923E+13
Cs-134	6.5454E-01	2,378.332	4,756.663	0.00E+00	1.56E+03	3.11E+03	0.5750	6.493E+14
Cs-135	1.9753E-05	2,378.332	4,756.663	0.00E+00	4.70E-02	9.40E-02	0.8500	1.191E+14
Cs-137	2.7375E+00	2,378.332	4,756.663	0.00E+00	6.51E+03	1.30E+04	1.2500	4.575E+14
Eu-154	1.2324E-01	2,378.332	4,756.663	0.00E+00	2.93E+02	5.86E+02	1.7500	6.120E+11
Eu-155	5.3037E-02	2,378.332	4,756.663	0.00E+00	1.26E+02	2.52E+02	2.2500	4.797E+11
Fe-55	7.9555E-01	2,378.332	4,756.663	0.00E+00	1.89E+03	3.78E+03	2.7500	4.349E+09
H-3	1.0531E-02	2,378.332	4,756.663	0.00E+00	2.50E+01	5.01E+01	3.5000	5.119E+08
I-129	7.1287E-07	2,378.332	4,756.663	0.00E+00	1.70E-03	3.39E-03	5.0000	1.226E+05
Kr-85	2.4955E-01	2,378.332	4,756.663	0.00E+00	5.94E+02	1.19E+03	7.0000	1.411E+04
Np-237	1.2121E-05	2,378.332	4,756.663	0.00E+00	2.88E-02	5.77E-02	11.0000	1.619E+03
Pa-231	1.1230E-09	2,378.332	4,756.663	0.00E+00	2.67E-06	5.34E-06		
Pb-210	6.1636E-14	2,378.332	4,756.663	0.00E+00	1.47E-10	2.93E-10		
Pm-147	1.1302E+00	2,378.332	4,756.663	0.00E+00	2.69E+03	5.38E+03		
Pu-238	5.4826E-02	2,378.332	4,756.663	0.00E+00	1.30E+02	2.61E+02		
Pu-239	1.4056E-03	2,378.332	4,756.663	0.00E+00	3.34E+00	6.69E+00		
Pu-240	1.1536E-03	2,378.332	4,756.663	0.00E+00	2.74E+00	5.49E+00		
Pu-241	4.2995E-01	2,378.332	4,756.663	0.00E+00	1.02E+03	2.05E+03		
Pu-242	4.9910E-06	2,378.332	4,756.663	0.00E+00	1.19E-02	2.37E-02		
Ra-226	2.4008E-13	2,378.332	4,756.663	0.00E+00	5.71E-10	1.14E-09		
Ra-228	1.8220E-11	2,378.332	4,756.663	0.00E+00	4.33E-08	8.67E-08		
Ru-106	1.0343E-01	2,378.332	4,756.663	0.00E+00	2.46E+02	4.92E+02		
Se-79	1.2832E-05	2,378.332	4,756.663	0.00E+00	3.05E-02	6.10E-02		
Sn-126	1.2090E-05	2,378.332	4,756.663	0.00E+00	2.88E-02	5.75E-02		
Sr-90	2.5646E+00	2,378.332	4,756.663	0.00E+00	6.10E+03	1.22E+04		
Tc-99	4.0319E-04	2,378.332	4,756.663	0.00E+00	9.59E-01	1.92E+00		
Th-229	7.7375E-11	2,378.332	4,756.663	0.00E+00	1.84E-07	3.68E-07		
Th-230	1.2211E-10	2,378.332	4,756.663	0.00E+00	2.90E-07	5.81E-07		
Th-232	2.3842E-11	2,378.332	4,756.663	0.00E+00	5.67E-08	1.13E-07		
Ti-208	1.4313E-07	2,378.332	4,756.663	0.00E+00	3.40E-04	6.81E-04		
U-232	4.1927E-07	2,378.332	4,756.663	0.00E+00	9.97E-04	1.99E-03		
U-233	6.8491E-08	2,378.332	4,756.663	0.00E+00	1.63E-04	3.26E-04		
U-234	2.0189E-06	2,378.332	4,756.663	0.00E+00	4.80E-03	9.60E-03		
U-235	-2.6572E-06	2,378.332	0.000	2.72E-02	2.09E-02	2.72E-02		
U-236	1.3575E-05	2,378.332	4,756.663	0.00E+00	3.23E-02	6.46E-02	1.56E+02	3.12E+02
U-238	-2.2698E-08	2,378.332	0.000	1.82E-03	1.77E-03	1.82E-03		
Y-90	2.5646E+00	2,378.332	4,756.663	0.00E+00	6.10E+03	1.22E+04	Total	Total
Other Radionuclides					8.47E+03	1.69E+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 (304)	SST	
BOL HM Constituents:	U-ZrHx-Er	U	
BOL Enrichment %:	69.89795918	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	509.963	2,378.332	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,756.663	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	1.00
Bounding:	0.78		

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
 SNF ID #: 241
 Fuel Units & Descr: 96 - ELEMENT
 Heavy Metal Mass: BOL=16.82kg : EOL=14.63kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 Estimates as of: 2010
 Template: TRIGA-FLIP (LW/U-Zrx, 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"
 0.86

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8488E-10	2,080.280	4,160.559	0.00E+00	5.93E-07	1.19E-06	Avg. MeV	
Am-241	7.5767E-03	2,080.280	4,160.559	0.00E+00	1.58E+01	3.15E+01	0.0150	6.713E+14
Am-242m	2.4459E-05	2,080.280	4,160.559	0.00E+00	5.09E-02	1.02E-01	0.0250	1.473E+14
Am-243	3.0983E-05	2,080.280	4,160.559	0.00E+00	6.45E-02	1.29E-01	0.0375	1.303E+14
C-14	1.2590E-04	2,080.280	4,160.559	0.00E+00	2.62E-01	5.24E-01	0.0575	1.301E+14
Cl-36	2.6624E-06	2,080.280	4,160.559	0.00E+00	5.54E-03	1.11E-02	0.0850	8.093E+13
Cm-243	3.8244E-05	2,080.280	4,160.559	0.00E+00	7.96E-02	1.59E-01	0.1250	6.498E+13
Cm-244	4.1010E-03	2,080.280	4,160.559	0.00E+00	8.53E+00	1.71E+01	0.2250	6.877E+13
Co-60	1.2410E+00	2,080.280	4,160.559	0.00E+00	2.58E+03	5.16E+03	0.3750	3.432E+13
Cs-134	6.5454E-01	2,080.280	4,160.559	0.00E+00	1.36E+03	2.72E+03	0.5750	5.680E+14
Cs-135	1.9753E-05	2,080.280	4,160.559	0.00E+00	4.11E-02	8.22E-02	0.8500	1.042E+14
Cs-137	2.7375E+00	2,080.280	4,160.559	0.00E+00	5.69E+03	1.14E+04	1.2500	4.002E+14
Eu-154	1.2324E-01	2,080.280	4,160.559	0.00E+00	2.56E+02	5.13E+02	1.7500	5.353E+11
Eu-155	5.3037E-02	2,080.280	4,160.559	0.00E+00	1.10E+02	2.21E+02	2.2500	4.196E+11
Fe-55	7.9555E-01	2,080.280	4,160.559	0.00E+00	1.65E+03	3.31E+03	2.7500	3.804E+09
H-3	1.0531E-02	2,080.280	4,160.559	0.00E+00	2.19E+01	4.38E+01	3.5000	4.478E+08
I-129	7.1287E-07	2,080.280	4,160.559	0.00E+00	1.48E-03	2.97E-03	5.0000	1.072E+05
Kr-85	2.4955E-01	2,080.280	4,160.559	0.00E+00	5.19E+02	1.04E+03	7.0000	1.234E+04
Np-237	1.2121E-05	2,080.280	4,160.559	0.00E+00	2.52E-02	5.04E-02	11.0000	1.416E+03
Pa-231	1.1230E-09	2,080.280	4,160.559	0.00E+00	2.34E-06	4.67E-06		
Pb-210	6.1636E-14	2,080.280	4,160.559	0.00E+00	1.28E-10	2.56E-10		
Pm-147	1.1302E+00	2,080.280	4,160.559	0.00E+00	2.35E+03	4.70E+03		
Pu-238	5.4826E-02	2,080.280	4,160.559	0.00E+00	1.14E+02	2.28E+02		
Pu-239	1.4056E-03	2,080.280	4,160.559	0.00E+00	2.92E+00	5.85E+00		
Pu-240	1.1536E-03	2,080.280	4,160.559	0.00E+00	2.40E+00	4.80E+00		
Pu-241	4.2995E-01	2,080.280	4,160.559	0.00E+00	8.94E+02	1.79E+03		
Pu-242	4.9910E-06	2,080.280	4,160.559	0.00E+00	1.04E-02	2.08E-02		
Ra-226	2.4008E-13	2,080.280	4,160.559	0.00E+00	4.99E-10	9.99E-10		
Ra-228	1.8220E-11	2,080.280	4,160.559	0.00E+00	3.79E-08	7.58E-08		
Ru-106	1.0343E-01	2,080.280	4,160.559	0.00E+00	2.15E+02	4.30E+02		
Se-79	1.2832E-05	2,080.280	4,160.559	0.00E+00	2.67E-02	5.34E-02		
Sn-126	1.2090E-05	2,080.280	4,160.559	0.00E+00	2.51E-02	5.03E-02		
Sr-90	2.5646E+00	2,080.280	4,160.559	0.00E+00	5.34E+03	1.07E+04		
Tc-99	4.0319E-04	2,080.280	4,160.559	0.00E+00	8.39E-01	1.68E+00		
Th-229	7.7375E-11	2,080.280	4,160.559	0.00E+00	1.61E-07	3.22E-07		
Th-230	1.2211E-10	2,080.280	4,160.559	0.00E+00	2.54E-07	5.08E-07		
Th-232	2.3842E-11	2,080.280	4,160.559	0.00E+00	4.96E-08	9.92E-08		
Tl-208	1.4313E-07	2,080.280	4,160.559	0.00E+00	2.98E-04	5.96E-04		
U-232	4.1927E-07	2,080.280	4,160.559	0.00E+00	8.72E-04	1.74E-03		
U-233	6.8491E-08	2,080.280	4,160.559	0.00E+00	1.42E-04	2.85E-04		
U-234	2.0189E-06	2,080.280	4,160.559	0.00E+00	4.20E-03	8.40E-03		
U-235	-2.6572E-06	2,080.280	0.000	2.54E-02	1.99E-02	2.54E-02		
U-236	1.3575E-05	2,080.280	4,160.559	0.00E+00	2.82E-02	5.65E-02		
U-238	-2.2698E-08	2,080.280	0.000	1.70E-03	1.65E-03	1.70E-03		
Y-90	2.5646E+00	2,080.280	4,160.559	0.00E+00	5.34E+03	1.07E+04		
Other Radionuclides					7.41E+03	1.48E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.36E+02	2.73E+02
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 (304)	SST	
BOL HM Constituents:	U-ZrHX-Er	U	
BOL Enrichment %:	70.00179205	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:	792.756	2,080.280	
Bounding:		4,160.559	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.36	2.62	1.00
Bounding:	0.73		

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
 SNF ID #: 240
 Fuel Units & Descr: 87 - ELEMENT
 Heavy Metal Mass: BOL=17.05kg ; EOL=15.63kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2025
 Estimates as of: 2010
 Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
²Template Burnup(MWd): 66.52
 Template BOL Heavy Metal Mass (MT): 0.000196
³Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.78

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	2.8488E-10	1,356.060	2,712.119	0.00E+00	3.86E-07	7.73E-07	Avg. MeV	
Am-241	7.5767E-03	1,356.060	2,712.119	0.00E+00	1.03E+01	2.05E+01	0.0150	4.376E+14
Am-242m	2.4459E-05	1,356.060	2,712.119	0.00E+00	3.32E-02	6.63E-02	0.0250	9.603E+13
Am-243	3.0983E-05	1,356.060	2,712.119	0.00E+00	4.20E-02	8.40E-02	0.0375	8.495E+13
C-14	1.2590E-04	1,356.060	2,712.119	0.00E+00	1.71E-01	3.41E-01	0.0575	8.478E+13
Cl-36	2.6624E-06	1,356.060	2,712.119	0.00E+00	3.61E-03	7.22E-03	0.0850	5.275E+13
Co-60	3.8244E-05	1,356.060	2,712.119	0.00E+00	5.19E-02	1.04E-01	0.1250	4.236E+13
Co-244	4.1010E-03	1,356.060	2,712.119	0.00E+00	5.56E+00	1.11E+01	0.2250	4.483E+13
Co-60	1.2410E+00	1,356.060	2,712.119	0.00E+00	1.68E+03	3.37E+03	0.3750	2.237E+13
Cs-134	6.5454E-01	1,356.060	2,712.119	0.00E+00	8.88E+02	1.78E+03	0.5750	3.702E+14
Cs-135	1.9753E-05	1,356.060	2,712.119	0.00E+00	2.68E-02	5.36E-02	0.8500	6.791E+13
Cs-137	2.7375E+00	1,356.060	2,712.119	0.00E+00	3.71E+03	7.42E+03	1.2500	2.609E+14
Eu-154	1.2324E-01	1,356.060	2,712.119	0.00E+00	1.67E+02	3.34E+02	1.7500	3.490E+11
Eu-155	5.3037E-02	1,356.060	2,712.119	0.00E+00	7.19E+01	1.44E+02	2.2500	2.735E+11
Fe-55	7.9556E-01	1,356.060	2,712.119	0.00E+00	1.08E+03	2.16E+03	2.7500	2.480E+09
H-3	1.0531E-02	1,356.060	2,712.119	0.00E+00	1.43E+01	2.86E+01	3.5000	2.919E+08
I-129	7.1287E-07	1,356.060	2,712.119	0.00E+00	9.67E-04	1.93E-03	5.0000	6.991E+04
Kr-85	2.4955E-01	1,356.060	2,712.119	0.00E+00	3.38E+02	6.77E+02	7.0000	8.046E+03
Np-237	1.2121E-05	1,356.060	2,712.119	0.00E+00	1.64E-02	3.29E-02	11.0000	9.233E+02
Pa-231	1.1230E-09	1,356.060	2,712.119	0.00E+00	1.52E-06	3.05E-06		
Pb-210	6.1636E-14	1,356.060	2,712.119	0.00E+00	8.36E-11	1.67E-10		
Pm-147	1.1302E+00	1,356.060	2,712.119	0.00E+00	1.53E+03	3.07E+03		
Pu-238	5.4826E-02	1,356.060	2,712.119	0.00E+00	7.43E+01	1.49E+02		
Pu-239	1.4056E-03	1,356.060	2,712.119	0.00E+00	1.91E+00	3.81E+00		
Pu-240	1.1536E-03	1,356.060	2,712.119	0.00E+00	1.56E+00	3.13E+00		
Pu-241	4.2995E-01	1,356.060	2,712.119	0.00E+00	5.83E+02	1.17E+03		
Pu-242	4.9910E-06	1,356.060	2,712.119	0.00E+00	6.77E-03	1.35E-02		
Ra-226	2.4008E-13	1,356.060	2,712.119	0.00E+00	3.26E-10	6.51E-10		
Ra-228	1.8220E-11	1,356.060	2,712.119	0.00E+00	2.47E-08	4.94E-08		
Ru-106	1.0343E-01	1,356.060	2,712.119	0.00E+00	1.40E+02	2.81E+02		
Se-79	1.2832E-05	1,356.060	2,712.119	0.00E+00	1.74E-02	3.48E-02		
Sn-126	1.2090E-05	1,356.060	2,712.119	0.00E+00	1.64E-02	3.28E-02		
Sr-90	2.5646E+00	1,356.060	2,712.119	0.00E+00	3.48E+03	6.96E+03		
Tc-99	4.0319E-04	1,356.060	2,712.119	0.00E+00	5.47E-01	1.09E+00		
Th-229	7.7375E-11	1,356.060	2,712.119	0.00E+00	1.05E-07	2.10E-07		
Th-230	1.2211E-10	1,356.060	2,712.119	0.00E+00	1.66E-07	3.31E-07		
Th-232	2.3842E-11	1,356.060	2,712.119	0.00E+00	3.23E-08	6.47E-08		
Tl-208	1.4313E-07	1,356.060	2,712.119	0.00E+00	1.94E-04	3.88E-04		
U-232	4.1927E-07	1,356.060	2,712.119	0.00E+00	5.69E-04	1.14E-03		
U-233	6.8491E-08	1,356.060	2,712.119	0.00E+00	9.29E-05	1.86E-04		
U-234	2.0189E-06	1,356.060	2,712.119	0.00E+00	2.74E-03	5.48E-03		
U-235	-2.6572E-06	1,356.060	2,712.119	0.000	2.22E-02	2.58E-02		
U-236	1.3575E-05	1,356.060	2,712.119	0.00E+00	1.84E-02	3.68E-02		
U-238	-2.2698E-08	1,356.060	2,712.119	0.000	1.73E-03	1.73E-03		
Y-90	2.5646E+00	1,356.060	2,712.119	0.00E+00	3.48E+03	6.96E+03		
Other Radionuclides					4.83E+03	9.66E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.89E+01	1.78E+02
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 (304)	SST	
BOL HM Constituents:	U-ZrHx-Er	U	
BOL Enrichment %:	69.89795918	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	482.248	1,356.060	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,712.119	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.23	2.81	1.00
Bounding:	0.47		

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	¹ Fuel decay start date: 2035	Estimated
SNF ID #: 243	Estimates as of: 2010	Canister usage:
Fuel Units & Descr: 78 - ELEMENT	Template: TRIGA-FLIP (LW/U-Zr, SST, 60 to 100% U)	18"x10"
Heavy Metal Mass: BOL=15.29kg ; EOL=13.29kg	² Template Burnup(MWd): 66.52	0.70
ROD Storage Site: INEEL	Template BOL Heavy Metal Mass (MT): 0.000196	
	Template Decay Time: 5 years	

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8488E-10	1,897.799	3,795.598	0.00E+00	5.41E-07	1.08E-06	Avg. MeV	
Am-241	7.5767E-03	1,897.799	3,795.598	0.00E+00	1.44E+01	2.88E+01	0.0150	6.124E+14
Am-242m	2.4459E-05	1,897.799	3,795.598	0.00E+00	4.64E-02	9.28E-02	0.0250	1.344E+14
Am-243	3.0983E-05	1,897.799	3,795.598	0.00E+00	5.88E-02	1.18E-01	0.0375	1.189E+14
C-14	1.2590E-04	1,897.799	3,795.598	0.00E+00	2.39E-01	4.78E-01	0.0575	1.186E+14
Cl-36	2.6624E-06	1,897.799	3,795.598	0.00E+00	5.05E-03	1.01E-02	0.0850	7.383E+13
Cm-243	3.8244E-05	1,897.799	3,795.598	0.00E+00	7.26E-02	1.45E-01	0.1250	5.928E+13
Cm-244	4.1010E-03	1,897.799	3,795.598	0.00E+00	7.78E-00	1.56E+01	0.2250	6.274E+13
Co-60	1.2410E+00	1,897.799	3,795.598	0.00E+00	2.36E+03	4.71E+03	0.3750	3.131E+13
Cs-134	6.5454E-01	1,897.799	3,795.598	0.00E+00	1.24E+03	2.48E+03	0.5750	5.181E+14
Cs-135	1.9753E-05	1,897.799	3,795.598	0.00E+00	3.75E-02	7.50E-02	0.8500	9.504E+13
Cs-137	2.7375E+00	1,897.799	3,795.598	0.00E+00	5.20E+03	1.04E+04	1.2500	3.651E+14
Eu-154	1.2324E-01	1,897.799	3,795.598	0.00E+00	2.34E+02	4.68E+02	1.7500	4.884E+11
Eu-155	5.3037E-02	1,897.799	3,795.598	0.00E+00	1.01E+02	2.01E+02	2.2500	3.828E+11
Fe-55	7.9555E-01	1,897.799	3,795.598	0.00E+00	1.51E+03	3.02E+03	2.7500	3.470E+09
H-3	1.0531E-02	1,897.799	3,795.598	0.00E+00	2.00E+01	4.00E+01	3.5000	4.085E+08
I-129	7.1287E-07	1,897.799	3,795.598	0.00E+00	1.35E-03	2.71E-03	5.0000	9.784E+04
Kr-85	2.4955E-01	1,897.799	3,795.598	0.00E+00	4.74E+02	9.47E+02	7.0000	1.126E+04
Np-237	1.2121E-05	1,897.799	3,795.598	0.00E+00	2.30E-02	4.60E-02	11.0000	1.292E+03
Pa-231	1.1230E-09	1,897.799	3,795.598	0.00E+00	2.13E-06	4.26E-06		
Pb-210	6.1636E-14	1,897.799	3,795.598	0.00E+00	1.17E-10	2.34E-10		
Pm-147	1.1302E+00	1,897.799	3,795.598	0.00E+00	2.14E+03	4.29E+03		
Pu-238	5.4826E-02	1,897.799	3,795.598	0.00E+00	1.04E+02	2.08E+02		
Pu-239	1.4056E-03	1,897.799	3,795.598	0.00E+00	2.67E+00	5.34E+00		
Pu-240	1.1536E-03	1,897.799	3,795.598	0.00E+00	2.19E+00	4.38E+00		
Pu-241	4.2995E-01	1,897.799	3,795.598	0.00E+00	8.16E+02	1.63E+03		
Pu-242	4.9910E-06	1,897.799	3,795.598	0.00E+00	9.47E-03	1.89E-02		
Ra-226	2.4008E-13	1,897.799	3,795.598	0.00E+00	4.56E-10	9.11E-10		
Ra-228	1.8220E-11	1,897.799	3,795.598	0.00E+00	3.46E-08	6.92E-08		
Ru-106	1.0343E-01	1,897.799	3,795.598	0.00E+00	1.96E+02	3.93E+02		
Se-79	1.2832E-05	1,897.799	3,795.598	0.00E+00	2.44E-02	4.87E-02		
Sn-126	1.2090E-05	1,897.799	3,795.598	0.00E+00	2.29E-02	4.59E-02		
Sr-90	2.5646E+00	1,897.799	3,795.598	0.00E+00	4.87E+03	9.73E+03		
Tc-99	4.0319E-04	1,897.799	3,795.598	0.00E+00	7.65E-01	1.53E+00		
Th-229	7.7375E-11	1,897.799	3,795.598	0.00E+00	1.47E-07	2.94E-07		
Th-230	1.2211E-10	1,897.799	3,795.598	0.00E+00	2.32E-07	4.63E-07		
Th-232	2.3842E-11	1,897.799	3,795.598	0.00E+00	4.52E-08	9.05E-08		
Th-232	1.4313E-07	1,897.799	3,795.598	0.00E+00	2.72E-04	5.43E-04		
U-232	4.1927E-07	1,897.799	3,795.598	0.00E+00	7.96E-04	1.59E-03		
U-233	6.8491E-08	1,897.799	3,795.598	0.00E+00	1.30E-04	2.60E-04		
U-234	2.0189E-06	1,897.799	3,795.598	0.00E+00	3.83E-03	7.66E-03		
U-235	-2.6572E-06	1,897.799	0.000	2.31E-02	1.81E-02	2.31E-02		
U-236	1.3575E-05	1,897.799	3,795.598	0.00E+00	2.58E-02	5.15E-02		
U-238	-2.2698E-08	1,897.799	0.000	1.54E-03	1.50E-03	1.54E-03		
Y-90	2.5646E+00	1,897.799	3,795.598	0.00E+00	4.87E+03	9.73E+03		
Other Radionuclides					6.76E+03	1.35E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.24E+02	2.49E+02
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 (304)	SST	
BOL HM Constituents:	U-ZrHX-Er	U	
BOL Enrichment %:	70	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	432.360	1,897.799	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		3,795.598	

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

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
 SNF ID #: 239
 Fuel Units & Descr: 7 - ELEMENT
 Heavy Metal Mass: BOL=1.37kg ; EOL=1.18kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1976
 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: 25 years

Estimated
 Canister usage:
 18"x10"
 0.06

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0386E-09	180.295	360.589	0.00E+00	1.87E-07	3.75E-07	Avg. MeV	
Am-241	1.4973E-02	180.295	360.589	0.00E+00	2.70E+00	5.40E+00	0.0150	3.169E+13
Am-242m	2.2324E-05	180.295	360.589	0.00E+00	4.02E-03	8.05E-03	0.0250	6.562E+12
Am-243	3.0923E-05	180.295	360.589	0.00E+00	5.58E-03	1.12E-02	0.0375	5.768E+12
C-14	1.2559E-04	180.295	360.589	0.00E+00	2.26E-02	4.53E-02	0.0575	6.196E+12
Cl-36	2.6624E-06	180.295	360.589	0.00E+00	4.80E-04	9.60E-04	0.0850	3.699E+12
Cm-243	2.3527E-05	180.295	360.589	0.00E+00	4.24E-03	8.48E-03	0.1250	2.526E+12
Cm-244	1.9092E-03	180.295	360.589	0.00E+00	3.44E-01	6.88E-01	0.2250	3.196E+12
Co-60	8.9552E-02	180.295	360.589	0.00E+00	1.61E+01	3.23E+01	0.3750	1.387E+12
Cs-134	7.9074E-04	180.295	360.589	0.00E+00	1.43E-01	2.85E-01	0.5750	2.319E+13
Cs-135	1.9753E-05	180.295	360.589	0.00E+00	3.56E-03	7.12E-03	0.8500	3.896E+11
Cs-137	1.7243E+00	180.295	360.589	0.00E+00	3.11E+02	6.22E+02	1.2500	2.638E+12
Eu-154	2.4609E-02	180.295	360.589	0.00E+00	4.44E+00	8.87E+00	1.7500	1.095E+10
Eu-155	3.2456E-03	180.295	360.589	0.00E+00	5.85E-01	1.17E+00	2.2500	1.332E+07
Fe-55	3.8605E-03	180.295	360.589	0.00E+00	6.96E-01	1.39E+00	2.7500	1.821E+06
H-3	3.4305E-03	180.295	360.589	0.00E+00	6.19E-01	1.24E+00	3.5000	1.060E+04
I-129	7.1287E-07	180.295	360.589	0.00E+00	1.29E-04	2.57E-04	5.0000	4.497E+03
Kr-85	6.8536E-02	180.295	360.589	0.00E+00	1.24E+01	2.47E+01	7.0000	5.163E+02
Np-237	1.2219E-05	180.295	360.589	0.00E+00	2.20E-03	4.41E-03	11.0000	5.918E+01
Pa-231	2.0701E-09	180.295	360.589	0.00E+00	3.73E-07	7.46E-07		
Pb-210	1.3279E-12	180.295	360.589	0.00E+00	2.39E-10	4.79E-10		
Pm-147	5.7517E-03	180.295	360.589	0.00E+00	1.04E+00	2.07E+00		
Pu-238	4.6828E-02	180.295	360.589	0.00E+00	8.44E+00	1.69E+01		
Pu-239	1.4048E-03	180.295	360.589	0.00E+00	2.53E-01	5.07E-01		
Pu-240	1.1563E-03	180.295	360.589	0.00E+00	2.08E-01	4.17E-01		
Pu-241	1.6431E-01	180.295	360.589	0.00E+00	2.96E+01	5.92E+01		
Pu-242	4.9910E-06	180.295	360.589	0.00E+00	9.00E-04	1.80E-03		
Ra-226	5.4390E-12	180.295	360.589	0.00E+00	9.81E-10	1.96E-09		
Ra-228	2.3437E-11	180.295	360.589	0.00E+00	4.23E-09	8.45E-09		
Ru-106	1.1115E-07	180.295	360.589	0.00E+00	2.00E-05	4.01E-05		
Se-79	1.2829E-05	180.295	360.589	0.00E+00	2.31E-03	4.63E-03		
Sn-126	1.2088E-05	180.295	360.589	0.00E+00	2.18E-03	4.36E-03		
Sr-90	1.5935E+00	180.295	360.589	0.00E+00	2.87E+02	5.75E+02		
Tc-99	4.0319E-04	180.295	360.589	0.00E+00	7.27E-02	1.45E-01		
Th-229	2.4023E-10	180.295	360.589	0.00E+00	4.33E-08	8.66E-08		
Th-230	9.6948E-10	180.295	360.589	0.00E+00	1.75E-07	3.50E-07		
Th-232	2.3857E-11	180.295	360.589	0.00E+00	4.30E-09	8.60E-09		
Th-208	1.3982E-07	180.295	360.589	0.00E+00	2.52E-05	5.04E-05		
U-232	3.7943E-07	180.295	360.589	0.00E+00	6.84E-05	1.37E-04		
U-233	6.9814E-08	180.295	360.589	0.00E+00	1.26E-05	2.52E-05		
U-234	5.4059E-06	180.295	360.589	0.00E+00	9.75E-04	1.95E-03		
U-235	-2.6572E-06	180.295	0.000	2.07E-03	1.59E-03	2.07E-03		
U-236	1.3576E-05	180.295	360.589	0.00E+00	2.45E-03	4.90E-03		
U-238	-2.2698E-08	180.295	0.000	1.39E-04	1.35E-04	1.39E-04		
Y-90	1.5935E+00	180.295	360.589	0.00E+00	2.87E+02	5.75E+02		
Other Radionuclides					3.05E+02	6.11E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.14E+00	8.27E+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 (304)	SST	
BOL HM Constituents:	U-ZrHx-Er	U	
BOL Enrichment %:	69.89795918	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	38.802	180.295	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		360.589	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.39	4.65	1.00
Bounding:	0.77		

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 FLIP
 SNF ID #: 354
 Fuel Units & Descr: 6 - ELEMENT
 Heavy Metal Mass: BOL=1.07kg ; EOL=.98kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1994
 Estimates as of: 2010
 Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
²Template Burnup(MWd): 66.52
 Template BOL Heavy Metal Mass (MT): 0.000196
 Template Decay Time: 15 years

Estimated
 Canister usage:
 18"x10"
 0.05

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	5.6765E-10	84.968	169.935	0.00E+00	4.82E-08	9.65E-08		
Am-241	1.1720E-02	84.968	169.935	0.00E+00	9.96E-01	1.99E+00	0.0150	1.910E+13
Am-242m	2.3361E-05	84.968	169.935	0.00E+00	1.98E-03	3.97E-03	0.0250	3.978E+12
Am-243	3.0953E-05	84.968	169.935	0.00E+00	2.63E-03	5.26E-03	0.0375	3.514E+12
C-14	1.2574E-04	84.968	169.935	0.00E+00	1.07E-02	2.14E-02	0.0575	3.718E+12
Cl-36	2.6624E-06	84.968	169.935	0.00E+00	2.26E-04	4.52E-04	0.0850	2.232E+12
Cm-243	2.9991E-05	84.968	169.935	0.00E+00	2.55E-03	5.10E-03	0.1250	1.585E+12
Cm-244	2.7977E-03	84.968	169.935	0.00E+00	2.38E-01	4.75E-01	0.2250	1.928E+12
Co-60	3.3343E-01	84.968	169.935	0.00E+00	2.83E+01	5.67E+01	0.3750	8.464E+11
Cs-134	2.2760E-02	84.968	169.935	0.00E+00	1.93E+00	3.87E+00	0.5750	1.398E+13
Cs-135	1.9753E-05	84.968	169.935	0.00E+00	1.68E-03	3.36E-03	0.8500	4.252E+11
Cs-137	2.1723E+00	84.968	169.935	0.00E+00	1.85E+02	3.69E+02	1.2500	4.428E+12
Eu-154	5.5066E-02	84.968	169.935	0.00E+00	4.68E+00	9.36E+00	1.7500	8.923E+09
Eu-155	1.3119E-02	84.968	169.935	0.00E+00	1.11E+00	2.23E+00	2.2500	2.580E+07
Fe-55	5.5412E-02	84.968	169.935	0.00E+00	4.71E+00	9.42E+00	2.7500	1.110E+06
H-3	6.0102E-03	84.968	169.935	0.00E+00	5.11E-01	1.02E+00	3.5000	2.607E+04
I-129	7.1287E-07	84.968	169.935	0.00E+00	6.06E-05	1.21E-04	5.0000	3.036E+03
Kr-85	1.3077E-01	84.968	169.935	0.00E+00	1.11E+01	2.22E+01	7.0000	3.490E+02
Np-237	1.2153E-05	84.968	169.935	0.00E+00	1.03E-03	2.07E-03	11.0000	4.003E+01
Pa-231	1.5021E-09	84.968	169.935	0.00E+00	1.28E-07	2.55E-07		
Pb-210	2.2760E-13	84.968	169.935	0.00E+00	1.93E-11	3.87E-11		
Pm-147	8.0622E-02	84.968	169.935	0.00E+00	6.85E+00	1.37E+01		
Pu-238	5.0676E-02	84.968	169.935	0.00E+00	4.31E+00	8.61E+00		
Pu-239	1.4051E-03	84.968	169.935	0.00E+00	1.19E-01	2.39E-01		
Pu-240	1.1553E-03	84.968	169.935	0.00E+00	9.82E-02	1.96E-01		
Pu-241	2.6578E-01	84.968	169.935	0.00E+00	2.26E+01	4.52E+01		
Pu-242	4.9910E-06	84.968	169.935	0.00E+00	4.24E-04	8.48E-04		
Ra-226	1.2541E-12	84.968	169.935	0.00E+00	1.07E-10	2.13E-10		
Ra-228	2.1843E-11	84.968	169.935	0.00E+00	1.86E-09	3.71E-09		
Ru-106	1.0722E-04	84.968	169.935	0.00E+00	9.11E-03	1.82E-02		
Se-79	1.2831E-05	84.968	169.935	0.00E+00	1.09E-03	2.18E-03		
Sn-126	1.2090E-05	84.968	169.935	0.00E+00	1.03E-03	2.05E-03		
Sr-90	2.0204E+00	84.968	169.935	0.00E+00	1.72E+02	3.43E+02		
Tc-99	4.0319E-04	84.968	169.935	0.00E+00	3.43E-02	6.85E-02		
Th-229	1.4217E-10	84.968	169.935	0.00E+00	1.21E-08	2.42E-08		
Th-230	3.6906E-10	84.968	169.935	0.00E+00	3.14E-08	6.27E-08		
Th-232	2.3857E-11	84.968	169.935	0.00E+00	2.03E-09	4.05E-09		
Ti-208	1.4857E-07	84.968	169.935	0.00E+00	1.26E-05	2.52E-05		
U-232	4.1251E-07	84.968	169.935	0.00E+00	3.50E-05	7.01E-05		
U-233	6.9017E-08	84.968	169.935	0.00E+00	5.86E-06	1.17E-05		
U-234	3.4546E-06	84.968	169.935	0.00E+00	2.94E-04	5.87E-04		
U-235	-2.6572E-06	84.968	0.000	1.62E-03	1.39E-03	1.62E-03		
U-236	1.3575E-05	84.968	169.935	0.00E+00	1.15E-03	2.31E-03	2.78E+00	5.52E+00
U-238	-2.2698E-08	84.968	0.000	1.07E-04	1.05E-04	1.07E-04	Total	Total
Y-90	2.0219E+00	84.968	169.935	0.00E+00	1.72E+02	3.44E+02		
Other Radionuclides					1.81E+02	3.62E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.78E+00	5.52E+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 (304)	SST	
BOL HM Constituents:	U-ZrHx-Er	U	
BOL Enrichment %:	70.2247191	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	77.667	84.968	
Bounding:	43.788	169.935	

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:	0.23	1.09	1.00
Bounding:	0.47	3.88	

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 (AUSTRIA)
 SNF ID #: 492
 Fuel Units & Descr: 10 - ELEMENT
 Heavy Metal Mass: BOL=1.96kg ; EOL=1.95kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2010
 Estimates as of: 2010
 Template: TRIGA-FLIP (LW/U-Zrx, 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"
 0.09

Radionuclide	II. Estimates		Gamma Sources				
	m	x _n	x _b	y _n	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	2.8488E-10	47.512	95.025	0.00E+00	1.35E-08	2.71E-08	0.0150
Am-241	7.5767E-03	47.512	95.025	0.00E+00	3.60E-01	7.20E-01	1.533E+13
Am-242m	2.4459E-05	47.512	95.025	0.00E+00	1.16E-03	2.32E-03	0.0250
Am-243	3.0983E-05	47.512	95.025	0.00E+00	1.47E-03	2.94E-03	0.0375
C-14	1.2590E-04	47.512	95.025	0.00E+00	5.98E-03	1.20E-02	0.0575
Cl-36	2.6624E-06	47.512	95.025	0.00E+00	1.26E-04	2.53E-04	0.0850
Cm-243	3.8244E-05	47.512	95.025	0.00E+00	1.82E-03	3.63E-03	0.1250
Cm-244	4.1010E-03	47.512	95.025	0.00E+00	1.95E-01	3.90E-01	0.2250
Co-60	1.2410E+00	47.512	95.025	0.00E+00	5.90E+01	1.18E+02	0.3750
Cs-134	6.5454E-01	47.512	95.025	0.00E+00	3.11E+01	6.22E+01	0.5750
Cs-135	1.9753E-05	47.512	95.025	0.00E+00	9.39E-04	1.88E-03	0.8500
Cs-137	2.7375E+00	47.512	95.025	0.00E+00	1.30E+02	2.60E+02	1.2500
Eu-154	1.2324E-01	47.512	95.025	0.00E+00	5.86E+00	1.17E+01	1.7500
Eu-155	5.3037E-02	47.512	95.025	0.00E+00	2.52E+00	5.04E+00	2.2500
Fe-55	7.9555E-01	47.512	95.025	0.00E+00	3.78E+01	7.56E+01	2.7500
H-3	1.0531E-02	47.512	95.025	0.00E+00	5.00E-01	1.00E+00	3.5000
I-129	7.1287E-07	47.512	95.025	0.00E+00	3.39E-05	6.77E-05	5.0000
Kr-85	2.4955E-01	47.512	95.025	0.00E+00	1.19E+01	2.37E+01	7.0000
Np-237	1.2121E-05	47.512	95.025	0.00E+00	5.76E-04	1.15E-03	11.0000
Pa-231	1.1230E-09	47.512	95.025	0.00E+00	5.34E-08	1.07E-07	
Pb-210	6.1636E-14	47.512	95.025	0.00E+00	2.93E-12	5.86E-12	
Pm-147	1.1302E+00	47.512	95.025	0.00E+00	5.37E+01	1.07E+02	
Pu-238	5.4826E-02	47.512	95.025	0.00E+00	2.60E+00	5.21E+00	
Pu-239	1.4056E-03	47.512	95.025	0.00E+00	6.68E-02	1.34E-01	
Pu-240	1.1536E-03	47.512	95.025	0.00E+00	5.48E-02	1.10E-01	
Pu-241	4.2995E-01	47.512	95.025	0.00E+00	2.04E+01	4.09E+01	
Pu-242	4.9910E-06	47.512	95.025	0.00E+00	2.37E-04	4.74E-04	
Ra-226	2.4008E-13	47.512	95.025	0.00E+00	1.14E-11	2.28E-11	
Ra-228	1.8220E-11	47.512	95.025	0.00E+00	8.66E-10	1.73E-09	
Ru-106	1.0343E-01	47.512	95.025	0.00E+00	4.91E+00	9.83E+00	
Se-79	1.2832E-05	47.512	95.025	0.00E+00	6.10E-04	1.22E-03	
Sn-126	1.2090E-05	47.512	95.025	0.00E+00	5.74E-04	1.15E-03	
Sr-90	2.5646E+00	47.512	95.025	0.00E+00	1.22E+02	2.44E+02	
Tc-99	4.0319E-04	47.512	95.025	0.00E+00	1.92E-02	3.83E-02	
Th-229	7.7375E-11	47.512	95.025	0.00E+00	3.68E-09	7.35E-09	
Th-230	1.2211E-10	47.512	95.025	0.00E+00	5.80E-09	1.16E-08	
Th-232	2.3842E-11	47.512	95.025	0.00E+00	1.13E-09	2.27E-09	
Tl-208	1.4313E-07	47.512	95.025	0.00E+00	6.80E-06	1.36E-05	
U-232	4.1927E-07	47.512	95.025	0.00E+00	1.99E-05	3.98E-05	
U-233	6.8491E-08	47.512	95.025	0.00E+00	3.25E-06	6.51E-06	
U-234	2.0189E-06	47.512	95.025	0.00E+00	9.59E-05	1.92E-04	
U-235	-2.6572E-06	47.512	0.000	2.96E-03	2.83E-03	2.96E-03	
U-236	1.3575E-05	47.512	95.025	0.00E+00	6.45E-04	1.29E-03	
U-238	-2.2698E-08	47.512	0.000	1.98E-04	1.97E-04	1.98E-04	
Y-90	2.5646E+00	47.512	95.025	0.00E+00	1.22E+02	2.44E+02	
Other Radionuclides					1.69E+02	3.38E+02	

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.12E+00	6.23E+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 (304)	SST	
BOL HM Constituents:	U-ZrHx-Er	U	
BOL Enrichment %:	69.89795918	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	47.512	9.504	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		95.025	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.07	0.20	0.98
Bounding:	0.14		

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 (BANGLADESH)
 SNF ID #: 470
 Fuel Units & Descr: 100 - ELEMENT
 Heavy Metal Mass: BOL=50.40kg ; EOL=46.06kg
 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"
 0.90

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	8.5173E-10	4,142.996	8,285.991	0.00E+00	3.53E-06	7.06E-06	Avg. MeV	
Am-241	1.8331E-03	4,142.996	8,285.991	0.00E+00	7.59E+00	1.52E+01	0.0150	1.339E+15
Am-242m	1.4129E-06	4,142.996	8,285.991	0.00E+00	5.85E-03	1.17E-02	0.0250	2.947E+14
Am-243	1.4774E-07	4,142.996	8,285.991	0.00E+00	6.12E-04	1.22E-03	0.0375	2.510E+14
C-14	1.2871E-04	4,142.996	8,285.991	0.00E+00	5.33E-01	1.07E+00	0.0575	2.576E+14
Cl-36	2.8120E-06	4,142.996	8,285.991	0.00E+00	1.17E-02	2.33E-02	0.0850	1.596E+14
Cm-243	1.7940E-07	4,142.996	8,285.991	0.00E+00	7.43E-04	1.49E-03	0.1250	1.159E+14
Cm-244	1.6962E-06	4,142.996	8,285.991	0.00E+00	7.03E-03	1.41E-02	0.2250	1.354E+14
Co-60	1.2839E+00	4,142.996	8,285.991	0.00E+00	5.32E+03	1.06E+04	0.3750	6.870E+13
Cs-134	9.0541E-02	4,142.996	8,285.991	0.00E+00	3.75E+02	7.50E+02	0.5750	9.133E+13
Cs-135	3.2195E-05	4,142.996	8,285.991	0.00E+00	1.33E-01	2.67E-01	0.8500	3.919E+13
Cs-137	2.7564E+00	4,142.996	8,285.991	0.00E+00	1.14E+04	2.28E+04	1.2500	7.960E+14
Eu-154	1.5368E-02	4,142.996	8,285.991	0.00E+00	6.37E+01	1.27E+02	1.7500	5.307E+11
Eu-155	2.9293E-02	4,142.996	8,285.991	0.00E+00	1.21E+02	2.43E+02	2.2500	8.553E+11
Fe-55	7.7158E-01	4,142.996	8,285.991	0.00E+00	3.20E+03	6.39E+03	2.7500	6.787E+09
H-3	1.1111E-02	4,142.996	8,285.991	0.00E+00	4.60E+01	9.21E+01	3.5000	7.901E+08
I-129	7.3684E-07	4,142.996	8,285.991	0.00E+00	3.05E-03	6.11E-03	5.0000	4.373E+03
Kr-85	2.5263E-01	4,142.996	8,285.991	0.00E+00	1.05E+03	2.09E+03	7.0000	4.950E+02
Np-237	1.2427E-06	4,142.996	8,285.991	0.00E+00	5.15E-03	1.03E-02	11.0000	5.639E+01
Pa-231	3.8511E-09	4,142.996	8,285.991	0.00E+00	1.60E-05	3.19E-05		
Pb-210	7.3880E-15	4,142.996	8,285.991	0.00E+00	3.06E-11	6.12E-11		
Pm-147	2.1023E+00	4,142.996	8,285.991	0.00E+00	8.71E+03	1.74E+04		
Pu-238	1.0383E-03	4,142.996	8,285.991	0.00E+00	4.30E+00	8.60E+00		
Pu-239	5.5293E-03	4,142.996	8,285.991	0.00E+00	2.29E+01	4.58E+01		
Pu-240	2.1278E-03	4,142.996	8,285.991	0.00E+00	8.82E+00	1.76E+01		
Pu-241	1.0195E-01	4,142.996	8,285.991	0.00E+00	4.22E+02	8.45E+02		
Pu-242	2.3128E-07	4,142.996	8,285.991	0.00E+00	9.58E-04	1.92E-03		
Ra-226	5.2782E-14	4,142.996	8,285.991	0.00E+00	2.19E-10	4.37E-10		
Ra-228	1.9338E-10	4,142.996	8,285.991	0.00E+00	8.01E-07	1.60E-06		
Ru-106	9.1684E-02	4,142.996	8,285.991	0.00E+00	3.80E+02	7.60E+02		
Se-79	1.3018E-05	4,142.996	8,285.991	0.00E+00	5.39E-02	1.08E-01		
Sn-126	1.2167E-05	4,142.996	8,285.991	0.00E+00	5.04E-02	1.01E-01		
Sr-90	2.6045E+00	4,142.996	8,285.991	0.00E+00	1.08E+04	2.16E+04		
Tc-99	4.4241E-04	4,142.996	8,285.991	0.00E+00	1.83E+00	3.67E+00		
Th-229	1.3713E-10	4,142.996	8,285.991	0.00E+00	5.68E-07	1.14E-06		
Th-230	1.8090E-11	4,142.996	8,285.991	0.00E+00	7.49E-08	1.50E-07		
Th-232	2.5278E-10	4,142.996	8,285.991	0.00E+00	1.05E-06	2.09E-06		
Ti-208	1.6947E-08	4,142.996	8,285.991	0.00E+00	7.02E-05	1.40E-04		
U-232	4.8737E-08	4,142.996	8,285.991	0.00E+00	2.02E-04	4.04E-04		
U-233	1.2203E-07	4,142.996	8,285.991	0.00E+00	5.06E-04	1.01E-03		
U-234	1.5925E-07	4,142.996	8,285.991	0.00E+00	6.60E-04	1.32E-03		
U-235	-2.6194E-06	4,142.996	0.000	2.18E-02	1.10E-02	2.18E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.2693E-05	4,142.996	8,285.991	0.00E+00	5.26E-02	1.05E-01	2.41E+02	4.82E+02
U-238	-3.6331E-08	4,142.996	0.000	1.35E-02	1.34E-02	1.35E-02	Total	Total
Y-90	2.6060E+00	4,142.996	8,285.991	0.00E+00	1.08E+04	2.16E+04		
Other Radionuclides					1.49E+04	2.99E+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 (304)	SST	
BOL HM Constituents:	U-ZrH-X-Er	U	
BOL Enrichment %:	20.03968254	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	475.121	4,142.996	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		8,285.991	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	2.41	8.72	
Bounding:	4.82		

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: TRIGA FLIP (DAMAGED) (SO. KOREA) 1. Fuel decay start date: 1996
 SNF ID #: 819 Estimates as of: 2010
 Fuel Units & Descr: 4 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=.58kg ; EOL=.56kg 2. Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 10 years

Estimated
 Canister usage:
 18"x10"
 0.04

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	1.3731E-09	25.583	51.167	0.00E+00	3.51E-08	7.03E-08		
Am-241	2.3865E-03	25.583	51.167	0.00E+00	6.11E-02	1.22E-01	0.0150	6.610E+12
Am-242m	1.3812E-06	25.583	51.167	0.00E+00	3.53E-05	7.07E-05	0.0250	1.400E+12
Am-243	1.4767E-07	25.583	51.167	0.00E+00	3.78E-06	7.56E-06	0.0375	1.196E+12
C-14	1.2863E-04	25.583	51.167	0.00E+00	3.29E-03	6.58E-03	0.0575	1.275E+12
Cl-36	2.8120E-06	25.583	51.167	0.00E+00	7.19E-05	1.44E-04	0.0850	7.734E+11
Cm-243	1.5895E-07	25.583	51.167	0.00E+00	4.07E-06	8.13E-06	0.1250	5.084E+11
Cm-244	1.4008E-06	25.583	51.167	0.00E+00	3.58E-05	7.17E-05	0.2250	6.597E+11
Co-60	6.6541E-01	25.583	51.167	0.00E+00	1.70E+01	3.40E+01	0.3750	3.030E+11
Cs-134	1.6887E-02	25.583	51.167	0.00E+00	4.32E-01	8.64E-01	0.5750	4.747E+12
Cs-135	3.2195E-05	25.583	51.167	0.00E+00	8.24E-04	1.65E-03	0.8500	8.474E+10
Cs-137	2.4556E+00	25.583	51.167	0.00E+00	6.28E+01	1.26E+02	1.2500	2.548E+12
Eu-154	1.0268E-02	25.583	51.167	0.00E+00	2.63E-01	5.25E-01	1.7500	1.534E+09
Eu-155	1.4570E-02	25.583	51.167	0.00E+00	3.73E-01	7.45E-01	2.2500	8.009E+07
Fe-55	2.0361E-01	25.583	51.167	0.00E+00	5.21E+00	1.04E+01	2.7500	1.326E+06
H-3	8.3940E-03	25.583	51.167	0.00E+00	2.15E-01	4.29E-01	3.5000	1.571E+05
I-129	7.3684E-07	25.583	51.167	0.00E+00	1.89E-05	3.77E-05	5.0000	2.695E+01
Kr-85	1.8286E-01	25.583	51.167	0.00E+00	4.68E+00	9.36E+00	7.0000	3.047E+00
Np-237	1.2462E-06	25.583	51.167	0.00E+00	3.19E-05	6.38E-05	11.0000	3.470E-01
Pa-231	4.9143E-09	25.583	51.167	0.00E+00	1.26E-07	2.51E-07		
Pb-210	1.7173E-14	25.583	51.167	0.00E+00	4.39E-13	8.79E-13		
Pm-147	5.6165E-01	25.583	51.167	0.00E+00	1.44E+01	2.87E+01		
Pu-238	9.9820E-04	25.583	51.167	0.00E+00	2.55E-02	5.11E-02		
Pu-239	5.5293E-03	25.583	51.167	0.00E+00	1.41E-01	2.83E-01		
Pu-240	2.1263E-03	25.583	51.167	0.00E+00	5.44E-02	1.09E-01		
Pu-241	8.0165E-02	25.583	51.167	0.00E+00	2.05E+00	4.10E+00		
Pu-242	2.3128E-07	25.583	51.167	0.00E+00	5.92E-06	1.18E-05		
Ra-226	9.9774E-14	25.583	51.167	0.00E+00	2.55E-12	5.11E-12		
Ra-228	2.1729E-10	25.583	51.167	0.00E+00	5.56E-09	1.11E-08		
Ru-106	2.9519E-03	25.583	51.167	0.00E+00	7.55E-02	1.51E-01		
Se-79	1.3017E-05	25.583	51.167	0.00E+00	3.33E-04	6.66E-04		
Sn-126	1.2167E-05	25.583	51.167	0.00E+00	3.11E-04	6.23E-04		
Sr-90	2.3128E+00	25.583	51.167	0.00E+00	5.92E+01	1.18E+02		
Tc-99	4.4241E-04	25.583	51.167	0.00E+00	1.13E-02	2.26E-02		
Th-229	1.9459E-10	25.583	51.167	0.00E+00	4.98E-09	9.96E-09		
Th-230	2.5564E-11	25.583	51.167	0.00E+00	6.54E-10	1.31E-09		
Th-232	2.5278E-10	25.583	51.167	0.00E+00	6.47E-09	1.29E-08		
Tl-208	1.6947E-08	25.583	51.167	0.00E+00	4.34E-07	8.67E-07		
U-232	4.6812E-08	25.583	51.167	0.00E+00	1.20E-06	2.40E-06		
U-233	1.2206E-07	25.583	51.167	0.00E+00	3.12E-06	6.25E-06		
U-234	1.7323E-07	25.583	51.167	0.00E+00	4.43E-06	8.86E-06		
U-235	-2.6194E-06	25.583	0.000	5.81E-04	5.14E-04	5.81E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.2693E-05	25.583	51.167	0.00E+00	3.25E-04	6.49E-04	1.00E+00	2.00E+00
U-238	-3.6331E-08	25.583	0.000	1.06E-04	1.05E-04	1.06E-04	Total	Total
Y-90	2.3128E+00	25.583	51.167	0.00E+00	5.92E+01	1.18E+02		
Other Radionuclides					6.27E+01	1.25E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.00E+00	2.00E+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	This Template was used for the following reasons:
Fuel Cladding:	SST (304)	SST	This fuel matches on all parameters except enrichment.
BOL HM Constituents:	U-ZrH-X-Er	U	
BOL Enrichment %:	46.09053498	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	14.210	25.583	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		51.167	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.29	1.80	1.00
Bounding:	2.57		

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 FLIP (GA)
 SNF ID #: 729
 Fuel Units & Descr: 111 - ELEMENT
 Heavy Metal Mass: BOL=21.53kg ; EOL=16.35kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 Estimates as of: 2010
 Template: TRIGA-FLIP (LW/U-Zrx, 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"
 1.00

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	2.8488E-10	4,926.693	9,853.386	0.00E+00	1.40E-06	2.81E-06		
Am-241	7.5767E-03	4,926.693	9,853.386	0.00E+00	3.73E+01	7.47E+01	0.0150	1.590E+15
Am-242m	2.4459E-05	4,926.693	9,853.386	0.00E+00	1.21E-01	2.41E-01	0.0250	3.489E+14
Am-243	3.0983E-05	4,926.693	9,853.386	0.00E+00	1.53E-01	3.05E-01	0.0375	3.086E+14
C-14	1.2590E-04	4,926.693	9,853.386	0.00E+00	6.20E-01	1.24E+00	0.0575	3.080E+14
Cl-36	2.6624E-06	4,926.693	9,853.386	0.00E+00	1.31E-02	2.62E-02	0.0850	1.917E+14
Cm-243	3.8244E-05	4,926.693	9,853.386	0.00E+00	1.88E-01	3.77E-01	0.1250	1.539E+14
Cm-244	4.1010E-03	4,926.693	9,853.386	0.00E+00	2.02E+01	4.04E+01	0.2250	1.629E+14
Co-60	1.2410E+00	4,926.693	9,853.386	0.00E+00	6.11E+03	1.22E+04	0.3750	8.127E+13
Cs-134	6.5454E-01	4,926.693	9,853.386	0.00E+00	3.22E+03	6.45E+03	0.5750	1.345E+15
Cs-135	1.9753E-05	4,926.693	9,853.386	0.00E+00	9.73E-02	1.95E-01	0.8500	2.467E+14
Cs-137	2.7375E+00	4,926.693	9,853.386	0.00E+00	1.35E+04	2.70E+04	1.2500	9.478E+14
Eu-154	1.2324E-01	4,926.693	9,853.386	0.00E+00	6.07E+02	1.21E+03	1.7500	1.268E+12
Eu-155	5.3037E-02	4,926.693	9,853.386	0.00E+00	2.61E+02	5.23E+02	2.2500	9.938E+11
Fe-55	7.9555E-01	4,926.693	9,853.386	0.00E+00	3.92E+03	7.84E+03	2.7500	9.008E+09
H-3	1.0531E-02	4,926.693	9,853.386	0.00E+00	5.19E+01	1.04E+02	3.5000	1.060E+09
I-129	7.1287E-07	4,926.693	9,853.386	0.00E+00	3.51E-03	7.02E-03	5.0000	2.540E+05
Kr-85	2.4955E-01	4,926.693	9,853.386	0.00E+00	1.23E+03	2.46E+03	7.0000	2.923E+04
Np-237	1.2121E-05	4,926.693	9,853.386	0.00E+00	5.97E-02	1.19E-01	11.0000	3.354E+03
Pa-231	1.1230E-09	4,926.693	9,853.386	0.00E+00	5.53E-06	1.11E-05		
Pb-210	6.1636E-14	4,926.693	9,853.386	0.00E+00	3.04E-10	6.07E-10		
Pm-147	1.1302E+00	4,926.693	9,853.386	0.00E+00	5.57E+03	1.11E+04		
Pu-238	5.4826E-02	4,926.693	9,853.386	0.00E+00	2.70E+02	5.40E+02		
Pu-239	1.4056E-03	4,926.693	9,853.386	0.00E+00	6.92E+00	1.38E+01		
Pu-240	1.1536E-03	4,926.693	9,853.386	0.00E+00	5.68E+00	1.14E+01		
Pu-241	4.2995E-01	4,926.693	9,853.386	0.00E+00	2.12E+03	4.24E+03		
Pu-242	4.9910E-06	4,926.693	9,853.386	0.00E+00	2.46E-02	4.92E-02		
Ra-226	2.4008E-13	4,926.693	9,853.386	0.00E+00	1.18E-09	2.37E-09		
Ra-228	1.8220E-11	4,926.693	9,853.386	0.00E+00	8.98E-08	1.80E-07		
Ru-106	1.0343E-01	4,926.693	9,853.386	0.00E+00	5.10E+02	1.02E+03		
Se-79	1.2832E-05	4,926.693	9,853.386	0.00E+00	6.32E-02	1.26E-01		
Sn-126	1.2090E-05	4,926.693	9,853.386	0.00E+00	5.96E-02	1.19E-01		
Sr-90	2.5646E+00	4,926.693	9,853.386	0.00E+00	1.26E+04	2.53E+04		
Tc-99	4.0319E-04	4,926.693	9,853.386	0.00E+00	1.99E+00	3.97E+00		
Th-229	7.7375E-11	4,926.693	9,853.386	0.00E+00	3.81E-07	7.62E-07		
Th-230	1.2211E-10	4,926.693	9,853.386	0.00E+00	6.02E-07	1.20E-06		
Th-232	2.3842E-11	4,926.693	9,853.386	0.00E+00	1.17E-07	2.35E-07		
Ti-208	1.4313E-07	4,926.693	9,853.386	0.00E+00	7.05E-04	1.41E-03		
U-232	4.1927E-07	4,926.693	9,853.386	0.00E+00	2.07E-03	4.13E-03		
U-233	6.8491E-08	4,926.693	9,853.386	0.00E+00	3.37E-04	6.75E-04		
U-234	2.0189E-06	4,926.693	9,853.386	0.00E+00	9.95E-03	1.99E-02		
U-235	-2.6572E-06	4,926.693	0.000	3.26E-02	1.95E-02	3.26E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.3575E-05	4,926.693	9,853.386	0.00E+00	6.69E-02	1.34E-01	3.23E+02	6.46E+02
U-238	-2.2698E-08	4,926.693	0.000	2.17E-03	2.06E-03	2.17E-03	Total	Total
Y-90	2.5646E+00	4,926.693	9,853.386	0.00E+00	1.26E+04	2.53E+04		
Other Radionuclides					1.75E+04	3.51E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX-Er	U	
BOL Enrichment %:	70.03211513	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	4,697.965	4,926.693	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		9,853.386	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.67	1.05	1.00
Bounding:	1.35		

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 (MALAYSIA) ¹Fuel decay start date: 2010
 SNF ID #: 497 Estimates as of: 2010
 Fuel Units & Descr: 94 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=47.38kg ; EOL=46.53kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.85

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	807.598	1,615.196	0.00E+00	6.88E-07	1.38E-06	0.0150	2.611E+14
Am-241	1.8331E-03	807.598	1,615.196	0.00E+00	1.48E+00	2.96E+00	0.0250	5.744E+13
Am-242m	1.4129E-06	807.598	1,615.196	0.00E+00	1.14E-03	2.28E-03	0.0375	4.892E+13
Am-243	1.4774E-07	807.598	1,615.196	0.00E+00	1.19E-04	2.39E-04	0.0575	5.021E+13
C-14	1.2871E-04	807.598	1,615.196	0.00E+00	1.04E-01	2.08E-01	0.0850	3.111E+13
Cl-36	2.8120E-06	807.598	1,615.196	0.00E+00	2.27E-03	4.54E-03	0.1250	2.259E+13
Cm-243	1.7940E-07	807.598	1,615.196	0.00E+00	1.45E-04	2.90E-04	0.2250	2.639E+13
Cm-244	1.6962E-06	807.598	1,615.196	0.00E+00	1.37E-03	2.74E-03	0.3750	1.339E+13
Co-60	1.2839E+00	807.598	1,615.196	0.00E+00	1.04E+03	2.07E+03	0.5750	1.780E+14
Cs-134	9.0541E-02	807.598	1,615.196	0.00E+00	7.31E+01	1.46E+02	0.8500	7.640E+12
Cs-135	3.2195E-05	807.598	1,615.196	0.00E+00	2.60E-02	5.20E-02	1.2500	1.552E+14
Cs-137	2.7564E+00	807.598	1,615.196	0.00E+00	2.23E+03	4.45E+03	1.7500	1.034E+11
Eu-154	1.5368E-02	807.598	1,615.196	0.00E+00	1.24E+01	2.48E+01	2.2500	1.667E+11
Eu-155	2.9293E-02	807.598	1,615.196	0.00E+00	2.37E+01	4.73E+01	2.7500	1.323E+09
Fe-55	7.7158E-01	807.598	1,615.196	0.00E+00	6.23E+02	1.25E+03	3.5000	1.540E+08
H-3	1.1111E-02	807.598	1,615.196	0.00E+00	8.97E+00	1.79E+01	5.0000	8.758E+02
I-129	7.3684E-07	807.598	1,615.196	0.00E+00	5.95E-04	1.19E-03	7.0000	9.917E+01
Kr-85	2.5263E-01	807.598	1,615.196	0.00E+00	2.04E+02	4.08E+02	11.0000	1.130E+01
Np-237	1.2427E-06	807.598	1,615.196	0.00E+00	1.00E-03	2.01E-03		
Pa-231	3.8511E-09	807.598	1,615.196	0.00E+00	3.11E-06	6.22E-06		
Pb-210	7.3880E-15	807.598	1,615.196	0.00E+00	5.97E-12	1.19E-11		
Pm-147	2.1023E+00	807.598	1,615.196	0.00E+00	1.70E+03	3.40E+03		
Pu-238	1.0383E-03	807.598	1,615.196	0.00E+00	8.39E-01	1.68E+00		
Pu-239	5.5293E-03	807.598	1,615.196	0.00E+00	4.47E+00	8.93E+00		
Pu-240	2.1278E-03	807.598	1,615.196	0.00E+00	1.72E+00	3.44E+00		
Pu-241	1.0195E-01	807.598	1,615.196	0.00E+00	8.23E+01	1.65E+02		
Pu-242	2.3128E-07	807.598	1,615.196	0.00E+00	1.87E-04	3.74E-04		
Ra-226	5.2782E-14	807.598	1,615.196	0.00E+00	4.26E-11	8.53E-11		
Ra-228	1.9338E-04	807.598	1,615.196	0.00E+00	1.56E-07	3.12E-07		
Ru-106	9.1684E-02	807.598	1,615.196	0.00E+00	7.40E+01	1.48E+02		
Se-79	1.3018E-05	807.598	1,615.196	0.00E+00	1.05E-02	2.10E-02		
Sn-126	1.2167E-05	807.598	1,615.196	0.00E+00	9.83E-03	1.97E-02		
Sr-90	2.6045E+00	807.598	1,615.196	0.00E+00	2.10E+03	4.21E+03		
Tc-99	4.4241E-04	807.598	1,615.196	0.00E+00	3.57E-01	7.15E-01		
Th-229	1.3713E-10	807.598	1,615.196	0.00E+00	1.11E-07	2.21E-07		
Th-230	1.8090E-11	807.598	1,615.196	0.00E+00	1.46E-08	2.92E-08		
Th-232	2.5278E-10	807.598	1,615.196	0.00E+00	2.04E-07	4.08E-07		
Tl-208	1.6947E-08	807.598	1,615.196	0.00E+00	1.37E-05	2.74E-05		
U-232	4.8737E-08	807.598	1,615.196	0.00E+00	3.94E-05	7.87E-05		
U-233	1.2203E-07	807.598	1,615.196	0.00E+00	9.86E-05	1.97E-04		
U-234	1.5925E-07	807.598	1,615.196	0.00E+00	1.29E-04	2.57E-04		
U-235	-2.6194E-06	807.598	0.000	2.05E-02	1.84E-02	2.05E-02		
U-236	1.2693E-05	807.598	1,615.196	0.00E+00	1.03E-02	2.05E-02		
U-238	-3.6331E-08	807.598	0.000	1.27E-02	1.27E-02	1.27E-02		
Y-90	2.6060E+00	807.598	1,615.196	0.00E+00	2.10E+03	4.21E+03		
Other Radionuclides					2.91E+03	5.82E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.70E+01	9.40E+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 (304)	SST	
BOL HM Constituents:	U-ZrHx-Er	U	
BOL Enrichment %:	20.03968254	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	446.614	807.598	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,615.196	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.50	1.81	1.00
Bounding:	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 (MEXICO) 1Fuel decay start date: 2010
 SNF ID #: 493 Estimates as of: 2010
 Fuel Units & Descr: 35 - ELEMENT Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
 Heavy Metal Mass: BOL=6.86kg ; EOL=6.83kg 2Template Burnup(MWd): 66.52
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000196
Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.32

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	2.8488E-10	64.669	129.338	0.00E+00	1.84E-08	3.68E-08	Avg. MeV	
Am-241	7.5767E-03	64.669	129.338	0.00E+00	4.90E-01	9.80E-01	0.0150	2.087E+13
Am-242m	2.4459E-05	64.669	129.338	0.00E+00	1.58E-03	3.16E-03	0.0250	4.579E+12
Am-243	3.0983E-05	64.669	129.338	0.00E+00	2.00E-03	4.01E-03	0.0375	4.051E+12
C-14	1.2590E-04	64.669	129.338	0.00E+00	8.14E-03	1.63E-02	0.0575	4.043E+12
Cf-252	2.6624E-06	64.669	129.338	0.00E+00	1.72E-04	3.44E-04	0.0850	2.516E+12
Cm-243	3.8244E-05	64.669	129.338	0.00E+00	2.47E-03	4.95E-03	0.1250	2.020E+12
Cm-244	4.1010E-03	64.669	129.338	0.00E+00	2.65E-01	5.30E-01	0.2250	2.138E+12
Co-60	1.2410E+00	64.669	129.338	0.00E+00	8.03E+01	1.61E+02	0.3750	1.067E+12
Cs-134	6.5454E-01	64.669	129.338	0.00E+00	4.23E+01	8.47E+01	0.5750	1.766E+13
Cs-135	1.9753E-05	64.669	129.338	0.00E+00	1.28E-03	2.55E-03	0.8500	3.239E+12
Cs-137	2.7375E+00	64.669	129.338	0.00E+00	1.77E+02	3.54E+02	1.2500	1.244E+13
Eu-154	1.2324E-01	64.669	129.338	0.00E+00	7.97E+00	1.59E+01	1.7500	1.664E+10
Eu-155	5.3037E-02	64.669	129.338	0.00E+00	3.43E+00	6.86E+00	2.2500	1.304E+10
Fe-55	7.9555E-01	64.669	129.338	0.00E+00	5.14E+01	1.03E+02	2.7500	1.182E+08
H-3	1.0531E-02	64.669	129.338	0.00E+00	6.81E-01	1.36E+00	3.5000	1.392E+07
I-129	7.1287E-07	64.669	129.338	0.00E+00	4.61E-05	9.22E-05	5.0000	3.336E+03
Kr-85	2.4955E-01	64.669	129.338	0.00E+00	1.61E+01	3.23E+01	7.0000	3.839E+02
Np-237	1.2121E-05	64.669	129.338	0.00E+00	7.84E-04	1.57E-03	11.0000	4.405E+01
Pa-231	1.1230E-09	64.669	129.338	0.00E+00	7.26E-08	1.45E-07		
Pb-210	6.1636E-14	64.669	129.338	0.00E+00	3.99E-12	7.97E-12		
Pm-147	1.1302E+00	64.669	129.338	0.00E+00	7.31E+01	1.46E+02		
Pu-238	5.4826E-02	64.669	129.338	0.00E+00	3.55E+00	7.09E+00		
Pu-239	1.4056E-03	64.669	129.338	0.00E+00	9.09E-02	1.82E-01		
Pu-240	1.1536E-03	64.669	129.338	0.00E+00	7.46E-02	1.49E-01		
Pu-241	4.2995E-01	64.669	129.338	0.00E+00	2.78E+01	5.56E+01		
Pu-242	4.9910E-06	64.669	129.338	0.00E+00	3.23E-04	6.46E-04		
Ra-226	2.4008E-13	64.669	129.338	0.00E+00	1.55E-11	3.11E-11		
Ra-228	1.8220E-11	64.669	129.338	0.00E+00	1.18E-09	2.36E-09		
Ru-106	1.0343E-01	64.669	129.338	0.00E+00	6.69E+00	1.34E+01		
Se-79	1.2832E-05	64.669	129.338	0.00E+00	8.30E-04	1.66E-03		
Sn-126	1.2090E-05	64.669	129.338	0.00E+00	7.82E-04	1.56E-03		
Sr-90	2.5646E+00	64.669	129.338	0.00E+00	1.66E+02	3.32E+02		
Tc-99	4.0319E-04	64.669	129.338	0.00E+00	2.61E-02	5.21E-02		
Th-229	7.7375E-11	64.669	129.338	0.00E+00	5.00E-09	1.00E-08		
Th-230	1.2211E-10	64.669	129.338	0.00E+00	7.90E-09	1.58E-08		
Th-232	2.3842E-11	64.669	129.338	0.00E+00	1.54E-09	3.08E-09		
Tl-208	1.4313E-07	64.669	129.338	0.00E+00	9.26E-06	1.85E-05		
U-232	4.1927E-07	64.669	129.338	0.00E+00	2.71E-05	5.42E-05		
U-233	6.8491E-08	64.669	129.338	0.00E+00	4.43E-06	8.86E-06		
U-234	2.0189E-06	64.669	129.338	0.00E+00	1.31E-04	2.61E-04		
U-235	2.6572E-06	64.669	0.000	1.04E-02	1.02E-02	1.04E-02		
U-236	1.3575E-05	64.669	129.338	0.00E+00	8.78E-04	1.76E-03		
U-238	2.2698E-08	64.669	0.000	6.94E-04	6.93E-04	6.94E-04		
Y-90	2.5646E+00	64.669	129.338	0.00E+00	1.66E+02	3.32E+02		
Other Radionuclides					2.30E+02	4.61E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.24E+00	8.48E+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 (304)	SST	
BOL HM Constituents:	U-ZrHx-Er	U	
BOL Enrichment %:	69.89795918	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	64.669	33.265	
Bounding:		129.338	

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:	0.03	0.51	
Bounding:	0.06		

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 FLIP (PHILIPPINES)
 SNF ID #: 499
 Fuel Units & Descr: 123 - ELEMENT
 Heavy Metal Mass: BOL=105.47kg ; EOL=105.34kg
 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"
 1.15

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	994.285	1,988.569	0.00E+00	8.47E-07	1.69E-06	0.0150	3.214E+14
Am-241	1.8331E-03	994.285	1,988.569	0.00E+00	1.82E+00	3.65E+00	0.0250	7.072E+13
Am-242m	1.4129E-06	994.285	1,988.569	0.00E+00	1.40E-03	2.81E-03	0.0375	6.023E+13
Am-243	1.4774E-07	994.285	1,988.569	0.00E+00	1.47E-04	2.94E-04	0.0575	6.182E+13
C-14	1.2871E-04	994.285	1,988.569	0.00E+00	1.28E-01	2.56E-01	0.0850	3.830E+13
Cl-36	2.8120E-06	994.285	1,988.569	0.00E+00	2.80E-03	5.59E-03	0.1250	2.781E+13
Cm-243	1.7940E-07	994.285	1,988.569	0.00E+00	1.78E-04	3.57E-04	0.2250	3.249E+13
Cm-244	1.6962E-06	994.285	1,988.569	0.00E+00	1.69E-03	3.37E-03	0.3750	1.649E+13
Co-60	1.2839E+00	994.285	1,988.569	0.00E+00	1.28E+03	2.55E+03	0.5750	2.192E+14
Cs-134	9.0541E-02	994.285	1,988.569	0.00E+00	9.00E+01	1.80E+02	0.8500	9.406E+12
Cs-135	3.2195E-05	994.285	1,988.569	0.00E+00	3.20E-02	6.40E-02	1.2500	1.910E+14
Cs-137	2.7564E+00	994.285	1,988.569	0.00E+00	2.74E+03	5.48E+03	1.7500	1.274E+11
Eu-154	1.5368E-02	994.285	1,988.569	0.00E+00	1.53E+01	3.06E+01	2.2500	2.053E+11
Eu-155	2.9293E-02	994.285	1,988.569	0.00E+00	2.91E+01	5.83E+01	2.7500	1.629E+09
Fe-55	7.7158E-01	994.285	1,988.569	0.00E+00	7.67E+02	1.53E+03	3.5000	1.896E+08
H-3	1.1111E-02	994.285	1,988.569	0.00E+00	1.10E+01	2.21E+01	5.0000	1.108E+03
I-129	7.3684E-07	994.285	1,988.569	0.00E+00	7.33E-04	1.47E-03	7.0000	1.255E+02
Kr-85	2.5263E-01	994.285	1,988.569	0.00E+00	2.51E+02	5.02E+02	11.0000	1.430E+01
Np-237	1.2427E-06	994.285	1,988.569	0.00E+00	1.24E-03	2.47E-03		
Pa-231	3.8511E-09	994.285	1,988.569	0.00E+00	3.83E-06	7.66E-06		
Pb-210	7.3880E-15	994.285	1,988.569	0.00E+00	7.35E-12	1.47E-11		
Pm-147	2.1023E+00	994.285	1,988.569	0.00E+00	2.09E+03	4.18E+03		
Pu-238	1.0383E-03	994.285	1,988.569	0.00E+00	1.03E+00	2.06E+00		
Pu-239	5.5293E-03	994.285	1,988.569	0.00E+00	5.50E+00	1.10E+01		
Pu-240	2.1278E-03	994.285	1,988.569	0.00E+00	2.12E+00	4.23E+00		
Pu-241	1.0195E-01	994.285	1,988.569	0.00E+00	1.01E+02	2.03E+02		
Pu-242	2.3128E-07	994.285	1,988.569	0.00E+00	2.30E-04	4.60E-04		
Ra-226	5.2782E-14	994.285	1,988.569	0.00E+00	5.25E-11	1.05E-10		
Ra-228	1.9338E-10	994.285	1,988.569	0.00E+00	1.92E-07	3.85E-07		
Ru-106	9.1684E-02	994.285	1,988.569	0.00E+00	9.12E+01	1.82E+02		
Se-79	1.3018E-05	994.285	1,988.569	0.00E+00	1.29E-02	2.59E-02		
Sn-126	1.2167E-05	994.285	1,988.569	0.00E+00	1.21E-02	2.42E-02		
Sr-90	2.6045E+00	994.285	1,988.569	0.00E+00	2.59E+03	5.18E+03		
Tc-99	4.4241E-04	994.285	1,988.569	0.00E+00	4.40E-01	8.80E-01		
Th-229	1.3713E-10	994.285	1,988.569	0.00E+00	1.36E-07	2.73E-07		
Th-230	1.8090E-11	994.285	1,988.569	0.00E+00	1.80E-08	3.60E-08		
Th-232	2.5278E-10	994.285	1,988.569	0.00E+00	2.51E-07	5.03E-07		
Ti-208	1.6947E-08	994.285	1,988.569	0.00E+00	1.69E-05	3.37E-05		
U-232	4.8737E-08	994.285	1,988.569	0.00E+00	4.85E-05	9.69E-05		
U-233	1.2203E-07	994.285	1,988.569	0.00E+00	1.21E-04	2.43E-04		
U-234	1.5925E-07	994.285	1,988.569	0.00E+00	1.58E-04	3.17E-04		
U-235	-2.6194E-06	994.285	0.000	4.56E-02	4.30E-02	4.56E-02		
U-236	1.2693E-05	994.285	1,988.569	0.00E+00	1.26E-02	2.52E-02		
U-238	-3.6331E-08	994.285	0.000	2.84E-02	2.83E-02	2.84E-02		
Y-90	2.6060E+00	994.285	1,988.569	0.00E+00	2.59E+03	5.18E+03		
Other Radionuclides					3.58E+03	7.17E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.79E+01	1.16E+02
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 (304)	SST	
BOL HM Constituents:	U-ZrHx-Er	U	
BOL Enrichment %:	20.02427184	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	994.285	122.190	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		1,988.569	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.28	0.12	0.99
Bounding:	0.55		

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 (SLOVENIA)
 SNF ID #: 495
 Fuel Units & Descr: 26 - ELEMENT
 Heavy Metal Mass: BOL=4.99kg ; EOL=4.69kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1999
 Estimates as of: 2010
 Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
²Template Burnup(MWd): 66.52
 Template BOL Heavy Metal Mass (MT): 0.000196
 Template Decay Time: 10 years

Estimated
 Canister usage:
 18"x10"
 0.23

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	4.2243E-10	281.705	563.409	0.00E+00	1.19E-07	2.38E-07	0.0150	7.224E+13
Am-241	9.9143E-03	281.705	563.409	0.00E+00	2.79E+00	5.59E+00	0.0250	1.525E+13
Am-242m	2.3903E-05	281.705	563.409	0.00E+00	6.73E-03	1.35E-02	0.0375	1.344E+13
Am-243	3.0968E-05	281.705	563.409	0.00E+00	8.72E-03	1.74E-02	0.0575	1.402E+13
C-14	1.2581E-04	281.705	563.409	0.00E+00	3.54E-02	7.09E-02	0.0850	8.500E+12
Cl-36	2.6624E-06	281.705	563.409	0.00E+00	7.50E-04	1.50E-03	0.1250	6.174E+12
Cm-243	3.3870E-05	281.705	563.409	0.00E+00	9.54E-03	1.91E-02	0.2250	7.288E+12
Cm-244	3.3870E-03	281.705	563.409	0.00E+00	9.54E-01	1.91E+00	0.3750	3.303E+12
Co-60	6.4311E-01	281.705	563.409	0.00E+00	1.81E+02	3.62E+02	0.5750	5.483E+13
Cs-134	1.2201E-01	281.705	563.409	0.00E+00	3.44E+01	6.87E+01	0.8500	3.567E+12
Cs-135	1.9753E-05	281.705	563.409	0.00E+00	5.56E-03	1.11E-02	1.2500	2.804E+13
Cs-137	2.4384E+00	281.705	563.409	0.00E+00	6.87E+02	1.37E+03	1.7500	4.043E+10
Eu-154	8.2396E-02	281.705	563.409	0.00E+00	2.32E+01	4.64E+01	2.2500	8.688E+08
Eu-155	2.6383E-02	281.705	563.409	0.00E+00	7.43E+00	1.49E+01	2.7500	1.889E+07
Fe-55	2.1001E-01	281.705	563.409	0.00E+00	5.92E+01	1.18E+02	3.5000	1.979E+06
H-3	7.9555E-03	281.705	563.409	0.00E+00	2.24E+00	4.48E+00	5.0000	1.208E+04
I-129	7.1287E-07	281.705	563.409	0.00E+00	2.01E-04	4.02E-04	7.0000	1.389E+03
Kr-85	1.8070E-01	281.705	563.409	0.00E+00	5.09E+01	1.02E+02	11.0000	1.594E+02
Np-237	1.2135E-05	281.705	563.409	0.00E+00	3.42E-03	6.84E-03		
Pa-231	1.3125E-09	281.705	563.409	0.00E+00	3.70E-07	7.39E-07		
Pb-210	1.1201E-13	281.705	563.409	0.00E+00	3.16E-11	6.31E-11		
Pm-147	3.0186E-01	281.705	563.409	0.00E+00	8.50E+01	1.70E+02		
Pu-238	5.2706E-02	281.705	563.409	0.00E+00	1.48E+01	2.97E+01		
Pu-239	1.4054E-03	281.705	563.409	0.00E+00	3.96E-01	7.92E-01		
Pu-240	1.1545E-03	281.705	563.409	0.00E+00	3.25E-01	6.50E-01		
Pu-241	3.3809E-01	281.705	563.409	0.00E+00	9.52E+01	1.90E+02		
Pu-242	4.9910E-06	281.705	563.409	0.00E+00	1.41E-03	2.81E-03		
Ra-226	6.1395E-13	281.705	563.409	0.00E+00	1.73E-10	3.46E-10		
Ra-228	2.0490E-11	281.705	563.409	0.00E+00	5.77E-09	1.15E-08		
Ru-106	3.3298E-03	281.705	563.409	0.00E+00	9.38E-01	1.88E+00		
Se-79	1.2831E-05	281.705	563.409	0.00E+00	3.61E-03	7.23E-03		
Sn-126	1.2090E-05	281.705	563.409	0.00E+00	3.41E-03	6.81E-03		
Sr-90	2.2760E+00	281.705	563.409	0.00E+00	6.41E+02	1.28E+03		
Tc-99	4.0319E-04	281.705	563.409	0.00E+00	1.14E-01	2.27E-01		
Th-229	1.0973E-10	281.705	563.409	0.00E+00	3.09E-08	6.18E-08		
Th-230	2.2940E-10	281.705	563.409	0.00E+00	6.46E-08	1.29E-07		
Th-232	2.3842E-11	281.705	563.409	0.00E+00	6.72E-09	1.34E-08		
Tl-208	1.4857E-07	281.705	563.409	0.00E+00	4.19E-05	8.37E-05		
U-232	4.1927E-07	281.705	563.409	0.00E+00	1.18E-04	2.36E-04		
U-233	6.8746E-08	281.705	563.409	0.00E+00	1.94E-05	3.87E-05		
U-234	2.7511E-06	281.705	563.409	0.00E+00	7.75E-04	1.55E-03		
U-235	-2.6572E-05	281.705	0.000	7.54E-03	6.79E-03	7.54E-03		
U-236	1.3575E-05	281.705	563.409	0.00E+00	3.82E-03	7.65E-03		
U-238	-2.2698E-08	281.705	0.000	5.03E-04	4.97E-04	5.03E-04		
Y-90	2.2775E+00	281.705	563.409	0.00E+00	6.42E+02	1.28E+03		
Other Radionuclides					6.82E+02	1.36E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX-Er	U	
BOL Enrichment %:	69.96306689	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	94.021	281.705	
Bounding:		563.409	

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:	0.17	3.00	
Bounding:	0.33		

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 FLIP (SO. KOREA)
 SNF ID #: 494
 Fuel Units & Descr: 114 - ELEMENT
 Heavy Metal Mass: BOL=21.66kg ; EOL=19.11kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1996
 Estimates as of: 2010
 Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
²Template Burnup(MWd): 66.52
 Template BOL Heavy Metal Mass (MT): 0.000196
 Template Decay Time: 10 years

Estimated
 Canister usage:
 18"x10"
 1.03

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	4.2243E-10	2,426.993	4,853.986	0.00E+00	1.03E-06	2.05E-06	Avg. MeV	
Am-241	9.9143E-03	2,426.993	4,853.986	0.00E+00	2.41E+01	4.81E+01	0.0150	6.224E+14
Am-242m	2.3903E-05	2,426.993	4,853.986	0.00E+00	5.80E-02	1.16E-01	0.0250	1.314E+14
Am-243	3.0968E-05	2,426.993	4,853.986	0.00E+00	7.52E-02	1.50E-01	0.0375	1.158E+14
C-14	1.2581E-04	2,426.993	4,853.986	0.00E+00	3.05E-01	6.11E-01	0.0575	1.208E+14
Cl-36	2.6624E-06	2,426.993	4,853.986	0.00E+00	6.46E-03	1.29E-02	0.0850	7.323E+13
Cm-243	3.3870E-05	2,426.993	4,853.986	0.00E+00	8.22E-02	1.64E-01	0.1250	5.319E+13
Cm-244	3.3870E-03	2,426.993	4,853.986	0.00E+00	8.22E+00	1.64E+01	0.2250	6.279E+13
Co-60	6.4311E-01	2,426.993	4,853.986	0.00E+00	1.56E+03	3.12E+03	0.3750	2.846E+13
Cs-134	1.2201E-01	2,426.993	4,853.986	0.00E+00	2.96E+02	5.92E+02	0.5750	4.724E+14
Cs-135	1.9753E-05	2,426.993	4,853.986	0.00E+00	4.79E-02	9.59E-02	0.8500	3.073E+13
Cs-137	2.4384E+00	2,426.993	4,853.986	0.00E+00	5.92E+03	1.18E+04	1.2500	2.415E+14
Eu-154	8.2396E-02	2,426.993	4,853.986	0.00E+00	2.00E+02	4.00E+02	1.7500	3.483E+11
Eu-155	2.6383E-02	2,426.993	4,853.986	0.00E+00	6.40E+01	1.28E+02	2.2500	7.485E+09
Fe-55	2.1001E-01	2,426.993	4,853.986	0.00E+00	5.10E+02	1.02E+03	2.7500	1.628E+08
H-3	7.9555E-03	2,426.993	4,853.986	0.00E+00	1.93E+01	3.86E+01	3.5000	1.705E+07
I-129	7.1287E-07	2,426.993	4,853.986	0.00E+00	1.73E-03	3.46E-03	5.0000	1.040E+05
Kr-85	1.8070E-01	2,426.993	4,853.986	0.00E+00	4.39E+02	8.77E+02	7.0000	1.197E+04
Np-237	1.2135E-05	2,426.993	4,853.986	0.00E+00	2.95E-02	5.89E-02	11.0000	1.373E+03
Pa-231	1.3125E-09	2,426.993	4,853.986	0.00E+00	3.19E-06	6.37E-06		
Pb-210	1.1201E-13	2,426.993	4,853.986	0.00E+00	2.72E-10	5.44E-10		
Pm-147	3.0186E-01	2,426.993	4,853.986	0.00E+00	7.33E+02	1.47E+03		
Pu-238	5.2706E-02	2,426.993	4,853.986	0.00E+00	1.28E+02	2.56E+02		
Pu-239	1.4054E-03	2,426.993	4,853.986	0.00E+00	3.41E+00	6.82E+00		
Pu-240	1.1545E-03	2,426.993	4,853.986	0.00E+00	2.80E+00	5.60E+00		
Pu-241	3.3809E-01	2,426.993	4,853.986	0.00E+00	8.21E+02	1.64E+03		
Pu-242	4.9910E-06	2,426.993	4,853.986	0.00E+00	1.21E-02	2.42E-02		
Ra-226	6.1395E-13	2,426.993	4,853.986	0.00E+00	1.49E-09	2.98E-09		
Ra-228	2.0490E-11	2,426.993	4,853.986	0.00E+00	4.97E-08	9.95E-08		
Ru-106	3.3298E-03	2,426.993	4,853.986	0.00E+00	8.08E+00	1.62E+01		
Se-79	1.2831E-05	2,426.993	4,853.986	0.00E+00	3.11E-02	6.23E-02		
Sn-126	1.2090E-05	2,426.993	4,853.986	0.00E+00	2.93E-02	5.87E-02		
Sr-90	2.2760E+00	2,426.993	4,853.986	0.00E+00	5.52E+03	1.10E+04		
Tc-99	4.0319E-04	2,426.993	4,853.986	0.00E+00	9.79E-01	1.96E+00		
Th-229	1.0973E-10	2,426.993	4,853.986	0.00E+00	2.66E-07	5.33E-07		
Th-230	2.2940E-10	2,426.993	4,853.986	0.00E+00	5.57E-07	1.11E-06		
Th-232	2.3842E-11	2,426.993	4,853.986	0.00E+00	5.79E-08	1.16E-07		
Tl-208	1.4857E-07	2,426.993	4,853.986	0.00E+00	3.61E-04	7.21E-04		
U-232	4.1927E-07	2,426.993	4,853.986	0.00E+00	1.02E-03	2.04E-03		
U-233	6.8746E-08	2,426.993	4,853.986	0.00E+00	1.67E-04	3.34E-04		
U-234	2.7511E-06	2,426.993	4,853.986	0.00E+00	6.68E-03	1.34E-02		
U-235	-2.6572E-06	2,426.993	0.000	3.28E-02	2.63E-02	3.28E-02		
U-236	1.3575E-05	2,426.993	4,853.986	0.00E+00	3.29E-02	6.59E-02		
U-238	-2.2698E-08	2,426.993	0.000	2.18E-03	2.13E-03	2.18E-03		
Y-90	2.2775E+00	2,426.993	4,853.986	0.00E+00	5.53E+03	1.11E+04		
Other Radionuclides					5.87E+03	1.17E+04		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							1.02E+02	2.04E+02
							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 (304)	SST	
BOL HM Constituents:	U-ZrHx-Er	U	
BOL Enrichment %:	70	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	816.755	2,426.993	
Bounding:		4,853.986	

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:	0.33	2.97	
Bounding:	0.66		

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 (TAIWAN)
 SNF ID #: 498
 Fuel Units & Descr: 144 - ELEMENT
 Heavy Metal Mass: BOL=118.66kg ; EOL=118.51kg
 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"
 1.30

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	1,118.570	2,237.140	0.00E+00	9.53E-07	1.91E-06	Avg. MeV	
Am-241	1.8331E-03	1,118.570	2,237.140	0.00E+00	2.05E+00	4.10E+00	0.0150	3.616E+14
Am-242m	1.4129E-06	1,118.570	2,237.140	0.00E+00	1.58E-03	3.16E-03	0.0250	7.956E+13
Am-243	1.4774E-07	1,118.570	2,237.140	0.00E+00	1.65E-04	3.31E-04	0.0375	6.776E+13
C-14	1.2871E-04	1,118.570	2,237.140	0.00E+00	1.44E-01	2.88E-01	0.0575	6.954E+13
Cl-36	2.8120E-06	1,118.570	2,237.140	0.00E+00	3.15E-03	6.29E-03	0.0850	4.308E+13
Cm-243	1.7940E-07	1,118.570	2,237.140	0.00E+00	2.01E-04	4.01E-04	0.1250	3.129E+13
Cm-244	1.6962E-06	1,118.570	2,237.140	0.00E+00	1.90E-03	3.79E-03	0.2250	3.655E+13
Co-60	1.2839E+00	1,118.570	2,237.140	0.00E+00	1.44E+03	2.87E+03	0.3750	1.855E+13
Cs-134	9.0541E-02	1,118.570	2,237.140	0.00E+00	1.01E+02	2.03E+02	0.5750	2.466E+14
Cs-135	3.2195E-05	1,118.570	2,237.140	0.00E+00	3.60E-02	7.20E-02	0.8500	1.058E+13
Cs-137	2.7564E+00	1,118.570	2,237.140	0.00E+00	3.08E+03	6.17E+03	1.2500	2.149E+14
Eu-154	1.5368E-02	1,118.570	2,237.140	0.00E+00	1.72E+01	3.44E+01	1.7500	1.433E+11
Eu-155	2.9293E-02	1,118.570	2,237.140	0.00E+00	3.28E+01	6.55E+01	2.2500	2.309E+11
Fe-55	7.7158E-01	1,118.570	2,237.140	0.00E+00	8.63E+02	1.73E+03	2.7500	1.832E+09
H-3	1.1111E-02	1,118.570	2,237.140	0.00E+00	1.24E+01	2.49E+01	3.5000	2.133E+08
I-129	7.3684E-07	1,118.570	2,237.140	0.00E+00	8.24E-04	1.65E-03	5.0000	1.248E+03
Kr-85	2.5263E-01	1,118.570	2,237.140	0.00E+00	2.83E+02	5.65E+02	7.0000	1.412E+02
Np-237	1.2427E-06	1,118.570	2,237.140	0.00E+00	1.39E-03	2.78E-03	11.0000	1.609E+01
Pa-231	3.8511E-09	1,118.570	2,237.140	0.00E+00	4.31E-06	8.62E-06		
Pb-210	7.3880E-15	1,118.570	2,237.140	0.00E+00	8.26E-12	1.65E-11		
Pm-147	2.1023E+00	1,118.570	2,237.140	0.00E+00	2.35E+03	4.70E+03		
Pu-238	1.0383E-03	1,118.570	2,237.140	0.00E+00	1.16E+00	2.32E+00		
Pu-239	5.5293E-03	1,118.570	2,237.140	0.00E+00	6.18E+00	1.24E+01		
Pu-240	2.1278E-03	1,118.570	2,237.140	0.00E+00	2.38E+00	4.76E+00		
Pu-241	1.0195E-01	1,118.570	2,237.140	0.00E+00	1.14E+02	2.28E+02		
Pu-242	2.3128E-07	1,118.570	2,237.140	0.00E+00	2.59E-04	5.17E-04		
Ra-226	5.2782E-14	1,118.570	2,237.140	0.00E+00	5.90E-11	1.18E-10		
Ra-228	1.9338E-10	1,118.570	2,237.140	0.00E+00	2.16E-07	4.33E-07		
Ru-106	9.1684E-02	1,118.570	2,237.140	0.00E+00	1.03E+02	2.05E+02		
Se-79	1.3018E-05	1,118.570	2,237.140	0.00E+00	1.46E-02	2.91E-02		
Sn-126	1.2167E-05	1,118.570	2,237.140	0.00E+00	1.36E-02	2.72E-02		
Sr-90	2.6045E+00	1,118.570	2,237.140	0.00E+00	2.91E+03	5.83E+03		
Tc-99	4.4241E-04	1,118.570	2,237.140	0.00E+00	4.95E-01	9.90E-01		
Th-229	1.3713E-10	1,118.570	2,237.140	0.00E+00	1.53E-07	3.07E-07		
Th-230	1.8090E-11	1,118.570	2,237.140	0.00E+00	2.02E-08	4.05E-08		
Th-232	2.5278E-10	1,118.570	2,237.140	0.00E+00	2.83E-07	5.66E-07		
Tl-208	1.6947E-08	1,118.570	2,237.140	0.00E+00	1.90E-05	3.79E-05		
U-232	4.8737E-08	1,118.570	2,237.140	0.00E+00	5.45E-05	1.09E-04		
U-233	1.2203E-07	1,118.570	2,237.140	0.00E+00	1.36E-04	2.73E-04		
U-234	1.5925E-07	1,118.570	2,237.140	0.00E+00	1.78E-04	3.56E-04		
U-235	-2.6194E-06	1,118.570	0.000	5.13E-02	4.84E-02	5.13E-02		
U-236	1.2693E-05	1,118.570	2,237.140	0.00E+00	1.42E-02	2.84E-02		
U-238	-3.6331E-08	1,118.570	0.000	3.19E-02	3.19E-02	3.19E-02		
Y-90	2.6060E+00	1,118.570	2,237.140	0.00E+00	2.92E+03	5.83E+03		
Other Radionuclides					4.03E+03	8.07E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.51E+01	1.30E+02
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 (304) / SST	
BOL HM Constituents:	U-ZrHx-Er / U	
BOL Enrichment %:	20.02427184 / 10 to 20	

Burnup Summary (MWd) ²		Basis for burnup used in estimate:
From SFD	Estimated	
Nominal:	1,118.570	137.463 Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		2,237.140 Bounding burnup assumed to be twice nominal burnup.

Checks		Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	
	0.28	0.99
Bounding:	0.55	

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 (THAILAND)
 SNF ID #: 496
 Fuel Units & Desc: 36 - ELEMENT
 Heavy Metal Mass: BOL=18.14kg ; EOL=15.65kg
 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"
 0.32

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	2,381.554	4,763.109	0.00E+00	2.03E-06	4.06E-06	0.0150	7.698E+14
Am-241	1.8331E-03	2,381.554	4,763.109	0.00E+00	4.37E+00	8.73E+00	0.0250	1.694E+14
Am-242m	1.4129E-06	2,381.554	4,763.109	0.00E+00	3.36E-03	6.73E-03	0.0375	1.443E+14
Am-243	1.4774E-07	2,381.554	4,763.109	0.00E+00	3.52E-04	7.04E-04	0.0575	1.481E+14
C-14	1.2871E-04	2,381.554	4,763.109	0.00E+00	3.07E-01	6.13E-01	0.0850	9.173E+13
Cl-36	2.8120E-06	2,381.554	4,763.109	0.00E+00	6.70E-03	1.34E-02	0.1250	6.661E+13
Cm-243	1.7940E-07	2,381.554	4,763.109	0.00E+00	4.27E-04	8.54E-04	0.2250	7.782E+13
Cm-244	1.6962E-06	2,381.554	4,763.109	0.00E+00	4.04E-03	8.08E-03	0.3750	3.949E+13
Co-60	1.2839E+00	2,381.554	4,763.109	0.00E+00	3.06E+03	6.12E+03	0.5750	5.250E+14
Cs-134	9.0541E-02	2,381.554	4,763.109	0.00E+00	2.16E+02	4.31E+02	0.8500	2.253E+13
Cs-135	3.2195E-05	2,381.554	4,763.109	0.00E+00	7.67E-02	1.53E-01	1.2500	4.576E+14
Cs-137	2.7564E+00	2,381.554	4,763.109	0.00E+00	6.56E+03	1.31E+04	1.7500	3.051E+11
Eu-154	1.5368E-02	2,381.554	4,763.109	0.00E+00	3.66E+01	7.32E+01	2.2500	4.917E+11
Eu-155	2.9293E-02	2,381.554	4,763.109	0.00E+00	6.98E+01	1.40E+02	2.7500	3.901E+09
Fe-55	7.7158E-01	2,381.554	4,763.109	0.00E+00	1.84E+03	3.68E+03	3.5000	4.542E+08
H-3	1.1111E-02	2,381.554	4,763.109	0.00E+00	2.65E+01	5.29E+01	5.0000	2.507E+03
I-129	7.3684E-07	2,381.554	4,763.109	0.00E+00	1.75E-03	3.51E-03	7.0000	2.838E+02
Kr-85	2.5263E-01	2,381.554	4,763.109	0.00E+00	6.02E+02	1.20E+03	11.0000	3.232E+01
Np-237	1.2427E-06	2,381.554	4,763.109	0.00E+00	2.96E-03	5.92E-03		
Pa-231	3.8511E-09	2,381.554	4,763.109	0.00E+00	9.17E-06	1.83E-05		
Pb-210	7.3880E-15	2,381.554	4,763.109	0.00E+00	1.76E-11	3.52E-11		
Pm-147	2.1023E+00	2,381.554	4,763.109	0.00E+00	5.01E+03	1.00E+04		
Pu-238	1.0383E-03	2,381.554	4,763.109	0.00E+00	2.47E+00	4.95E+00		
Pu-239	5.5293E-03	2,381.554	4,763.109	0.00E+00	1.32E+01	2.63E+01		
Pu-240	2.1278E-03	2,381.554	4,763.109	0.00E+00	5.07E+00	1.01E+01		
Pu-241	1.0195E-01	2,381.554	4,763.109	0.00E+00	2.43E+02	4.86E+02		
Pu-242	2.3128E-07	2,381.554	4,763.109	0.00E+00	5.51E-04	1.10E-03		
Ra-226	5.2782E-14	2,381.554	4,763.109	0.00E+00	1.26E-10	2.51E-10		
Ra-228	1.9338E-10	2,381.554	4,763.109	0.00E+00	4.61E-07	9.21E-07		
Ru-106	9.1684E-02	2,381.554	4,763.109	0.00E+00	2.18E+02	4.37E+02		
Se-79	1.3018E-05	2,381.554	4,763.109	0.00E+00	3.10E-02	6.20E-02		
Sn-126	1.2167E-05	2,381.554	4,763.109	0.00E+00	2.90E-02	5.80E-02		
Sr-90	2.6045E+00	2,381.554	4,763.109	0.00E+00	6.20E+03	1.24E+04		
Tc-99	4.4241E-04	2,381.554	4,763.109	0.00E+00	1.05E+00	2.11E+00		
Th-229	1.3713E-10	2,381.554	4,763.109	0.00E+00	3.27E-07	6.53E-07		
Th-230	1.8090E-11	2,381.554	4,763.109	0.00E+00	4.31E-08	8.62E-08		
Th-232	2.5278E-10	2,381.554	4,763.109	0.00E+00	6.02E-07	1.20E-06		
Tl-208	1.6947E-08	2,381.554	4,763.109	0.00E+00	4.04E-05	8.07E-05		
U-232	4.8737E-08	2,381.554	4,763.109	0.00E+00	1.16E-04	2.32E-04		
U-233	1.2203E-07	2,381.554	4,763.109	0.00E+00	2.91E-04	5.81E-04		
U-234	1.5925E-07	2,381.554	4,763.109	0.00E+00	3.79E-04	7.59E-04		
U-235	-2.6194E-06	2,381.554	0.000	7.86E-03	1.62E-03	7.86E-03		
U-236	1.2693E-05	2,381.554	4,763.109	0.00E+00	3.02E-02	6.05E-02		
U-238	-3.6331E-08	2,381.554	0.000	4.88E-03	4.79E-03	4.88E-03		
Y-90	2.6060E+00	2,381.554	4,763.109	0.00E+00	6.21E+03	1.24E+04		
Other Radionuclides					8.59E+03	1.72E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.39E+02	2.77E+02
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 (304)	SST	
BOL HM Constituents:	U-ZrHx-Er	U	
BOL Enrichment %:	20.03968254	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nomina:	855.199	2,381.554	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,763.109	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nomina:	3.85	2.78	1.00
Bounding:	7.70		

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 [DAMAGED] (TEXAS A&M)
 SNF ID #: 844
 Fuel Units & Descr: 5 - ELEMENT
 Heavy Metal Mass: BOL=88kg ; EOL=.81kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 Estimates as of: 2010
 Template: TRIGA-FLIP (LW/U-Zrx, 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"
 0.05

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	63.678	127.356	0.00E+00	1.81E-08	3.63E-08	0.0150	2.055E+13
Am-241	7.5767E-03	63.678	127.356	0.00E+00	4.82E-01	9.65E-01	0.0250	4.509E+12
Am-242m	2.4459E-05	63.678	127.356	0.00E+00	1.56E-03	3.11E-03	0.0375	3.989E+12
Am-243	3.0983E-05	63.678	127.356	0.00E+00	1.97E-03	3.95E-03	0.0575	3.981E+12
C-14	1.2590E-04	63.678	127.356	0.00E+00	8.02E-03	1.60E-02	0.0850	2.477E+12
Ci-36	2.6624E-06	63.678	127.356	0.00E+00	1.70E-04	3.39E-04	0.1250	1.989E+12
Cm-243	3.8244E-05	63.678	127.356	0.00E+00	2.44E-03	4.87E-03	0.2250	2.105E+12
Cm-244	4.1010E-03	63.678	127.356	0.00E+00	2.61E-01	5.22E-01	0.3750	1.050E+12
Co-60	1.2410E+00	63.678	127.356	0.00E+00	7.90E+01	1.58E+02	0.5750	1.739E+13
Cs-134	6.5454E-01	63.678	127.356	0.00E+00	4.17E+01	8.34E+01	0.8500	3.189E+12
Cs-135	1.9753E-05	63.678	127.356	0.00E+00	1.26E-03	2.52E-03	1.2500	1.225E+13
Cs-137	2.7375E+00	63.678	127.356	0.00E+00	1.74E+02	3.49E+02	1.7500	1.639E+10
Eu-154	1.2324E-01	63.678	127.356	0.00E+00	7.85E+00	1.57E+01	2.2500	1.284E+10
Eu-155	5.3037E-02	63.678	127.356	0.00E+00	3.38E+00	6.75E+00	2.7500	1.164E+08
Fe-55	7.9555E-01	63.678	127.356	0.00E+00	5.07E+01	1.01E+02	3.5000	1.371E+07
H-3	1.0531E-02	63.678	127.356	0.00E+00	6.71E-01	1.34E+00	5.0000	3.283E+03
I-129	7.1287E-07	63.678	127.356	0.00E+00	4.54E-05	9.08E-05	7.0000	3.778E+02
Kr-85	2.4955E-01	63.678	127.356	0.00E+00	1.59E+01	3.18E+01	11.0000	4.336E+01
Np-237	1.2121E-05	63.678	127.356	0.00E+00	7.72E-04	1.54E-03		
Pa-231	1.1230E-09	63.678	127.356	0.00E+00	7.15E-08	1.43E-07		
Pb-210	6.1366E-14	63.678	127.356	0.00E+00	3.92E-12	7.85E-12		
Pm-147	1.1302E+00	63.678	127.356	0.00E+00	7.20E+01	1.44E+02		
Pu-238	5.4826E-02	63.678	127.356	0.00E+00	3.49E+00	6.98E+00		
Pu-239	1.4056E-03	63.678	127.356	0.00E+00	8.95E-02	1.79E-01		
Pu-240	1.1536E-03	63.678	127.356	0.00E+00	7.35E-02	1.47E-01		
Pu-241	4.2995E-01	63.678	127.356	0.00E+00	2.74E+01	5.48E+01		
Pu-242	4.9910E-06	63.678	127.356	0.00E+00	3.18E-04	6.36E-04		
Ra-226	2.4008E-13	63.678	127.356	0.00E+00	1.53E-11	3.06E-11		
Ra-228	1.8220E-11	63.678	127.356	0.00E+00	1.16E-09	2.32E-09		
Ru-106	1.0343E-01	63.678	127.356	0.00E+00	6.59E+00	1.32E+01		
Se-79	1.2832E-05	63.678	127.356	0.00E+00	8.17E-04	1.63E-03		
Sn-126	1.2090E-05	63.678	127.356	0.00E+00	7.70E-04	1.54E-03		
Sr-90	2.5646E+00	63.678	127.356	0.00E+00	1.63E+02	3.27E+02		
Tc-99	4.0319E-04	63.678	127.356	0.00E+00	2.57E-02	5.13E-02		
Th-229	7.7375E-11	63.678	127.356	0.00E+00	4.93E-09	9.85E-09		
Th-230	1.2211E-10	63.678	127.356	0.00E+00	7.78E-09	1.56E-08		
Th-232	2.3842E-11	63.678	127.356	0.00E+00	1.52E-09	3.04E-09		
Th-208	1.4313E-07	63.678	127.356	0.00E+00	9.11E-06	1.82E-05		
U-232	4.1927E-07	63.678	127.356	0.00E+00	2.67E-05	5.34E-05		
U-233	6.8491E-08	63.678	127.356	0.00E+00	4.36E-06	8.72E-06		
U-234	2.0189E-06	63.678	127.356	0.00E+00	1.29E-04	2.57E-04		
U-235	-2.6572E-06	63.678	0.000	1.33E-03	1.16E-03	1.33E-03		
U-236	1.3575E-05	63.678	127.356	0.00E+00	8.64E-04	1.73E-03		
U-238	-2.2698E-08	63.678	0.000	8.87E-05	8.73E-05	8.87E-05		
Y-90	2.5646E+00	63.678	127.356	0.00E+00	1.63E+02	3.27E+02		
Other Radionuclides					2.27E+02	4.54E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.18E+00	8.35E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX-Er	U	
BOL Enrichment %:	69.96587031	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	24.859	63.678	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		127.356	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.21	2.56	1.00
Bounding:	0.43		

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 ANL-W (NRAD)
 SNF ID #: 884
 Fuel Units & Descr: 61 - ELEMENT
 Heavy Metal Mass: BOL=10.86kg ; EOL=10.60kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1994
 Estimates as of: 2010
 Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
²Template Burnup(MWd): 66.52
 Template BOL Heavy Metal Mass (MT): 0.000196
 Template Decay Time: 15 years

Estimated
 Canister usage:
 18"x10"
 0.55

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	5.6765E-10	263.209	486.995	0.00E+00	1.49E-07	2.76E-07	0.0150	5.473E+13
Am-241	1.1720E-02	263.209	486.995	0.00E+00	3.08E+00	5.71E+00	0.0250	1.140E+13
Am-242m	2.3361E-05	263.209	486.995	0.00E+00	6.15E-03	1.14E-02	0.0375	1.007E+13
Am-243	3.0953E-05	263.209	486.995	0.00E+00	8.15E-03	1.51E-02	0.0575	1.066E+13
C-14	1.2574E-04	263.209	486.995	0.00E+00	3.31E-02	6.12E-02	0.0850	6.417E+12
Cl-36	2.6624E-06	263.209	486.995	0.00E+00	7.01E-04	1.30E-03	0.1250	4.542E+12
Co-60	3.3343E-01	263.209	486.995	0.00E+00	7.36E-01	1.36E+00	0.2250	5.527E+12
Cs-134	2.2760E-02	263.209	486.995	0.00E+00	8.78E+01	1.62E+02	0.3750	2.426E+12
Cs-135	1.9753E-05	263.209	486.995	0.00E+00	5.99E+00	1.11E+01	0.5750	4.006E+12
Cs-137	2.1723E+00	263.209	486.995	0.00E+00	5.20E-03	9.62E-03	0.8500	1.218E+12
Eu-154	5.5066E-02	263.209	486.995	0.00E+00	5.72E+02	1.06E+03	1.2500	1.269E+13
Eu-155	1.3119E-02	263.209	486.995	0.00E+00	1.45E+01	2.68E+01	1.7500	2.557E+10
Fe-55	5.5412E-02	263.209	486.995	0.00E+00	3.45E+00	6.39E+00	2.2500	7.394E+07
H-3	6.0102E-03	263.209	486.995	0.00E+00	1.46E+01	2.70E+01	2.7500	3.181E+06
I-129	7.1287E-07	263.209	486.995	0.00E+00	1.58E+00	2.93E+00	3.5000	7.470E+04
Kr-85	1.3077E-01	263.209	486.995	0.00E+00	1.88E-04	3.47E-04	5.0000	8.701E+03
Np-237	1.2153E-05	263.209	486.995	0.00E+00	3.44E+01	6.37E+01	7.0000	1.000E+03
Pa-231	1.5021E-09	263.209	486.995	0.00E+00	3.20E-03	5.92E-03	11.0000	1.147E+02
Pb-210	2.2760E-13	263.209	486.995	0.00E+00	3.95E-07	7.32E-07		
Pm-147	8.0622E-02	263.209	486.995	0.00E+00	5.99E-11	1.11E-10		
Pu-238	5.0676E-02	263.209	486.995	0.00E+00	2.12E+01	3.93E+01		
Pu-239	1.4051E-03	263.209	486.995	0.00E+00	1.33E+01	2.47E+01		
Pu-240	1.1553E-03	263.209	486.995	0.00E+00	3.70E-01	6.84E-01		
Pu-241	2.6578E-01	263.209	486.995	0.00E+00	3.04E-01	5.63E-01		
Pu-242	4.9910E-06	263.209	486.995	0.00E+00	7.00E+01	1.29E+02		
Ra-226	1.2541E-12	263.209	486.995	0.00E+00	1.31E-03	2.43E-03		
Ra-228	2.1843E-11	263.209	486.995	0.00E+00	3.30E-10	6.11E-10		
Ru-106	1.0722E-04	263.209	486.995	0.00E+00	5.75E-09	1.06E-08		
Se-79	1.2831E-05	263.209	486.995	0.00E+00	2.82E-02	5.22E-02		
Sn-126	1.2090E-05	263.209	486.995	0.00E+00	3.38E-03	6.25E-03		
Sr-90	2.0204E+00	263.209	486.995	0.00E+00	3.18E-03	5.89E-03		
Tc-99	4.0319E-04	263.209	486.995	0.00E+00	5.32E+02	9.84E+02		
Th-229	1.4217E-10	263.209	486.995	0.00E+00	1.06E-01	1.96E-01		
Th-230	3.6906E-10	263.209	486.995	0.00E+00	3.74E-08	6.92E-08		
Th-232	2.3857E-11	263.209	486.995	0.00E+00	9.71E-08	1.80E-07		
Ti-208	1.4857E-07	263.209	486.995	0.00E+00	6.28E-09	1.16E-08		
U-232	4.1251E-07	263.209	486.995	0.00E+00	3.91E-05	7.24E-05		
U-233	6.9017E-08	263.209	486.995	0.00E+00	1.09E-04	2.01E-04		
U-234	3.4546E-06	263.209	486.995	0.00E+00	1.82E-05	3.36E-05		
U-235	-2.6572E-06	263.209	0.000	1.65E-02	9.09E-04	1.68E-03		
U-236	1.3575E-05	263.209	486.995	0.00E+00	1.58E-02	1.65E-02		
U-238	-2.2698E-08	263.209	0.000	1.09E-03	3.57E-03	6.61E-03		
Y-90	2.0219E+00	263.209	486.995	0.00E+00	1.08E-03	1.09E-03		
Other Radionuclides					5.32E+02	9.85E+02		
					5.61E+02	1.04E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.56E+00	1.58E+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 (304)	SST	
BOL HM Constituents:	U-ZrHx-Er	U	
BOL Enrichment %:	70.2247191	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	263.209	243.498	
Bounding:	445.178	486.995	

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:	0.07	0.93	
Bounding:	0.13	1.09	

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 FLIP FFCR (GA)
 SNF ID #: 996
 Fuel Units & Descr: 6 - ELEMENT
 Heavy Metal Mass: BOL=96kg ; EOL=61kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 Estimates as of: 2010
 Template: TRIGA-FLIP (LW/U-Zrx, 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"
 0.06

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	339.870	679.741	0.00E+00	9.68E-08	1.94E-07	0.0150	1.097E+14
Am-241	7.5767E-03	339.870	679.741	0.00E+00	2.58E+00	5.15E+00	0.0250	2.407E+13
Am-242m	2.4459E-05	339.870	679.741	0.00E+00	8.31E-03	1.66E-02	0.0375	2.129E+13
Am-243	3.0983E-05	339.870	679.741	0.00E+00	1.05E-02	2.11E-02	0.0575	2.125E+13
C-14	1.2590E-04	339.870	679.741	0.00E+00	4.28E-02	8.56E-02	0.0850	1.322E+13
Cl-36	2.6624E-06	339.870	679.741	0.00E+00	9.05E-04	1.81E-03	0.1250	1.062E+13
Cm-243	3.8244E-05	339.870	679.741	0.00E+00	1.30E-02	2.60E-02	0.2250	1.124E+13
Cm-244	4.1010E-03	339.870	679.741	0.00E+00	1.39E+00	2.79E+00	0.3750	5.606E+12
Co-60	1.2410E+00	339.870	679.741	0.00E+00	4.22E+02	8.44E+02	0.5750	9.279E+12
Cs-134	6.5454E-01	339.870	679.741	0.00E+00	2.22E+02	4.45E+02	0.8500	1.702E+13
Cs-135	1.9753E-05	339.870	679.741	0.00E+00	6.71E-03	1.34E-02	1.2500	6.538E+13
Cs-137	2.7375E+00	339.870	679.741	0.00E+00	9.30E+02	1.86E+03	1.7500	1.752E+04
Eu-154	1.2324E-01	339.870	679.741	0.00E+00	4.19E+01	8.38E+01	7.0000	2.016E+03
Eu-155	5.3037E-02	339.870	679.741	0.00E+00	1.80E+01	3.61E+01	11.0000	2.314E+02
Fe-55	7.9555E-01	339.870	679.741	0.00E+00	2.70E+02	5.41E+02		
H-3	1.0531E-02	339.870	679.741	0.00E+00	3.58E+00	7.16E+00		
I-129	7.1287E-07	339.870	679.741	0.00E+00	2.42E-04	4.85E-04		
Kr-85	2.4955E-01	339.870	679.741	0.00E+00	8.48E+01	1.70E+02		
Np-237	1.2121E-05	339.870	679.741	0.00E+00	4.12E-03	8.24E-03		
Pa-231	1.1230E-09	339.870	679.741	0.00E+00	3.82E-07	7.63E-07		
Pb-210	6.1636E-14	339.870	679.741	0.00E+00	2.09E-11	4.19E-11		
Pm-147	1.1302E+00	339.870	679.741	0.00E+00	3.84E+02	7.68E+02		
Pu-238	5.4826E-02	339.870	679.741	0.00E+00	1.86E+01	3.73E+01		
Pu-239	1.4056E-03	339.870	679.741	0.00E+00	4.78E-01	9.55E-01		
Pu-240	1.1536E-03	339.870	679.741	0.00E+00	3.92E-01	7.84E-01		
Pu-241	4.2995E-01	339.870	679.741	0.00E+00	1.46E+02	2.92E+02		
Pu-242	4.9910E-06	339.870	679.741	0.00E+00	1.70E-03	3.39E-03		
Ra-226	2.4008E-13	339.870	679.741	0.00E+00	8.16E-11	1.63E-10		
Ra-228	1.8220E-11	339.870	679.741	0.00E+00	6.19E-09	1.24E-08		
Ru-106	1.0343E-01	339.870	679.741	0.00E+00	3.52E+01	7.03E+01		
Se-79	1.2832E-05	339.870	679.741	0.00E+00	4.36E-03	8.72E-03		
Sn-126	1.2090E-05	339.870	679.741	0.00E+00	4.11E-03	8.22E-03		
Sr-90	2.5646E+00	339.870	679.741	0.00E+00	8.72E+02	1.74E+03		
Tc-99	4.0319E-04	339.870	679.741	0.00E+00	1.37E-01	2.74E-01		
Th-229	7.7375E-11	339.870	679.741	0.00E+00	2.63E-08	5.26E-08		
Th-230	1.2211E-10	339.870	679.741	0.00E+00	4.15E-08	8.30E-08		
Th-232	2.3842E-11	339.870	679.741	0.00E+00	8.10E-09	1.62E-08		
Ti-208	1.4313E-07	339.870	679.741	0.00E+00	4.86E-05	9.73E-05		
U-232	4.1927E-07	339.870	679.741	0.00E+00	1.42E-04	2.85E-04		
U-233	6.8491E-08	339.870	679.741	0.00E+00	2.33E-05	4.66E-05		
U-234	2.0189E-06	339.870	679.741	0.00E+00	6.86E-04	1.37E-03		
U-235	-2.6572E-06	339.870	0.000	1.46E-03	5.57E-04	1.46E-03		
U-236	1.3575E-05	339.870	679.741	0.00E+00	4.61E-03	9.23E-03		
U-238	-2.2698E-08	339.870	0.000	9.71E-05	8.94E-05	9.71E-05		
Y-90	2.5646E+00	339.870	679.741	0.00E+00	8.72E+02	1.74E+03		
Other Radionuclides					1.21E+03	2.42E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.23E+01	4.46E+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 (304)	SST
BOL HM Constituents:	U-ZrHX-Er	U
BOL Enrichment %:	70.05184872	60 to 100

Burnup Summary (MWd) ²		Basis for burnup used in estimate:
From SFD	Estimated	
Nominal:	327.422	339.870
Bounding:		679.741

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	
	1.04	1.04
Bounding:	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: TRIGA FLIP FFCR (OSU)
 SNF ID #: 702
 Fuel Units & Descr: 4 - ELEMENT
 Heavy Metal Mass: BOL=64kg ; EOL= 62kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2025
 Estimates as of: 2010
 Template: TRIGA-FLIP (LW/U-Zrx, 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"
 0.05

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	21.670	43.339	0.00E+00	6.17E-09	1.23E-08	0.0150	6.993E+12
Am-241	7.5767E-03	21.670	43.339	0.00E+00	1.64E-01	3.28E-01	0.0250	1.534E+12
Am-242m	2.4459E-05	21.670	43.339	0.00E+00	5.30E-04	1.06E-03	0.0375	1.357E+12
Am-243	3.0983E-05	21.670	43.339	0.00E+00	6.71E-04	1.34E-03	0.0575	1.355E+12
C-14	1.2590E-04	21.670	43.339	0.00E+00	2.73E-03	5.46E-03	0.0850	8.430E+11
Cl-36	2.6624E-06	21.670	43.339	0.00E+00	5.77E-05	1.15E-04	0.1250	6.768E+11
Cm-243	3.8244E-05	21.670	43.339	0.00E+00	8.29E-04	1.66E-03	0.2250	7.164E+11
Cm-244	4.1010E-03	21.670	43.339	0.00E+00	8.89E-02	1.78E-01	0.3750	3.575E+11
Co-60	1.2410E+00	21.670	43.339	0.00E+00	2.69E+01	5.38E+01	0.5750	5.916E+12
Cs-134	6.5454E-01	21.670	43.339	0.00E+00	1.42E+01	2.84E+01	0.8500	1.085E+12
Cs-135	1.9753E-05	21.670	43.339	0.00E+00	4.28E-04	8.56E-04	1.2500	4.169E+12
Cs-137	2.7375E+00	21.670	43.339	0.00E+00	5.93E+01	1.19E+02	1.7500	5.576E+09
Eu-154	1.2324E-01	21.670	43.339	0.00E+00	2.67E+00	5.34E+00	2.2500	4.371E+09
Eu-155	5.3037E-02	21.670	43.339	0.00E+00	1.15E+00	2.30E+00	2.7500	3.962E+07
Fe-55	7.9555E-01	21.670	43.339	0.00E+00	1.72E+01	3.45E+01	3.5000	4.664E+06
H-3	1.0531E-02	21.670	43.339	0.00E+00	2.28E-01	4.56E-01	5.0000	1.117E+03
I-129	7.1287E-07	21.670	43.339	0.00E+00	1.54E-05	3.09E-05	7.0000	1.286E+02
Kr-85	2.4955E-01	21.670	43.339	0.00E+00	5.41E+00	1.08E+01	11.0000	1.475E+01
Np-237	1.2121E-05	21.670	43.339	0.00E+00	2.63E-04	5.25E-04		
Pa-231	1.1230E-09	21.670	43.339	0.00E+00	2.43E-08	4.87E-08		
Pb-210	6.1636E-14	21.670	43.339	0.00E+00	1.34E-12	2.67E-12		
Pm-147	1.1302E+00	21.670	43.339	0.00E+00	2.45E+01	4.90E+01		
Pu-238	5.4826E-02	21.670	43.339	0.00E+00	1.19E+00	2.38E+00		
Pu-239	1.4056E-03	21.670	43.339	0.00E+00	3.05E-02	6.09E-02		
Pu-240	1.1536E-03	21.670	43.339	0.00E+00	2.50E-02	5.00E-02		
Pu-241	4.2995E-01	21.670	43.339	0.00E+00	9.32E+00	1.86E+01		
Pu-242	4.9910E-06	21.670	43.339	0.00E+00	1.08E-04	2.16E-04		
Ra-226	2.4008E-13	21.670	43.339	0.00E+00	5.20E-12	1.04E-11		
Ra-228	1.8220E-11	21.670	43.339	0.00E+00	3.95E-10	7.90E-10		
Ru-106	1.0343E-01	21.670	43.339	0.00E+00	2.24E+00	4.48E+00		
Se-79	1.2832E-05	21.670	43.339	0.00E+00	2.78E-04	5.56E-04		
Sn-126	1.2090E-05	21.670	43.339	0.00E+00	2.62E-04	5.24E-04		
Sr-90	2.5646E+00	21.670	43.339	0.00E+00	5.56E+01	1.11E+02		
Tc-99	4.0319E-04	21.670	43.339	0.00E+00	8.74E-03	1.75E-02		
Th-229	7.7375E-11	21.670	43.339	0.00E+00	1.68E-09	3.35E-09		
Th-230	1.2211E-10	21.670	43.339	0.00E+00	2.65E-09	5.29E-09		
Th-232	2.3842E-11	21.670	43.339	0.00E+00	5.17E-10	1.03E-09		
Tl-208	1.4313E-07	21.670	43.339	0.00E+00	3.10E-06	6.20E-06		
U-232	4.1927E-07	21.670	43.339	0.00E+00	9.09E-06	1.82E-05		
U-233	6.8491E-08	21.670	43.339	0.00E+00	1.48E-06	2.97E-06		
U-234	2.0189E-06	21.670	43.339	0.00E+00	4.37E-05	8.75E-05		
U-235	-2.6572E-06	21.670	0.000	9.67E-04	9.09E-04	9.67E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.3575E-05	21.670	43.339	0.00E+00	2.94E-04	5.88E-04	1.42E+00	2.84E+00
U-238	-2.2698E-08	21.670	0.000	6.47E-05	6.43E-05	6.47E-05	Total	Total
Y-90	2.5646E+00	21.670	43.339	0.00E+00	5.56E+01	1.11E+02		
Other Radionuclides					7.72E+01	1.54E+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:	SST (304)	SST	
BOL HM Constituents:	U-ZrHX-Er	U	
BOL Enrichment %:	69.9	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	6.033	21.670	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		43.339	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.10	3.59	1.00
Bounding:	0.20		

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 FFCR (SO. KOREA)
 SNF ID #: 733
 Fuel Units & Descr: 4 - ELEMENT
 Heavy Metal Mass: BOL=.64kg ; EOL=.56kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1997
 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: 10 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	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	
	Template							Photon Energy Group	Photons/sec (bounding)
Ac-227	4.2243E-10	73.372	146.745	0.00E+00	3.10E-08	6.20E-08	Avg. MeV		
Am-241	9.9143E-03	73.372	146.745	0.00E+00	7.27E-01	1.45E+00	0.0150	1.882E+13	
Am-242m	2.3903E-05	73.372	146.745	0.00E+00	1.75E-03	3.51E-03	0.0250	3.972E+12	
Am-243	3.0968E-05	73.372	146.745	0.00E+00	2.27E-03	4.54E-03	0.0375	3.501E+12	
C-14	1.2581E-04	73.372	146.745	0.00E+00	9.23E-03	1.85E-02	0.0575	3.651E+12	
Cl-36	2.6624E-06	73.372	146.745	0.00E+00	1.95E-04	3.91E-04	0.0850	2.214E+12	
Cm-243	3.3870E-05	73.372	146.745	0.00E+00	2.49E-03	4.97E-03	0.1250	1.608E+12	
Cm-244	3.3870E-03	73.372	146.745	0.00E+00	2.49E-01	4.97E-01	0.2250	1.898E+12	
Co-60	6.4311E-01	73.372	146.745	0.00E+00	4.72E+01	9.44E+01	0.3750	8.604E+11	
Cs-134	1.2201E-01	73.372	146.745	0.00E+00	8.95E+00	1.79E+01	0.5750	1.428E+13	
Cs-135	1.9753E-05	73.372	146.745	0.00E+00	1.45E-03	2.90E-03	0.8500	9.291E+11	
Cs-137	2.4384E+00	73.372	146.745	0.00E+00	1.79E+02	3.58E+02	1.2500	7.302E+12	
Eu-154	8.2396E-02	73.372	146.745	0.00E+00	6.05E+00	1.21E+01	1.7500	1.053E+10	
Eu-155	2.6383E-02	73.372	146.745	0.00E+00	1.94E+00	3.87E+00	2.2500	2.263E+08	
Fe-55	2.1001E-01	73.372	146.745	0.00E+00	1.54E+01	3.08E+01	2.7500	4.921E+06	
H-3	7.9555E-03	73.372	146.745	0.00E+00	5.84E-01	1.17E+00	3.5000	5.156E+05	
I-129	7.1287E-07	73.372	146.745	0.00E+00	5.23E-05	1.05E-04	5.0000	3.145E+03	
Kr-85	1.8070E-01	73.372	146.745	0.00E+00	1.33E+01	2.65E+01	7.0000	3.618E+02	
Np-237	1.2135E-05	73.372	146.745	0.00E+00	8.90E-04	1.78E-03	11.0000	4.151E+01	
Pa-231	1.3125E-09	73.372	146.745	0.00E+00	9.63E-08	1.93E-07			
Pb-210	1.1201E-13	73.372	146.745	0.00E+00	8.22E-12	1.64E-11			
Pm-147	3.0186E-01	73.372	146.745	0.00E+00	2.21E+01	4.43E+01			
Pu-238	5.2706E-02	73.372	146.745	0.00E+00	3.87E+00	7.73E+00			
Pu-239	1.4054E-03	73.372	146.745	0.00E+00	1.03E-01	2.06E-01			
Pu-240	1.1545E-03	73.372	146.745	0.00E+00	8.47E-02	1.69E-01			
Pu-241	3.3809E-01	73.372	146.745	0.00E+00	2.48E+01	4.96E+01			
Pu-242	4.9910E-06	73.372	146.745	0.00E+00	3.66E-04	7.32E-04			
Ra-226	6.1395E-13	73.372	146.745	0.00E+00	4.50E-11	9.01E-11			
Ra-228	2.0490E-11	73.372	146.745	0.00E+00	1.50E-09	3.01E-09			
Ru-106	3.3298E-03	73.372	146.745	0.00E+00	2.44E-01	4.89E-01			
Se-79	1.2831E-05	73.372	146.745	0.00E+00	9.41E-04	1.88E-03			
Sn-126	1.2090E-05	73.372	146.745	0.00E+00	8.87E-04	1.77E-03			
Sr-90	2.2760E+00	73.372	146.745	0.00E+00	1.67E+02	3.34E+02			
Tc-99	4.0319E-04	73.372	146.745	0.00E+00	2.96E-02	5.92E-02			
Th-229	1.0973E-10	73.372	146.745	0.00E+00	8.05E-09	1.61E-08			
Th-230	2.2940E-10	73.372	146.745	0.00E+00	1.68E-08	3.37E-08			
Th-232	2.3842E-11	73.372	146.745	0.00E+00	1.75E-09	3.50E-09			
Th-208	1.4857E-07	73.372	146.745	0.00E+00	1.09E-05	2.18E-05			
U-232	4.1927E-07	73.372	146.745	0.00E+00	3.08E-05	6.15E-05			
U-233	6.8746E-08	73.372	146.745	0.00E+00	5.04E-06	1.01E-05			
U-234	2.7511E-06	73.372	146.745	0.00E+00	2.02E-04	4.04E-04			
U-235	-2.6572E-06	73.372	0.000	9.65E-04	7.70E-04	9.65E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
U-236	1.3575E-05	73.372	146.745	0.00E+00	9.96E-04	1.99E-03	3.09E+00	6.17E+00	
U-238	-2.2698E-08	73.372	0.000	6.44E-05	6.27E-05	6.44E-05	Total	Total	
Y-90	2.2775E+00	73.372	146.745	0.00E+00	1.67E+02	3.34E+02			
Other Radionuclides					1.78E+02	3.55E+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:	SST (304)	SST	
BOL HM Constituents:	U-ZrHx-Er	U	
BOL Enrichment %:	69.98432602	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	30.071	73.372	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		146.745	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.34	2.44	1.00
Bounding:	0.68		

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 #: 1035
 Fuel Units & Descr: 9 - ELEMENT
 Heavy Metal Mass: BOL=1.57kg ; EOL=1.57kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 Estimates as of: 2010
 Template: TRIGA-FLIP (LW/U-Zrx, 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"
 0.08

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)	Avg. MeV
Ac-227	2.8488E-10	59.322	118.644	0.00E+00	1.69E-08	3.38E-08			
Am-241	7.5767E-03	59.322	118.644	0.00E+00	4.49E-01	8.99E-01	0.0150	1.914E+13	
Am-242m	2.4459E-05	59.322	118.644	0.00E+00	1.45E-03	2.90E-03	0.0250	4.201E+12	
Am-243	3.0983E-05	59.322	118.644	0.00E+00	1.84E-03	3.68E-03	0.0375	3.716E+12	
C-14	1.2590E-04	59.322	118.644	0.00E+00	7.47E-03	1.49E-02	0.0575	3.709E+12	
Cl-36	2.6624E-06	59.322	118.644	0.00E+00	1.58E-04	3.16E-04	0.0850	2.308E+12	
Cm-243	3.8244E-05	59.322	118.644	0.00E+00	2.27E-03	4.54E-03	0.1250	1.853E+12	
Cm-244	4.1010E-03	59.322	118.644	0.00E+00	2.43E-01	4.87E-01	0.2250	1.961E+12	
Co-60	1.2410E+00	59.322	118.644	0.00E+00	7.36E+01	1.47E+02	0.3750	9.786E+11	
Cs-134	6.5454E-01	59.322	118.644	0.00E+00	3.88E+01	7.77E+01	0.5750	1.620E+11	
Cs-135	1.9753E-05	59.322	118.644	0.00E+00	1.17E-03	2.34E-03	0.8500	2.971E+12	
Cs-137	2.7375E+00	59.322	118.644	0.00E+00	1.62E+02	3.25E+02	1.2500	1.141E+13	
Eu-154	1.2324E-01	59.322	118.644	0.00E+00	7.31E+00	1.46E+01	1.7500	1.527E+10	
Eu-155	5.3037E-02	59.322	118.644	0.00E+00	3.15E+00	6.29E+00	2.2500	1.197E+10	
Fe-55	7.9555E-01	59.322	118.644	0.00E+00	4.72E+01	9.44E+01	2.7500	1.085E+08	
H-3	1.0531E-02	59.322	118.644	0.00E+00	6.25E-01	1.25E+00	3.5000	1.277E+07	
I-129	7.1287E-07	59.322	118.644	0.00E+00	4.23E-05	8.46E-05	5.0000	3.059E+03	
Kr-85	2.4955E-01	59.322	118.644	0.00E+00	1.48E+01	2.96E+01	7.0000	3.520E+02	
Np-237	1.2121E-05	59.322	118.644	0.00E+00	7.19E-04	1.44E-03	11.0000	4.039E+01	
Pa-231	1.1230E-09	59.322	118.644	0.00E+00	6.66E-08	1.33E-07			
Pb-210	6.1636E-14	59.322	118.644	0.00E+00	3.66E-12	7.31E-12			
Pm-147	1.1302E+00	59.322	118.644	0.00E+00	6.70E+01	1.34E+02			
Pu-238	5.4826E-02	59.322	118.644	0.00E+00	3.25E+00	6.50E+00			
Pu-239	1.4056E-03	59.322	118.644	0.00E+00	8.34E-02	1.67E-01			
Pu-240	1.1536E-03	59.322	118.644	0.00E+00	6.84E-02	1.37E-01			
Pu-241	4.2995E-01	59.322	118.644	0.00E+00	2.55E+01	5.10E+01			
Pu-242	4.9910E-06	59.322	118.644	0.00E+00	2.96E-04	5.92E-04			
Ra-226	2.4008E-13	59.322	118.644	0.00E+00	1.42E-11	2.85E-11			
Ra-228	1.8220E-11	59.322	118.644	0.00E+00	1.08E-09	2.16E-09			
Ru-106	1.0343E-01	59.322	118.644	0.00E+00	6.14E+00	1.23E+01			
Se-79	1.2832E-05	59.322	118.644	0.00E+00	7.61E-04	1.52E-03			
Sn-126	1.2090E-05	59.322	118.644	0.00E+00	7.17E-04	1.43E-03			
Sr-90	2.5646E+00	59.322	118.644	0.00E+00	1.52E+02	3.04E+02			
Tc-99	4.0319E-04	59.322	118.644	0.00E+00	2.39E-02	4.78E-02			
Th-229	7.7375E-11	59.322	118.644	0.00E+00	4.59E-09	9.18E-09			
Th-230	1.2211E-10	59.322	118.644	0.00E+00	7.24E-09	1.45E-08			
Th-232	2.3842E-11	59.322	118.644	0.00E+00	1.41E-09	2.83E-09			
Th-208	1.4313E-07	59.322	118.644	0.00E+00	8.49E-06	1.70E-05			
U-232	4.1927E-07	59.322	118.644	0.00E+00	2.49E-05	4.97E-05			
U-233	6.8491E-08	59.322	118.644	0.00E+00	4.06E-06	8.13E-06			
U-234	2.0189E-06	59.322	118.644	0.00E+00	1.20E-04	2.40E-04			
U-235	-2.6572E-06	59.322	0.000	2.38E-03	2.22E-03	2.38E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
U-236	1.3575E-05	59.322	118.644	0.00E+00	8.05E-04	1.61E-03	3.89E+00	7.78E+00	
U-238	-2.2698E-08	59.322	0.000	1.59E-04	1.58E-04	1.59E-04	Total	Total	
Y-90	2.5646E+00	59.322	118.644	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			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST (304)	SST	
BOL HM Constituents:	U-ZrHx-Er	U	
BOL Enrichment %:	69.93004832	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	59.322		Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.
Bounding:		118.644	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.11	0.00	0.96
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: TRIGA HIGH POWER (GA) 1 Fuel decay start date: 1970
 SNF ID #: 998 Estimates as of: 2010
 Fuel Units & Descr: 4 - ELEMENT Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
 Heavy Metal Mass: BOL=12kg ; EOL=12kg 2 Template Burnup(MWd): 66.52
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000196
Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x10"
 0.05

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	1.5469E-09	2.220	4.440	0.00E+00	3.43E-09	6.87E-09	0.0150	3.071E+11
Am-241	1.8326E-02	2.220	4.440	0.00E+00	3.62E-02	7.25E-02	0.0250	6.351E+10
Am-242m	2.1332E-05	2.220	4.440	0.00E+00	4.74E-05	9.47E-05	0.0375	5.560E+10
Am-243	3.0893E-05	2.220	4.440	0.00E+00	6.86E-05	1.37E-04	0.0575	6.022E+10
C-14	1.2544E-04	2.220	4.440	0.00E+00	2.78E-04	5.57E-04	0.0850	3.576E+10
Cl-36	2.6624E-06	2.220	4.440	0.00E+00	5.91E-06	1.18E-05	0.1250	2.388E+10
Cm-243	1.8446E-05	2.220	4.440	0.00E+00	4.10E-05	8.19E-05	0.2250	3.089E+10
Cm-244	1.3020E-03	2.220	4.440	0.00E+00	2.89E-03	5.78E-03	0.3750	1.342E+10
Co-60	2.4053E-02	2.220	4.440	0.00E+00	5.34E-02	1.07E-01	0.5750	2.264E+11
Cs-134	2.7480E-05	2.220	4.440	0.00E+00	6.10E-05	1.22E-04	0.8500	3.039E+09
Cs-135	1.9738E-05	2.220	4.440	0.00E+00	4.38E-05	8.76E-05	1.2500	9.577E+09
Cs-137	1.3692E+00	2.220	4.440	0.00E+00	3.04E+00	6.08E+00	1.7500	8.453E+07
Eu-154	1.1001E-02	2.220	4.440	0.00E+00	2.44E-02	4.88E-02	2.2500	4.822E+04
Eu-155	8.0292E-04	2.220	4.440	0.00E+00	1.78E-03	3.57E-03	2.7500	2.009E+04
Fe-55	2.6894E-04	2.220	4.440	0.00E+00	5.97E-04	1.19E-03	3.5000	9.163E+01
H-3	1.9573E-03	2.220	4.440	0.00E+00	4.35E-03	8.69E-03	5.0000	3.897E+01
I-129	7.1287E-07	2.220	4.440	0.00E+00	1.58E-06	3.17E-06	7.0000	4.467E+00
Kr-85	3.5914E-02	2.220	4.440	0.00E+00	7.97E-02	1.59E-01	11.0000	5.115E-01
Np-237	1.2294E-05	2.220	4.440	0.00E+00	2.73E-05	5.46E-05		
Pa-231	2.6383E-09	2.220	4.440	0.00E+00	5.86E-09	1.17E-08		
Pb-210	4.4648E-12	2.220	4.440	0.00E+00	9.91E-12	1.98E-11		
Pm-147	4.1025E-04	2.220	4.440	0.00E+00	9.11E-04	1.82E-03		
Pu-238	4.3265E-02	2.220	4.440	0.00E+00	9.61E-02	1.92E-01		
Pu-239	1.4044E-03	2.220	4.440	0.00E+00	3.12E-03	6.24E-03		
Pu-240	1.1563E-03	2.220	4.440	0.00E+00	2.57E-03	5.13E-03		
Pu-241	1.0156E-01	2.220	4.440	0.00E+00	2.25E-01	4.51E-01		
Pu-242	4.9910E-06	2.220	4.440	0.00E+00	1.11E-05	2.22E-05		
Ra-226	1.4301E-11	2.220	4.440	0.00E+00	3.18E-11	6.35E-11		
Ra-228	2.3767E-11	2.220	4.440	0.00E+00	5.28E-11	1.06E-10		
Ru-106	1.1521E-10	2.220	4.440	0.00E+00	2.56E-10	5.12E-10		
Se-79	1.2828E-05	2.220	4.440	0.00E+00	2.85E-05	5.70E-05		
Sn-126	1.2088E-05	2.220	4.440	0.00E+00	2.68E-05	5.37E-05		
Sr-90	1.2560E+00	2.220	4.440	0.00E+00	2.79E+00	5.58E+00		
Tc-99	4.0319E-04	2.220	4.440	0.00E+00	8.95E-04	1.79E-03		
Th-229	3.3915E-10	2.220	4.440	0.00E+00	7.53E-10	1.51E-09		
Th-230	1.8175E-09	2.220	4.440	0.00E+00	4.04E-09	8.07E-09		
Th-232	2.3873E-11	2.220	4.440	0.00E+00	5.30E-11	1.06E-10		
Th-208	1.2736E-07	2.220	4.440	0.00E+00	2.83E-07	5.66E-07		
U-232	3.4501E-07	2.220	4.440	0.00E+00	7.66E-07	1.53E-06		
U-233	7.0610E-08	2.220	4.440	0.00E+00	1.57E-07	3.14E-07		
U-234	7.1407E-06	2.220	4.440	0.00E+00	1.59E-05	3.17E-05		
U-235	-2.6572E-06	2.220	0.000	2.35E-04	2.29E-04	2.35E-04		
U-236	1.3576E-05	2.220	4.440	0.00E+00	3.01E-05	6.03E-05		
U-238	-2.2698E-08	2.220	0.000	2.69E-06	2.64E-06	2.69E-06		
Y-90	1.2563E+00	2.220	4.440	0.00E+00	2.79E+00	5.58E+00		
Other Radionuclides					3.00E+00	6.01E+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	This Template was used for the following reasons:
Fuel Cladding:	INCOLOY 800	SST	This fuel matches on all parameters except cladding (SST is conservative).
BOL HM Constituents:	U-ZrHx-Er	U	
BOL Enrichment %:	93.15162424	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD: 2.220	Estimated: 2.220	Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding:	4.440	4.440	Bounding burnup assumed to be twice nominal burnup.

Checks		
Nominal:	Burnup Multiplier: 0.06	Estimated EOL HM/Given EOL HM: 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 #: 930
 Fuel Units & Descr: 267 - ELEMENT
 Heavy Metal Mass: BOL=11.83kg ; EOL=5.58kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1999
 Estimates as of: 2010
 Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
²Template 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							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	4.2243E-10	5,938.035	11,241.665	0.00E+00	2.51E-06	4.75E-06	Avg. MeV	
Am-241	9.9143E-03	5,938.035	11,241.665	0.00E+00	5.89E+01	1.11E+02	0.0150	1.441E+15
Am-242m	2.3903E-05	5,938.035	11,241.665	0.00E+00	1.42E-01	2.69E-01	0.0250	3.043E+14
Am-243	3.0968E-05	5,938.035	11,241.665	0.00E+00	1.84E-01	3.48E-01	0.0375	2.682E+14
C-14	1.2581E-04	5,938.035	11,241.665	0.00E+00	7.47E-01	1.41E+00	0.0575	2.797E+14
Cl-36	2.6624E-06	5,938.035	11,241.665	0.00E+00	1.58E-02	2.99E-02	0.0850	1.696E+14
Cm-243	3.3870E-05	5,938.035	11,241.665	0.00E+00	2.01E-01	3.81E-01	0.1250	1.232E+14
Cm-244	3.3870E-03	5,938.035	11,241.665	0.00E+00	2.01E+01	3.81E+01	0.2250	1.454E+14
Co-60	6.4311E-01	5,938.035	11,241.665	0.00E+00	3.82E+03	7.23E+03	0.3750	6.591E+13
Cs-134	1.2201E-01	5,938.035	11,241.665	0.00E+00	7.24E+02	1.37E+03	0.5750	1.094E+15
Cs-135	1.9753E-05	5,938.035	11,241.665	0.00E+00	1.17E-01	2.22E-01	0.8500	7.118E+13
Cs-137	2.4384E+00	5,938.035	11,241.665	0.00E+00	1.45E+04	2.74E+04	1.2500	5.594E+14
Eu-154	8.2396E-02	5,938.035	11,241.665	0.00E+00	4.89E+02	9.26E+02	1.7500	8.067E+11
Eu-155	2.6383E-02	5,938.035	11,241.665	0.00E+00	1.57E+02	2.97E+02	2.2500	1.734E+10
Fe-55	2.1001E-01	5,938.035	11,241.665	0.00E+00	1.25E+03	2.36E+03	2.7500	3.770E+08
H-3	7.9555E-03	5,938.035	11,241.665	0.00E+00	4.72E+01	8.94E+01	3.5000	3.949E+07
I-129	7.1287E-07	5,938.035	11,241.665	0.00E+00	4.23E-03	8.01E-03	5.0000	2.409E+05
Kr-85	1.8070E-01	5,938.035	11,241.665	0.00E+00	1.07E+03	2.03E+03	7.0000	2.772E+04
Np-237	1.2135E-05	5,938.035	11,241.665	0.00E+00	7.21E-02	1.36E-01	11.0000	3.180E+03
Pa-231	1.3125E-09	5,938.035	11,241.665	0.00E+00	7.79E-06	1.48E-05		
Pb-210	1.1201E-13	5,938.035	11,241.665	0.00E+00	6.65E-10	1.26E-09		
Pm-147	3.0186E-01	5,938.035	11,241.665	0.00E+00	1.79E+03	3.39E+03		
Pu-238	5.2706E-02	5,938.035	11,241.665	0.00E+00	3.13E+02	5.93E+02		
Pu-239	1.4054E-03	5,938.035	11,241.665	0.00E+00	8.35E+00	1.58E+01		
Pu-240	1.1545E-03	5,938.035	11,241.665	0.00E+00	6.86E+00	1.30E+01		
Pu-241	3.3809E-01	5,938.035	11,241.665	0.00E+00	2.01E+03	3.80E+03		
Pu-242	4.9910E-06	5,938.035	11,241.665	0.00E+00	2.96E-02	5.61E-02		
Ra-226	6.1395E-13	5,938.035	11,241.665	0.00E+00	3.65E-09	6.90E-09		
Ra-228	2.0490E-11	5,938.035	11,241.665	0.00E+00	1.22E-07	2.30E-07		
Ru-106	3.3298E-03	5,938.035	11,241.665	0.00E+00	1.98E+01	3.74E+01		
Se-79	1.2831E-05	5,938.035	11,241.665	0.00E+00	7.62E-02	1.44E-01		
Sn-126	1.2090E-05	5,938.035	11,241.665	0.00E+00	7.18E-02	1.36E-01		
Sr-90	2.2760E+00	5,938.035	11,241.665	0.00E+00	1.35E+04	2.56E+04		
Tc-99	4.0319E-04	5,938.035	11,241.665	0.00E+00	2.39E+00	4.53E+00		
Th-229	1.0973E-10	5,938.035	11,241.665	0.00E+00	6.52E-07	1.23E-06		
Th-230	2.2940E-10	5,938.035	11,241.665	0.00E+00	1.36E-06	2.58E-06		
Th-232	2.3842E-11	5,938.035	11,241.665	0.00E+00	1.42E-07	2.68E-07		
Ti-208	1.4857E-07	5,938.035	11,241.665	0.00E+00	8.82E-04	1.67E-03		
U-232	4.1927E-07	5,938.035	11,241.665	0.00E+00	2.49E-03	4.71E-03		
U-233	6.8746E-08	5,938.035	11,241.665	0.00E+00	4.08E-04	7.73E-04		
U-234	2.7511E-06	5,938.035	11,241.665	0.00E+00	1.63E-02	3.09E-02		
U-235	-2.6572E-06	5,938.035	0.000	2.38E-02	8.03E-03	2.38E-02		
U-236	1.3575E-05	5,938.035	11,241.665	0.00E+00	8.06E-02	1.53E-01		
U-238	-2.2698E-08	5,938.035	0.000	2.72E-04	1.38E-04	2.72E-04		
Y-90	2.2775E+00	5,938.035	11,241.665	0.00E+00	1.35E+04	2.56E+04		
Other Radionuclides					1.44E+04	2.72E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.50E+02	4.73E+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	This Template was used for the following reasons: This fuel matches on all parameters except cladding (SST is conservative).
BOL HM Constituents:	INCOLOY 800	SST	
BOL Enrichment %:	U-ZrHx-Er	U	
	93.14636964	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		5,938.035	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup calculated assuming all BOL heavy metal burned.
		11,241.665	

Checks		
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup
Bounding:	1.48	
	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 HIGH POWER (ROMANIA)
 SNF ID #: 302
 Fuel Units & Descr: 611 - ELEMENT
 Heavy Metal Mass: BOL=27.07kg ; EOL=13.99kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1978
 Estimates as of: 2010
 Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
²Template Burnup(MWd): 66.52
 Template BOL Heavy Metal Mass (MT): 0.000196
 Template Decay Time: 25 years

Estimated
 Canister usage:
 18"x10"
 5.50

Radionuclide	m	x _n	x _p	b	y _n	y _p	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0386E-09	12,427.124	24,854.249	0.00E+00	1.29E-05	2.58E-05	Avg. MeV	
Am-241	1.4973E-02	12,427.124	24,854.249	0.00E+00	1.86E+02	3.72E+02	0.0150	2.185E+15
Am-242m	2.2324E-05	12,427.124	24,854.249	0.00E+00	2.77E-01	5.55E-01	0.0250	4.523E+14
Am-243	3.0923E-05	12,427.124	24,854.249	0.00E+00	3.84E-01	7.69E-01	0.0375	3.975E+14
C-14	1.2559E-04	12,427.124	24,854.249	0.00E+00	1.56E+00	3.12E+00	0.0575	4.271E+14
Cl-36	2.6624E-06	12,427.124	24,854.249	0.00E+00	3.31E-02	6.62E-02	0.0850	2.550E+14
Cm-243	2.3527E-05	12,427.124	24,854.249	0.00E+00	2.92E-01	5.85E-01	0.1250	1.741E+14
Cm-244	1.9092E-03	12,427.124	24,854.249	0.00E+00	2.37E+01	4.75E+01	0.2250	2.203E+14
Co-60	8.9552E-02	12,427.124	24,854.249	0.00E+00	1.11E+03	2.23E+03	0.3750	9.560E+13
Cs-134	7.9074E-04	12,427.124	24,854.249	0.00E+00	9.83E+00	1.97E+01	0.5750	1.598E+15
Cs-135	1.9753E-05	12,427.124	24,854.249	0.00E+00	2.45E-01	4.91E-01	0.8500	2.686E+13
Cs-137	1.7243E+00	12,427.124	24,854.249	0.00E+00	2.14E+04	4.29E+04	1.2500	1.818E+14
Eu-154	2.4609E-02	12,427.124	24,854.249	0.00E+00	3.06E+02	6.12E+02	1.7500	7.550E+11
Eu-155	3.2456E-03	12,427.124	24,854.249	0.00E+00	4.03E+01	8.07E+01	2.2500	9.182E+08
Fe-55	3.8605E-03	12,427.124	24,854.249	0.00E+00	4.80E+01	9.59E+01	2.7500	1.255E+08
H-3	3.4305E-03	12,427.124	24,854.249	0.00E+00	4.26E+01	8.53E+01	3.5000	7.305E+05
I-129	7.1287E-07	12,427.124	24,854.249	0.00E+00	8.86E-03	1.77E-02	5.0000	3.100E+05
Kr-85	6.8536E-02	12,427.124	24,854.249	0.00E+00	8.52E+02	1.70E+03	7.0000	3.559E+04
Np-237	1.2219E-05	12,427.124	24,854.249	0.00E+00	1.52E-01	3.04E-01	11.0000	4.079E+03
Pa-231	2.0701E-09	12,427.124	24,854.249	0.00E+00	2.57E-05	5.14E-05		
Pb-210	1.3279E-12	12,427.124	24,854.249	0.00E+00	1.65E-08	3.30E-08		
Pm-147	5.7517E-03	12,427.124	24,854.249	0.00E+00	7.15E+01	1.43E+02		
Pu-238	4.6828E-02	12,427.124	24,854.249	0.00E+00	5.82E+02	1.16E+03		
Pu-239	1.4048E-03	12,427.124	24,854.249	0.00E+00	1.75E+01	3.49E+01		
Pu-240	1.1563E-03	12,427.124	24,854.249	0.00E+00	1.44E+01	2.87E+01		
Pu-241	1.6431E-01	12,427.124	24,854.249	0.00E+00	2.04E+03	4.08E+03		
Pu-242	4.9910E-06	12,427.124	24,854.249	0.00E+00	6.20E-02	1.24E-01		
Ra-226	5.4390E-12	12,427.124	24,854.249	0.00E+00	6.76E-08	1.35E-07		
Ra-228	2.3437E-11	12,427.124	24,854.249	0.00E+00	2.91E-07	5.82E-07		
Ru-106	1.1115E-07	12,427.124	24,854.249	0.00E+00	1.38E-03	2.76E-03		
Se-79	1.2829E-05	12,427.124	24,854.249	0.00E+00	1.59E-01	3.19E-01		
Sn-126	1.2088E-05	12,427.124	24,854.249	0.00E+00	1.50E-01	3.00E-01		
Sr-90	1.5935E+00	12,427.124	24,854.249	0.00E+00	1.98E+04	3.96E+04		
Tc-99	4.0319E-04	12,427.124	24,854.249	0.00E+00	5.01E+00	1.00E+01		
Th-229	2.4023E-10	12,427.124	24,854.249	0.00E+00	2.99E-06	5.97E-06		
Th-230	9.6948E-10	12,427.124	24,854.249	0.00E+00	1.20E-05	2.41E-05		
Th-232	2.3857E-11	12,427.124	24,854.249	0.00E+00	2.96E-07	5.93E-07		
Ti-208	1.3982E-07	12,427.124	24,854.249	0.00E+00	1.74E-03	3.48E-03		
U-232	3.7943E-07	12,427.124	24,854.249	0.00E+00	4.72E-03	9.43E-03		
U-233	6.9814E-08	12,427.124	24,854.249	0.00E+00	8.68E-04	1.74E-03		
U-234	5.4059E-06	12,427.124	24,854.249	0.00E+00	6.72E-02	1.34E-01		
U-235	2.6572E-06	12,427.124	0.000	5.45E-02	2.15E-02	5.45E-02		
U-236	1.3576E-05	12,427.124	24,854.249	0.00E+00	1.69E-01	3.37E-01		
U-238	2.2698E-08	12,427.124	0.000	6.24E-04	3.42E-04	6.24E-04		
Y-90	1.5935E+00	12,427.124	24,854.249	0.00E+00	1.98E+04	3.96E+04		
Other Radionuclides					2.11E+04	4.21E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.85E+02	5.70E+02
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	This Template was used for the following reasons: This fuel matches on all parameters except cladding (SST is conservative).
Fuel Cladding:	INCOLOY 800 / SST	
BOL HM Constituents:	U-ZrHx-Er / U	
BOL Enrichment %:	93.14035234 / 60 to 100	

Burnup Summary (MWd) ²		Basis for burnup used in estimate:
From SFD	Estimated	
Nominal:	12,427.124	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	24,854.249	

Checks		Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	
Bounding:	1.35	1.00
	2.71	

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
 SNF ID #: 250
 Fuel Units & Descr: 95 - ELEMENT
 Heavy Metal Mass: BOL=18.53kg ; EOL=18.01kg
 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

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)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	489.714	979.427	0.00E+00	4.17E-07	8.34E-07	Avg. MeV	
Am-241	1.8331E-03	489.714	979.427	0.00E+00	8.98E-01	1.80E+00	0.0150	1.583E+14
Am-242m	1.4129E-06	489.714	979.427	0.00E+00	6.92E-04	1.38E-03	0.0250	3.483E+13
Am-243	1.4774E-07	489.714	979.427	0.00E+00	7.24E-05	1.45E-04	0.0375	2.966E+13
C-14	1.2871E-04	489.714	979.427	0.00E+00	6.30E-02	1.26E-01	0.0575	3.045E+13
Cl-36	2.8120E-06	489.714	979.427	0.00E+00	1.38E-03	2.75E-03	0.0850	1.886E+13
Cm-243	1.7940E-07	489.714	979.427	0.00E+00	8.79E-05	1.76E-04	0.1250	1.370E+13
Cm-244	1.6962E-06	489.714	979.427	0.00E+00	8.31E-04	1.66E-03	0.2250	1.600E+13
Co-60	1.2839E+00	489.714	979.427	0.00E+00	6.29E+02	1.26E+03	0.3750	8.120E+12
Cs-134	9.0541E-02	489.714	979.427	0.00E+00	4.43E+01	8.87E+01	0.5750	1.080E+13
Cs-135	3.2195E-05	489.714	979.427	0.00E+00	1.58E-02	3.15E-02	0.8500	4.633E+12
Cs-137	2.7564E+00	489.714	979.427	0.00E+00	1.35E+03	2.70E+03	1.2500	9.409E+13
Eu-154	1.5368E-02	489.714	979.427	0.00E+00	7.53E+00	1.51E+01	1.7500	6.273E+10
Eu-155	2.9293E-02	489.714	979.427	0.00E+00	1.43E+01	2.87E+01	2.2500	1.011E+11
Fe-55	7.7158E-01	489.714	979.427	0.00E+00	3.78E+02	7.56E+02	2.7500	8.022E+08
H-3	1.1111E-02	489.714	979.427	0.00E+00	5.44E+00	1.09E+01	3.5000	9.339E+07
I-129	7.3684E-07	489.714	979.427	0.00E+00	3.61E-04	7.22E-04	5.0000	5.247E+02
Kr-85	2.5263E-01	489.714	979.427	0.00E+00	1.24E+02	2.47E+02	7.0000	5.941E+01
Np-237	1.2427E-06	489.714	979.427	0.00E+00	6.09E-04	1.22E-03	11.0000	6.769E+00
Pa-231	3.8511E-09	489.714	979.427	0.00E+00	1.89E-06	3.77E-06		
Pb-210	7.3880E-15	489.714	979.427	0.00E+00	3.62E-12	7.24E-12		
Pm-147	2.1023E+00	489.714	979.427	0.00E+00	1.03E+03	2.06E+03		
Pu-238	1.0383E-03	489.714	979.427	0.00E+00	5.08E-01	1.02E+00		
Pu-239	5.5293E-03	489.714	979.427	0.00E+00	2.71E+00	5.42E+00		
Pu-240	2.1278E-03	489.714	979.427	0.00E+00	1.04E+00	2.08E+00		
Pu-241	1.0195E-01	489.714	979.427	0.00E+00	4.99E+01	9.99E+01		
Pu-242	2.3128E-07	489.714	979.427	0.00E+00	1.13E-04	2.27E-04		
Ra-226	5.2782E-14	489.714	979.427	0.00E+00	2.58E-11	5.17E-11		
Ra-228	1.9338E-10	489.714	979.427	0.00E+00	9.47E-08	1.89E-07		
Ru-106	9.1684E-02	489.714	979.427	0.00E+00	4.49E+01	8.98E+01		
Se-79	1.3018E-05	489.714	979.427	0.00E+00	6.38E-03	1.28E-02		
Sn-126	1.2167E-05	489.714	979.427	0.00E+00	5.96E-03	1.19E-02		
Sr-90	2.6045E+00	489.714	979.427	0.00E+00	1.28E+03	2.55E+03		
Tc-99	4.4241E-04	489.714	979.427	0.00E+00	2.17E-01	4.33E-01		
Th-229	1.3713E-10	489.714	979.427	0.00E+00	6.72E-08	1.34E-07		
Th-230	1.8090E-11	489.714	979.427	0.00E+00	8.86E-09	1.77E-08		
Th-232	2.5278E-10	489.714	979.427	0.00E+00	1.24E-07	2.48E-07		
Ti-208	1.6947E-08	489.714	979.427	0.00E+00	8.30E-06	1.66E-05		
U-232	4.8737E-08	489.714	979.427	0.00E+00	2.39E-05	4.77E-05		
U-233	1.2203E-07	489.714	979.427	0.00E+00	5.98E-05	1.20E-04		
U-234	1.5925E-07	489.714	979.427	0.00E+00	7.80E-05	1.56E-04		
U-235	-2.6194E-06	489.714	0.000	8.01E-03	6.72E-03	8.01E-03		
U-236	1.2693E-05	489.714	979.427	0.00E+00	6.22E-03	1.24E-02		
U-238	-3.6331E-08	489.714	0.000	4.98E-03	4.96E-03	4.98E-03		
Y-90	2.6060E+00	489.714	979.427	0.00E+00	1.28E+03	2.55E+03		
Other Radionuclides					1.77E+03	3.53E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.85E+01	5.70E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	90.272	489.714	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		979.427	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.78	5.42	1.00
Bounding:	1.55		

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 1 Fuel decay start date: 2035
 SNF ID #: 268 Estimates as of: 2010
 Fuel Units & Descr: 137 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=26.72kg ; EOL=23.48kg 2 Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 1.23

Radionuclide	m	x _n	x _p	b	y _n	y _p	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	3.086.436	6.172.873	0.00E+00	2.63E-06	5.26E-06	Avg. MeV	
Am-241	1.8331E-03	3.086.436	6.172.873	0.00E+00	5.66E+00	1.13E+01	0.0150	9.97E+14
Am-242m	1.4129E-06	3.086.436	6.172.873	0.00E+00	4.36E-03	8.72E-03	0.0250	2.19E+14
Am-243	1.4774E-07	3.086.436	6.172.873	0.00E+00	4.56E-04	9.12E-04	0.0375	1.870E+14
C-14	1.2871E-04	3.086.436	6.172.873	0.00E+00	3.97E-01	7.94E-01	0.0575	1.919E+14
Cl-36	2.8120E-06	3.086.436	6.172.873	0.00E+00	8.68E-03	1.74E-02	0.0850	1.189E+14
Cm-243	1.7940E-07	3.086.436	6.172.873	0.00E+00	5.54E-04	1.11E-03	0.1250	8.633E+13
Cm-244	1.6962E-06	3.086.436	6.172.873	0.00E+00	5.24E-03	1.05E-02	0.2250	1.008E+14
Co-60	1.2839E+00	3.086.436	6.172.873	0.00E+00	3.96E+03	7.93E+03	0.3750	5.118E+13
Cs-134	9.0541E-02	3.086.436	6.172.873	0.00E+00	2.79E+02	5.59E+02	0.5750	6.804E+14
Cs-135	3.2195E-05	3.086.436	6.172.873	0.00E+00	9.94E-02	1.99E-01	0.8500	2.920E+13
Cs-137	2.7564E+00	3.086.436	6.172.873	0.00E+00	8.51E+03	1.70E+04	1.2500	5.930E+14
Eu-154	1.5368E-02	3.086.436	6.172.873	0.00E+00	4.74E+01	9.49E+01	1.7500	3.953E+11
Eu-155	2.9293E-02	3.086.436	6.172.873	0.00E+00	9.04E+01	1.81E+02	2.2500	6.372E+11
Fe-55	7.7158E-01	3.086.436	6.172.873	0.00E+00	2.38E+03	4.76E+03	2.7500	5.056E+09
H-3	1.1111E-02	3.086.436	6.172.873	0.00E+00	3.43E+01	6.86E+01	3.5000	5.886E+08
I-129	7.3684E-07	3.086.436	6.172.873	0.00E+00	2.27E-03	4.55E-03	5.0000	3.251E+03
Kr-85	2.5263E-01	3.086.436	6.172.873	0.00E+00	7.80E+02	1.56E+03	7.0000	3.680E+02
Np-237	1.2427E-06	3.086.436	6.172.873	0.00E+00	3.84E-03	7.67E-03	11.0000	4.192E+01
Pa-231	3.8511E-09	3.086.436	6.172.873	0.00E+00	1.19E-05	2.38E-05		
Pb-210	7.3880E-15	3.086.436	6.172.873	0.00E+00	2.28E-11	4.56E-11		
Pm-147	2.1023E+00	3.086.436	6.172.873	0.00E+00	6.49E+03	1.30E+04		
Pu-238	1.0383E-03	3.086.436	6.172.873	0.00E+00	3.20E+00	6.41E+00		
Pu-239	5.5293E-03	3.086.436	6.172.873	0.00E+00	1.71E+01	3.41E+01		
Pu-240	2.1278E-03	3.086.436	6.172.873	0.00E+00	6.57E+00	1.31E+01		
Pu-241	1.0195E-01	3.086.436	6.172.873	0.00E+00	3.15E+02	6.29E+02		
Pu-242	2.3128E-07	3.086.436	6.172.873	0.00E+00	7.14E-04	1.43E-03		
Ra-226	5.2782E-14	3.086.436	6.172.873	0.00E+00	1.63E-10	3.26E-10		
Ra-228	1.9338E-10	3.086.436	6.172.873	0.00E+00	5.97E-07	1.19E-06		
Ru-106	9.1684E-02	3.086.436	6.172.873	0.00E+00	2.83E+02	5.66E+02		
Se-79	1.3018E-05	3.086.436	6.172.873	0.00E+00	4.02E-02	8.04E-02		
Sn-126	1.2167E-05	3.086.436	6.172.873	0.00E+00	3.76E-02	7.51E-02		
Sr-90	2.6045E+00	3.086.436	6.172.873	0.00E+00	8.04E+03	1.61E+04		
Tc-99	4.4241E-04	3.086.436	6.172.873	0.00E+00	1.37E+00	2.73E+00		
Th-229	1.3713E-10	3.086.436	6.172.873	0.00E+00	4.23E-07	8.46E-07		
Th-230	1.8090E-11	3.086.436	6.172.873	0.00E+00	5.58E-08	1.12E-07		
Th-232	2.5278E-10	3.086.436	6.172.873	0.00E+00	7.80E-07	1.56E-06		
Tl-208	1.6947E-08	3.086.436	6.172.873	0.00E+00	5.23E-05	1.05E-04		
U-232	4.8737E-08	3.086.436	6.172.873	0.00E+00	1.50E-04	3.01E-04		
U-233	1.2203E-07	3.086.436	6.172.873	0.00E+00	3.77E-04	7.53E-04		
U-234	1.5925E-07	3.086.436	6.172.873	0.00E+00	4.92E-04	9.83E-04		
U-235	-2.6194E-06	3.086.436	0.000	1.14E-02	3.35E-03	1.14E-02		
U-236	1.2693E-05	3.086.436	6.172.873	0.00E+00	3.92E-02	7.84E-02		
U-238	-3.6331E-08	3.086.436	0.000	7.20E-03	7.09E-03	7.20E-03		
Y-90	2.6060E+00	3.086.436	6.172.873	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			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.8	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		3,086.436	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		6,172.873	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	3.39		1.00
Bounding:	6.78		

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
 SNF ID #: 262
 Fuel Units & Descr: 128 - ELEMENT
 Heavy Metal Mass: BOL=24.96kg ; EOL=22.18kg
 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							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	8.5173E-10	2,651.517	5,303.034	0.00E+00	2.26E-06	4.52E-06		
Am-241	1.8331E-03	2,651.517	5,303.034	0.00E+00	4.86E+00	9.72E+00	0.0150	8.571E+14
Am-242m	1.4129E-06	2,651.517	5,303.034	0.00E+00	3.75E-03	7.49E-03	0.0250	1.886E+14
Am-243	1.4774E-07	2,651.517	5,303.034	0.00E+00	3.92E-04	7.83E-04	0.0375	1.606E+14
C-14	1.2871E-04	2,651.517	5,303.034	0.00E+00	3.41E-01	6.83E-01	0.0575	1.649E+14
Cl-36	2.8120E-06	2,651.517	5,303.034	0.00E+00	7.46E-03	1.49E-02	0.0850	1.021E+14
Cm-243	1.7940E-07	2,651.517	5,303.034	0.00E+00	4.76E-04	9.51E-04	0.1250	7.416E+13
Cm-244	1.6962E-06	2,651.517	5,303.034	0.00E+00	4.50E-03	9.00E-03	0.2250	8.664E+13
Co-60	1.2839E+00	2,651.517	5,303.034	0.00E+00	3.40E+03	6.81E+03	0.3750	4.396E+13
Cs-134	9.0541E-02	2,651.517	5,303.034	0.00E+00	2.40E+02	4.80E+02	0.5750	5.845E+14
Cs-135	3.2195E-05	2,651.517	5,303.034	0.00E+00	8.54E-02	1.71E-01	0.8500	2.508E+13
Cs-137	2.7564E+00	2,651.517	5,303.034	0.00E+00	7.31E+03	1.46E+04	1.2500	5.094E+14
Eu-154	1.5368E-02	2,651.517	5,303.034	0.00E+00	4.07E+01	8.15E+01	1.7500	3.396E+11
Eu-155	2.9293E-02	2,651.517	5,303.034	0.00E+00	7.77E+01	1.55E+02	2.2500	5.474E+11
Fe-55	7.7158E-01	2,651.517	5,303.034	0.00E+00	2.05E+03	4.09E+03	2.7500	4.344E+09
H-3	1.1111E-02	2,651.517	5,303.034	0.00E+00	2.95E+01	5.89E+01	3.5000	5.057E+08
I-129	7.3684E-07	2,651.517	5,303.034	0.00E+00	1.95E-03	3.91E-03	5.0000	2.794E+03
Kr-85	2.5263E-01	2,651.517	5,303.034	0.00E+00	6.70E+02	1.34E+03	7.0000	3.163E+02
Np-237	1.2427E-06	2,651.517	5,303.034	0.00E+00	3.30E-03	6.59E-03	11.0000	3.603E+01
Pa-231	3.8511E-09	2,651.517	5,303.034	0.00E+00	1.02E-05	2.04E-05		
Pb-210	7.3880E-15	2,651.517	5,303.034	0.00E+00	1.96E-11	3.92E-11		
Pm-147	2.1023E+00	2,651.517	5,303.034	0.00E+00	5.57E+03	1.11E+04		
Pu-238	1.0383E-03	2,651.517	5,303.034	0.00E+00	2.75E+00	5.51E+00		
Pu-239	5.5293E-03	2,651.517	5,303.034	0.00E+00	1.47E+01	2.93E+01		
Pu-240	2.1278E-03	2,651.517	5,303.034	0.00E+00	5.64E+00	1.13E+01		
Pu-241	1.0195E-01	2,651.517	5,303.034	0.00E+00	2.70E+02	5.41E+02		
Pu-242	2.3128E-07	2,651.517	5,303.034	0.00E+00	6.13E-04	1.23E-03		
Ra-226	5.2782E-14	2,651.517	5,303.034	0.00E+00	1.40E-10	2.80E-10		
Ra-228	1.9338E-10	2,651.517	5,303.034	0.00E+00	5.13E-07	1.03E-06		
Ru-106	9.1684E-02	2,651.517	5,303.034	0.00E+00	2.43E+02	4.86E+02		
Se-79	1.3018E-05	2,651.517	5,303.034	0.00E+00	3.45E-02	6.90E-02		
Sn-126	1.2167E-05	2,651.517	5,303.034	0.00E+00	3.23E-02	6.45E-02		
Sr-90	2.6045E+00	2,651.517	5,303.034	0.00E+00	6.91E+03	1.38E+04		
Tc-99	4.4241E-04	2,651.517	5,303.034	0.00E+00	1.17E+00	2.35E+00		
Th-229	1.3713E-10	2,651.517	5,303.034	0.00E+00	3.64E-07	7.27E-07		
Th-230	1.8090E-11	2,651.517	5,303.034	0.00E+00	4.80E-08	9.59E-08		
Th-232	2.5278E-10	2,651.517	5,303.034	0.00E+00	6.70E-07	1.34E-06		
Tl-208	1.6947E-08	2,651.517	5,303.034	0.00E+00	4.49E-05	8.99E-05		
U-232	4.8737E-08	2,651.517	5,303.034	0.00E+00	1.29E-04	2.58E-04		
U-233	1.2203E-07	2,651.517	5,303.034	0.00E+00	3.24E-04	6.47E-04		
U-234	1.5925E-07	2,651.517	5,303.034	0.00E+00	4.22E-04	8.44E-04		
U-235	-2.6194E-06	2,651.517	0.000	1.08E-02	3.84E-03	1.08E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.2693E-05	2,651.517	5,303.034	0.00E+00	3.37E-02	6.73E-02	1.54E+02	3.09E+02
U-238	-3.6331E-08	2,651.517	0.000	6.71E-03	6.61E-03	6.71E-03	Total	Total
Y-90	2.6060E+00	2,651.517	5,303.034	0.00E+00	6.91E+03	1.38E+04		
Other Radionuclides					9.58E+03	1.91E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		2,651.517	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		5,303.034	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	3.12		1.00
Bounding:	6.23		

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 (MW/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD
 SNF ID #: 238
 Fuel Units & Descr: 71 - ELEMENT
 Heavy Metal Mass: BOL=13.38kg ; EOL=9.32kg
 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

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	3,869.714	7,739.428	0.00E+00	3.12E-06	6.24E-06	Avg. MeV	
Am-241	2.2586E-03	3,869.714	7,739.428	0.00E+00	8.74E+00	1.75E+01	0.0150	1.310E+15
Am-242m	1.9925E-06	3,869.714	7,739.428	0.00E+00	7.71E-03	1.54E-02	0.0250	2.843E+14
Am-243	2.3323E-07	3,869.714	7,739.428	0.00E+00	9.03E-04	1.81E-03	0.0375	3.541E+14
C-14	4.3308E-05	3,869.714	7,739.428	0.00E+00	1.68E-01	3.35E-01	0.0575	2.715E+14
Cl-36	4.3023E-08	3,869.714	7,739.428	0.00E+00	1.66E-04	3.33E-04	0.0850	1.900E+14
Cm-243	2.7429E-07	3,869.714	7,739.428	0.00E+00	1.06E-03	2.12E-03	0.1250	2.842E+14
Cm-244	3.1504E-06	3,869.714	7,739.428	0.00E+00	1.22E-02	2.44E-02	0.2250	1.586E+14
Co-60	3.1008E-02	3,869.714	7,739.428	0.00E+00	1.20E+02	2.40E+02	0.3750	7.060E+13
Cs-134	1.0367E-01	3,869.714	7,739.428	0.00E+00	4.01E+02	8.02E+02	0.5750	8.952E+14
Cs-135	3.1549E-05	3,869.714	7,739.428	0.00E+00	1.22E-01	2.44E-01	0.8500	2.203E+14
Cs-137	2.7564E+00	3,869.714	7,739.428	0.00E+00	1.07E+04	2.13E+04	1.2500	2.284E+14
Eu-154	1.3490E+00	3,869.714	7,739.428	0.00E+00	5.22E+03	1.04E+04	1.7500	6.537E+12
Eu-155	4.3880E-01	3,869.714	7,739.428	0.00E+00	1.70E+03	3.40E+03	2.2500	7.947E+11
Fe-55	8.6782E-03	3,869.714	7,739.428	0.00E+00	3.36E+01	6.72E+01	2.7500	6.454E+09
H-3	1.0805E-02	3,869.714	7,739.428	0.00E+00	4.18E+01	8.36E+01	3.5000	7.548E+08
I-129	7.3805E-07	3,869.714	7,739.428	0.00E+00	2.86E-03	5.71E-03	5.0000	4.423E+03
Kr-85	2.5218E-01	3,869.714	7,739.428	0.00E+00	9.76E+02	1.95E+03	7.0000	5.005E+02
Np-237	1.4463E-06	3,869.714	7,739.428	0.00E+00	5.60E-03	1.12E-02	11.0000	5.700E+01
Pa-231	3.5970E-09	3,869.714	7,739.428	0.00E+00	1.39E-05	2.78E-05		
Pb-210	8.2511E-15	3,869.714	7,739.428	0.00E+00	3.19E-11	6.39E-11		
Pm-147	2.0767E+00	3,869.714	7,739.428	0.00E+00	8.04E+03	1.61E+04		
Pu-238	1.3514E-03	3,869.714	7,739.428	0.00E+00	5.23E+00	1.05E+01		
Pu-239	5.6947E-03	3,869.714	7,739.428	0.00E+00	2.20E+01	4.41E+01		
Pu-240	2.2647E-03	3,869.714	7,739.428	0.00E+00	8.76E+00	1.75E+01		
Pu-241	1.2574E-01	3,869.714	7,739.428	0.00E+00	4.87E+02	9.73E+02		
Pu-242	3.0602E-07	3,869.714	7,739.428	0.00E+00	1.18E-03	2.37E-03		
Ra-226	5.7353E-14	3,869.714	7,739.428	0.00E+00	2.22E-10	4.44E-10		
Ra-228	1.8150E-08	3,869.714	7,739.428	0.00E+00	7.02E-07	1.40E-06		
Ru-106	9.3744E-02	3,869.714	7,739.428	0.00E+00	3.63E+02	7.26E+02		
Se-79	1.2938E-05	3,869.714	7,739.428	0.00E+00	5.01E-02	1.00E-01		
Sn-126	1.2239E-05	3,869.714	7,739.428	0.00E+00	4.74E-02	9.47E-02		
Sr-90	2.6000E+00	3,869.714	7,739.428	0.00E+00	1.01E+04	2.01E+04		
Tc-99	4.4120E-04	3,869.714	7,739.428	0.00E+00	1.71E+00	3.41E+00		
Th-229	1.4749E-10	3,869.714	7,739.428	0.00E+00	5.71E-07	1.14E-06		
Th-230	1.9549E-11	3,869.714	7,739.428	0.00E+00	7.56E-08	1.51E-07		
Th-232	2.3744E-10	3,869.714	7,739.428	0.00E+00	9.19E-07	1.84E-06		
Tl-208	1.9459E-08	3,869.714	7,739.428	0.00E+00	7.53E-05	1.51E-04		
U-232	5.6015E-08	3,869.714	7,739.428	0.00E+00	2.17E-04	4.34E-04		
U-233	1.3132E-07	3,869.714	7,739.428	0.00E+00	5.08E-04	1.02E-03		
U-234	1.7323E-07	3,869.714	7,739.428	0.00E+00	6.70E-04	1.34E-03		
U-235	-2.6159E-06	3,869.714	0.000	5.67E-03	0.00E+00	5.67E-03		
U-236	1.2717E-05	3,869.714	7,739.428	0.00E+00	4.92E-02	9.84E-02		
U-238	-3.8857E-08	3,869.714	0.000	3.61E-03	3.46E-03	3.61E-03		
Y-90	2.6015E+00	3,869.714	7,739.428	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			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	ALUM (1100)	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.62614987	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	494.298	3,869.714	
Bounding:		7,739.428	

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:	7.83	7.83	
Bounding:	15.66		

Estimated EOL HM/ Given EOL HM: 1.23

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
 SNF ID #: 261
 Fuel Units & Descr: 92 - ELEMENT
 Heavy Metal Mass: BOL=17.94kg ; EOL=16.10kg
 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"
 0.83

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)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	1,756.477	3,512.955	0.00E+00	1.50E-06	2.99E-06	Avg. MeV	
Am-241	1.8331E-03	1,756.477	3,512.955	0.00E+00	3.22E+00	6.44E+00	0.0150	5.678E+14
Am-242m	1.4129E-06	1,756.477	3,512.955	0.00E+00	2.48E-03	4.96E-03	0.0250	1.249E+14
Am-243	1.4774E-07	1,756.477	3,512.955	0.00E+00	2.60E-04	5.19E-04	0.0375	1.064E+14
C-14	1.2871E-04	1,756.477	3,512.955	0.00E+00	2.26E-01	4.52E-01	0.0575	1.092E+14
Cl-36	2.8120E-06	1,756.477	3,512.955	0.00E+00	4.94E-03	9.88E-03	0.0850	6.765E+13
Cm-243	1.7940E-07	1,756.477	3,512.955	0.00E+00	3.15E-04	6.30E-04	0.1250	4.913E+13
Cm-244	1.6962E-06	1,756.477	3,512.955	0.00E+00	2.98E-03	5.96E-03	0.2250	5.739E+13
Co-60	1.2839E+00	1,756.477	3,512.955	0.00E+00	2.26E+03	4.51E+03	0.3750	2.912E+13
Cs-134	9.0541E-02	1,756.477	3,512.955	0.00E+00	1.59E+02	3.18E+02	0.5750	3.872E+14
Cs-135	3.2195E-05	1,756.477	3,512.955	0.00E+00	5.66E-02	1.13E-01	0.8500	1.662E+13
Cs-137	2.7564E+00	1,756.477	3,512.955	0.00E+00	4.84E+03	9.68E+03	1.2500	3.375E+14
Eu-154	1.5368E-02	1,756.477	3,512.955	0.00E+00	2.70E+01	5.40E+01	1.7500	2.250E+11
Eu-155	2.9293E-02	1,756.477	3,512.955	0.00E+00	5.15E+01	1.03E+02	2.2500	3.626E+11
Fe-55	7.7158E-01	1,756.477	3,512.955	0.00E+00	1.36E+03	2.71E+03	2.7500	2.877E+09
H-3	1.1111E-02	1,756.477	3,512.955	0.00E+00	1.95E+01	3.90E+01	3.5000	3.350E+08
I-129	7.3684E-07	1,756.477	3,512.955	0.00E+00	1.29E-03	2.59E-03	5.0000	1.852E+03
Kr-85	2.5263E-01	1,756.477	3,512.955	0.00E+00	4.44E+02	8.87E+02	7.0000	2.096E+02
Np-237	1.2427E-06	1,756.477	3,512.955	0.00E+00	2.18E-03	4.37E-03	11.0000	2.388E+01
Pa-231	3.8511E-09	1,756.477	3,512.955	0.00E+00	6.76E-06	1.35E-05		
Pb-210	7.3880E-15	1,756.477	3,512.955	0.00E+00	1.30E-11	2.60E-11		
Pm-147	2.1023E+00	1,756.477	3,512.955	0.00E+00	3.69E+03	7.39E+03		
Pu-238	1.0383E-03	1,756.477	3,512.955	0.00E+00	1.82E+00	3.65E+00		
Pu-239	5.5293E-03	1,756.477	3,512.955	0.00E+00	9.71E+00	1.94E+01		
Pu-240	2.1278E-03	1,756.477	3,512.955	0.00E+00	3.74E+00	7.47E+00		
Pu-241	1.0195E-01	1,756.477	3,512.955	0.00E+00	1.79E+02	3.58E+02		
Pu-242	2.3128E-07	1,756.477	3,512.955	0.00E+00	4.06E-04	8.12E-04		
Ra-226	5.2782E-14	1,756.477	3,512.955	0.00E+00	9.27E-11	1.85E-10		
Ra-228	1.9338E-10	1,756.477	3,512.955	0.00E+00	3.40E-07	6.79E-07		
Ru-106	9.1684E-02	1,756.477	3,512.955	0.00E+00	1.61E+02	3.22E+02		
Se-79	1.3018E-05	1,756.477	3,512.955	0.00E+00	2.29E-02	4.57E-02		
Sn-126	1.2167E-05	1,756.477	3,512.955	0.00E+00	2.14E-02	4.27E-02		
Sr-90	2.6045E+00	1,756.477	3,512.955	0.00E+00	4.57E+03	9.15E+03		
Tc-99	4.4241E-04	1,756.477	3,512.955	0.00E+00	7.77E-01	1.55E+00		
Th-229	1.3713E-10	1,756.477	3,512.955	0.00E+00	2.41E-07	4.82E-07		
Th-230	1.8090E-11	1,756.477	3,512.955	0.00E+00	3.18E-08	6.36E-08		
Th-232	2.5278E-10	1,756.477	3,512.955	0.00E+00	4.44E-07	8.88E-07		
Ti-208	1.6947E-08	1,756.477	3,512.955	0.00E+00	2.98E-05	5.95E-05		
U-232	4.8737E-08	1,756.477	3,512.955	0.00E+00	8.56E-05	1.71E-04		
U-233	1.2203E-07	1,756.477	3,512.955	0.00E+00	2.14E-04	4.29E-04		
U-234	1.5925E-07	1,756.477	3,512.955	0.00E+00	2.80E-04	5.59E-04		
U-235	-2.6194E-06	1,756.477	0.000	7.55E-03	2.95E-03	7.55E-03		
U-236	1.2693E-05	1,756.477	3,512.955	0.00E+00	2.23E-02	4.46E-02		
U-238	-3.6331E-08	1,756.477	0.000	4.85E-03	4.79E-03	4.85E-03		
Y-90	2.6060E+00	1,756.477	3,512.955	0.00E+00	4.58E+03	9.15E+03		
Other Radionuclides					6.33E+03	1.27E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.02E+02	2.04E+02
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 304 / SST	
BOL HM Constituents:	U-ZrHX / U	
BOL Enrichment %:	19.48717949 / 10 to 20	

Burnup Summary (MWd) ²		Basis for burnup used in estimate:
From SFD	Estimated	
Nominal:	1,756.477	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	3,512.955	

Checks		Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	
Bounding:	2.87	1.00
	5.74	

¹Reactor shutdown, cora 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
 SNF ID #: 254
 Fuel Units & Descr: 102 - ELEMENT
 Heavy Metal Mass: BOL=19.11kg ; EOL=19.07kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 Estimate 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"
 0.92

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	8.5173E-10	372.490	744.980	0.00E+00	3.17E-07	6.35E-07		
Am-241	1.8331E-03	372.490	744.980	0.00E+00	6.83E-01	1.37E+00	0.0150	1.204E+14
Am-242m	1.4129E-06	372.490	744.980	0.00E+00	5.26E-04	1.05E-03	0.0250	2.649E+13
Am-243	1.4774E-07	372.490	744.980	0.00E+00	5.50E-05	1.10E-04	0.0375	2.256E+13
C-14	1.2871E-04	372.490	744.980	0.00E+00	4.79E-02	9.59E-02	0.0575	2.318E+13
Cl-36	2.8120E-06	372.490	744.980	0.00E+00	1.05E-03	2.09E-03	0.0850	1.435E+13
Cm-243	1.7940E-07	372.490	744.980	0.00E+00	6.68E-05	1.34E-04	0.1250	1.042E+13
Cm-244	1.6962E-06	372.490	744.980	0.00E+00	6.32E-04	1.26E-03	0.2250	1.217E+13
Co-60	1.2839E+00	372.490	744.980	0.00E+00	4.78E+02	9.56E+02	0.3750	6.176E+12
Cs-134	9.0541E-02	372.490	744.980	0.00E+00	3.37E+01	6.75E+01	0.5750	8.211E+13
Cs-135	3.2195E-05	372.490	744.980	0.00E+00	1.20E-02	2.40E-02	0.8500	3.524E+12
Cs-137	2.7564E+00	372.490	744.980	0.00E+00	1.03E+03	2.05E+03	1.2500	7.157E+13
Eu-154	1.5368E-02	372.490	744.980	0.00E+00	5.72E+00	1.14E+01	1.7500	4.771E+10
Eu-155	2.9293E-02	372.490	744.980	0.00E+00	1.09E+01	2.18E+01	2.2500	7.690E+10
Fe-55	7.7158E-01	372.490	744.980	0.00E+00	2.87E+02	5.75E+02	2.7500	6.102E+08
H-3	1.1111E-02	372.490	744.980	0.00E+00	4.14E+00	8.28E+00	3.5000	7.104E+07
I-129	7.3684E-07	372.490	744.980	0.00E+00	2.74E-04	5.49E-04	5.0000	4.023E+02
Kr-85	2.5263E-01	372.490	744.980	0.00E+00	9.41E+01	1.88E+02	7.0000	4.558E+01
Np-237	1.2427E-06	372.490	744.980	0.00E+00	4.63E-04	9.26E-04	11.0000	5.191E+00
Pa-231	3.8511E-09	372.490	744.980	0.00E+00	1.43E-06	2.87E-06		
Pb-210	7.3880E-15	372.490	744.980	0.00E+00	2.75E-12	5.50E-12		
Pm-147	2.1023E+00	372.490	744.980	0.00E+00	7.83E+02	1.57E+03		
Pu-238	1.0383E-03	372.490	744.980	0.00E+00	3.87E-01	7.74E-01		
Pu-239	5.5293E-03	372.490	744.980	0.00E+00	2.06E+00	4.12E+00		
Pu-240	2.1278E-03	372.490	744.980	0.00E+00	7.93E-01	1.59E+00		
Pu-241	1.0195E-01	372.490	744.980	0.00E+00	3.80E+01	7.60E+01		
Pu-242	2.3128E-07	372.490	744.980	0.00E+00	8.61E-05	1.72E-04		
Ra-226	5.2782E-14	372.490	744.980	0.00E+00	1.97E-11	3.93E-11		
Ra-228	1.9338E-10	372.490	744.980	0.00E+00	7.20E-08	1.44E-07		
Ru-106	9.1684E-02	372.490	744.980	0.00E+00	3.42E+01	6.83E+01		
Se-79	1.3018E-05	372.490	744.980	0.00E+00	4.85E-03	9.70E-03		
Sn-126	1.2167E-05	372.490	744.980	0.00E+00	4.53E-03	9.06E-03		
Sr-90	2.6045E+00	372.490	744.980	0.00E+00	9.70E+02	1.94E+03		
Tc-99	4.4241E-04	372.490	744.980	0.00E+00	1.65E-01	3.30E-01		
Th-229	1.3713E-10	372.490	744.980	0.00E+00	5.11E-08	1.02E-07		
Th-230	1.8090E-11	372.490	744.980	0.00E+00	6.74E-09	1.35E-08		
Th-232	2.5278E-10	372.490	744.980	0.00E+00	9.42E-08	1.88E-07		
Tl-208	1.6947E-08	372.490	744.980	0.00E+00	6.31E-06	1.26E-05		
U-232	4.8737E-08	372.490	744.980	0.00E+00	1.82E-05	3.63E-05		
U-233	1.2203E-07	372.490	744.980	0.00E+00	4.55E-05	9.09E-05		
U-234	1.5925E-07	372.490	744.980	0.00E+00	5.93E-05	1.19E-04		
U-235	-2.6194E-06	372.490	0.000	8.05E-03	7.08E-03	8.05E-03		
U-236	1.2693E-05	372.490	744.980	0.00E+00	4.73E-03	9.46E-03		
U-238	-3.6331E-08	372.490	0.000	5.17E-03	5.16E-03	5.17E-03		
Y-90	2.6060E+00	372.490	744.980	0.00E+00	9.71E+02	1.94E+03		
Other Radionuclides					1.34E+03	2.69E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.17E+01	4.34E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.48980681	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	372.490	38.948	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		744.980	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.57	0.10	0.98
Bounding:	1.14		

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
 SNF ID #: 260
 Fuel Units & Descr: 93 - ELEMENT
 Heavy Metal Mass: BOL=17.21kg ; EOL=16.35kg
 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"
 0.84

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	8.5173E-10	816.762	1,633.524	0.00E+00	6.96E-07	1.39E-06		
Am-241	1.8331E-03	816.762	1,633.524	0.00E+00	1.50E+00	2.99E+00	0.0150	2.640E+14
Am-242m	1.4129E-06	816.762	1,633.524	0.00E+00	1.15E-03	2.31E-03	0.0250	5.809E+13
Am-243	1.4774E-07	816.762	1,633.524	0.00E+00	1.21E-04	2.41E-04	0.0375	4.947E+13
C-14	1.2871E-04	816.762	1,633.524	0.00E+00	1.05E-01	2.10E-01	0.0575	5.078E+13
Cl-36	2.8120E-06	816.762	1,633.524	0.00E+00	2.30E-03	4.59E-03	0.0850	3.146E+13
Cm-243	1.7940E-07	816.762	1,633.524	0.00E+00	1.47E-04	2.93E-04	0.1250	2.284E+13
Cm-244	1.6962E-06	816.762	1,633.524	0.00E+00	1.39E-03	2.77E-03	0.2250	2.669E+13
Co-60	1.2839E+00	816.762	1,633.524	0.00E+00	1.05E+03	2.10E+03	0.3750	1.354E+14
Cs-134	9.0541E-02	816.762	1,633.524	0.00E+00	7.40E+01	1.48E+02	0.5750	1.800E+13
Cs-135	3.2195E-05	816.762	1,633.524	0.00E+00	2.63E-02	5.26E-02	0.8500	7.727E+12
Cs-137	2.7564E+00	816.762	1,633.524	0.00E+00	2.25E+03	4.50E+03	1.2500	1.569E+14
Eu-154	1.5368E-02	816.762	1,633.524	0.00E+00	1.26E+01	2.51E+01	1.7500	1.046E+11
Eu-155	2.9293E-02	816.762	1,633.524	0.00E+00	2.39E+01	4.79E+01	2.2500	1.686E+11
Fe-55	7.7158E-01	816.762	1,633.524	0.00E+00	6.30E+02	1.26E+03	2.7500	1.338E+09
H-3	1.1111E-02	816.762	1,633.524	0.00E+00	9.08E+00	1.82E+01	3.5000	1.558E+08
I-129	7.3684E-07	816.762	1,633.524	0.00E+00	6.02E-04	1.20E-03	5.0000	8.667E+02
Kr-85	2.5263E-01	816.762	1,633.524	0.00E+00	2.06E+02	4.13E+02	7.0000	9.811E+01
Np-237	1.2427E-06	816.762	1,633.524	0.00E+00	1.01E-03	2.03E-03	11.0000	1.118E+01
Pa-231	3.8511E-09	816.762	1,633.524	0.00E+00	3.15E-06	6.29E-06		
Pb-210	7.3880E-15	816.762	1,633.524	0.00E+00	6.03E-12	1.21E-11		
Pm-147	2.1023E+00	816.762	1,633.524	0.00E+00	1.72E+03	3.43E+03		
Pu-238	1.0383E-03	816.762	1,633.524	0.00E+00	8.48E-01	1.70E+00		
Pu-239	5.5293E-03	816.762	1,633.524	0.00E+00	4.52E+00	9.03E+00		
Pu-240	2.1278E-03	816.762	1,633.524	0.00E+00	1.74E+00	3.48E+00		
Pu-241	1.0195E-01	816.762	1,633.524	0.00E+00	8.33E+01	1.67E+02		
Pu-242	2.3128E-07	816.762	1,633.524	0.00E+00	1.89E-04	3.78E-04		
Ra-226	5.2782E-14	816.762	1,633.524	0.00E+00	4.31E-11	8.62E-11		
Ra-228	1.9338E-10	816.762	1,633.524	0.00E+00	1.58E-07	3.16E-07		
Ru-106	9.1684E-02	816.762	1,633.524	0.00E+00	7.49E+01	1.50E+02		
Se-79	1.3018E-05	816.762	1,633.524	0.00E+00	1.06E-02	2.13E-02		
Sn-126	1.2167E-05	816.762	1,633.524	0.00E+00	9.94E-03	1.99E-02		
Sr-90	2.6045E+00	816.762	1,633.524	0.00E+00	2.13E+03	4.25E+03		
Tc-99	4.4241E-04	816.762	1,633.524	0.00E+00	3.61E-01	7.23E-01		
Th-229	1.3713E-10	816.762	1,633.524	0.00E+00	1.12E-07	2.24E-07		
Th-230	1.8090E-11	816.762	1,633.524	0.00E+00	1.48E-08	2.96E-08		
Th-232	2.5278E-10	816.762	1,633.524	0.00E+00	2.06E-07	4.13E-07		
Ti-208	1.6947E-08	816.762	1,633.524	0.00E+00	1.38E-05	2.77E-05		
U-232	4.8737E-08	816.762	1,633.524	0.00E+00	3.98E-05	7.96E-05		
U-233	1.2203E-07	816.762	1,633.524	0.00E+00	9.97E-05	1.99E-04		
U-234	1.5925E-07	816.762	1,633.524	0.00E+00	1.30E-04	2.60E-04		
U-235	-2.6194E-06	816.762	0.000	7.34E-03	5.20E-03	7.34E-03		
U-236	1.2693E-05	816.762	1,633.524	0.00E+00	1.04E-02	2.07E-02		
U-238	-3.6331E-08	816.762	0.000	4.64E-03	4.61E-03	4.64E-03		
Y-90	2.6060E+00	816.762	1,633.524	0.00E+00	2.13E+03	4.26E+03		
Other Radionuclides					2.94E+03	5.89E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.75E+01	9.51E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.72972973	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		816.762	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		1,633.524	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.39		1.00
Bounding:	2.78		

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
 SNF ID #: 246
 Fuel Units & Descr: 115 - ELEMENT
 Heavy Metal Mass: BOL=21.90kg ; EOL=21.59kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2002
 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"
 1.04

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	296.406	592.811	0.00E+00	2.52E-07	5.05E-07	Avg. MeV	
Am-241	1.8331E-03	296.406	592.811	0.00E+00	5.43E-01	1.09E+00	0.0150	9.581E+13
Am-242m	1.4129E-06	296.406	592.811	0.00E+00	4.19E-04	8.38E-04	0.0250	2.108E+13
Am-243	1.4774E-07	296.406	592.811	0.00E+00	4.38E-05	8.76E-05	0.0375	1.795E+13
C-14	1.2871E-04	296.406	592.811	0.00E+00	3.81E-02	7.63E-02	0.0575	1.843E+13
Cl-36	2.8120E-06	296.406	592.811	0.00E+00	8.34E-04	1.67E-03	0.0850	1.142E+13
Cm-243	1.7940E-07	296.406	592.811	0.00E+00	5.32E-05	1.06E-04	0.1250	8.290E+12
Cm-244	1.6962E-06	296.406	592.811	0.00E+00	5.03E-04	1.01E-03	0.2250	9.685E+12
Co-60	1.2839E+00	296.406	592.811	0.00E+00	3.81E+02	7.61E+02	0.3750	4.915E+12
Cs-134	9.0541E-02	296.406	592.811	0.00E+00	2.68E+01	5.37E+01	0.5750	6.534E+13
Cs-135	3.2195E-05	296.406	592.811	0.00E+00	9.54E-03	1.91E-02	0.8500	2.804E+12
Cs-137	2.7564E+00	296.406	592.811	0.00E+00	8.17E+02	1.63E+03	1.2500	5.895E+13
Eu-154	1.5368E-02	296.406	592.811	0.00E+00	4.56E+00	9.11E+00	1.7500	3.797E+10
Eu-155	2.9293E-02	296.406	592.811	0.00E+00	8.68E+00	1.74E+01	2.2500	6.119E+10
Fe-55	7.7158E-01	296.406	592.811	0.00E+00	2.29E+02	4.57E+02	2.7500	4.856E+08
H-3	1.1111E-02	296.406	592.811	0.00E+00	3.29E+00	6.59E+00	3.5000	5.653E+07
I-129	7.3684E-07	296.406	592.811	0.00E+00	2.18E-04	4.37E-04	5.0000	3.242E+02
Kr-85	2.5263E-01	296.406	592.811	0.00E+00	7.49E+01	1.50E+02	7.0000	3.672E+01
Np-237	1.2427E-06	296.406	592.811	0.00E+00	3.68E-04	7.37E-04	11.0000	4.185E+00
Pa-231	3.8511E-09	296.406	592.811	0.00E+00	1.14E-06	2.28E-06		
Pb-210	7.3880E-15	296.406	592.811	0.00E+00	2.19E-12	4.38E-12		
Pm-147	2.1023E+00	296.406	592.811	0.00E+00	6.23E+02	1.25E+03		
Pu-238	1.0383E-03	296.406	592.811	0.00E+00	3.08E-01	6.16E-01		
Pu-239	5.5293E-03	296.406	592.811	0.00E+00	1.64E+00	3.28E+00		
Pu-240	2.1278E-03	296.406	592.811	0.00E+00	6.31E-01	1.26E+00		
Pu-241	1.0195E-01	296.406	592.811	0.00E+00	3.02E+01	6.04E+01		
Pu-242	2.3128E-07	296.406	592.811	0.00E+00	6.86E-05	1.37E-04		
Ra-226	5.2782E-14	296.406	592.811	0.00E+00	1.56E-11	3.13E-11		
Ra-228	1.9338E-10	296.406	592.811	0.00E+00	5.73E-08	1.15E-07		
Ru-106	9.1684E-02	296.406	592.811	0.00E+00	2.72E+01	5.44E+01		
Se-79	1.3018E-05	296.406	592.811	0.00E+00	3.86E-03	7.72E-03		
Sn-126	1.2167E-05	296.406	592.811	0.00E+00	3.61E-03	7.21E-03		
Sr-90	2.6045E+00	296.406	592.811	0.00E+00	7.72E+02	1.54E+03		
Tc-99	4.4241E-04	296.406	592.811	0.00E+00	1.31E-01	2.62E-01		
Th-229	1.3713E-10	296.406	592.811	0.00E+00	4.06E-08	8.13E-08		
Th-230	1.8090E-11	296.406	592.811	0.00E+00	5.36E-09	1.07E-08		
Th-232	2.5278E-10	296.406	592.811	0.00E+00	7.49E-08	1.50E-07		
Tl-208	1.6947E-08	296.406	592.811	0.00E+00	5.02E-06	1.00E-05		
U-232	4.8737E-08	296.406	592.811	0.00E+00	1.44E-05	2.89E-05		
U-233	1.2203E-07	296.406	592.811	0.00E+00	3.62E-05	7.23E-05		
U-234	1.5925E-07	296.406	592.811	0.00E+00	4.72E-05	9.44E-05		
U-235	-2.6194E-06	296.406	0.000	9.45E-03	8.67E-03	9.45E-03		
U-236	1.2693E-05	296.406	592.811	0.00E+00	3.76E-03	7.52E-03		
U-238	-3.6331E-08	296.406	0.000	5.89E-03	5.88E-03	5.89E-03		
Y-90	2.6060E+00	296.406	592.811	0.00E+00	7.72E+02	1.54E+03		
Other Radionuclides					1.07E+03	2.14E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.97312804	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	0.328	296.406	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	0.022	592.811	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.40	902.46	1.00
Bounding:	0.79	27,073.95	

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
 SNF ID #: 253
 Fuel Units & Descr: 163 - ELEMENT
 Heavy Metal Mass: BOL=31.79kg ; EOL=30.48kg
 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" x 10"
 1.47

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	8.5173E-10	1,244.808	2,489.616	0.00E+00	1.06E-06	2.12E-06	0.0150	4.024E+14
Am-241	1.8331E-03	1,244.808	2,489.616	0.00E+00	2.28E+00	4.56E+00	0.0250	8.854E+13
Am-242m	1.4129E-06	1,244.808	2,489.616	0.00E+00	1.76E-03	3.52E-03	0.0375	7.540E+13
Am-243	1.4774E-07	1,244.808	2,489.616	0.00E+00	1.84E-04	3.68E-04	0.0575	7.739E+13
C-14	1.2871E-04	1,244.808	2,489.616	0.00E+00	1.60E-01	3.20E-01	0.0850	4.795E+13
Cl-36	2.8120E-06	1,244.808	2,489.616	0.00E+00	3.50E-03	7.00E-03	0.1250	3.482E+13
Cm-243	1.7940E-07	1,244.808	2,489.616	0.00E+00	2.23E-04	4.47E-04	0.2250	4.067E+13
Cm-244	1.6962E-06	1,244.808	2,489.616	0.00E+00	2.11E-03	4.22E-03	0.3750	2.064E+13
Co-60	1.2839E+00	1,244.808	2,489.616	0.00E+00	1.60E+03	3.20E+03	0.5750	2.744E+14
Cs-134	9.0541E-02	1,244.808	2,489.616	0.00E+00	1.13E+02	2.25E+02	0.8500	1.178E+13
Cs-135	3.2195E-05	1,244.808	2,489.616	0.00E+00	4.01E-02	8.02E-02	1.2500	2.392E+14
Cs-137	2.7564E+00	1,244.808	2,489.616	0.00E+00	3.43E+03	6.86E+03	1.7500	1.594E+11
Eu-154	1.5368E-02	1,244.808	2,489.616	0.00E+00	1.91E+01	3.83E+01	2.2500	2.570E+11
Eu-155	2.9293E-02	1,244.808	2,489.616	0.00E+00	3.65E+01	7.29E+01	2.7500	2.039E+09
Fe-55	7.7158E-01	1,244.808	2,489.616	0.00E+00	9.60E+02	1.92E+03	3.5000	2.374E+08
H-3	1.1111E-02	1,244.808	2,489.616	0.00E+00	1.38E+01	2.77E+01	5.0000	1.324E+03
I-129	7.3684E-07	1,244.808	2,489.616	0.00E+00	9.17E-04	1.83E-03	7.0000	1.499E+02
Kr-85	2.5263E-01	1,244.808	2,489.616	0.00E+00	3.14E+02	6.29E+02	11.0000	1.708E+01
Np-237	1.2427E-06	1,244.808	2,489.616	0.00E+00	1.55E-03	3.09E-03		
Pa-231	3.8511E-09	1,244.808	2,489.616	0.00E+00	4.79E-06	9.59E-06		
Pb-210	7.3880E-15	1,244.808	2,489.616	0.00E+00	9.20E-12	1.84E-11		
Pm-147	2.1023E+00	1,244.808	2,489.616	0.00E+00	2.62E+03	5.23E+03		
Pu-238	1.0383E-03	1,244.808	2,489.616	0.00E+00	1.29E+00	2.59E+00		
Pu-239	5.5293E-03	1,244.808	2,489.616	0.00E+00	6.88E+00	1.38E+01		
Pu-240	2.1278E-03	1,244.808	2,489.616	0.00E+00	2.65E+00	5.30E+00		
Pu-241	1.0195E-01	1,244.808	2,489.616	0.00E+00	1.27E+02	2.54E+02		
Pu-242	2.3128E-07	1,244.808	2,489.616	0.00E+00	2.88E-04	5.76E-04		
Ra-226	5.2782E-14	1,244.808	2,489.616	0.00E+00	6.57E-11	1.31E-10		
Ra-228	1.9338E-10	1,244.808	2,489.616	0.00E+00	2.41E-07	4.81E-07		
Ru-106	9.1684E-02	1,244.808	2,489.616	0.00E+00	1.14E+02	2.28E+02		
Se-79	1.3018E-05	1,244.808	2,489.616	0.00E+00	1.62E-02	3.24E-02		
Sn-126	1.2167E-05	1,244.808	2,489.616	0.00E+00	1.51E-02	3.03E-02		
Sr-90	2.6045E+00	1,244.808	2,489.616	0.00E+00	3.24E+03	6.48E+03		
Tc-99	4.4241E-04	1,244.808	2,489.616	0.00E+00	5.51E-01	1.10E+00		
Th-229	1.3713E-10	1,244.808	2,489.616	0.00E+00	1.71E-07	3.41E-07		
Th-230	1.8090E-11	1,244.808	2,489.616	0.00E+00	2.25E-08	4.50E-08		
Th-232	2.5278E-10	1,244.808	2,489.616	0.00E+00	3.15E-07	6.29E-07		
Tl-208	1.6947E-08	1,244.808	2,489.616	0.00E+00	2.11E-05	4.22E-05		
U-232	4.8737E-08	1,244.808	2,489.616	0.00E+00	6.07E-05	1.21E-04		
U-233	1.2203E-07	1,244.808	2,489.616	0.00E+00	1.52E-04	3.04E-04		
U-234	1.5925E-07	1,244.808	2,489.616	0.00E+00	1.98E-04	3.96E-04		
U-235	-2.6194E-06	1,244.808	0.000	1.37E-02	1.05E-02	1.37E-02		
U-236	1.2693E-05	1,244.808	2,489.616	0.00E+00	1.58E-02	3.16E-02		
U-238	-3.6331E-08	1,244.808	0.000	8.55E-03	8.50E-03	8.55E-03		
Y-90	2.6060E+00	1,244.808	2,489.616	0.00E+00	3.24E+03	6.49E+03		
Other Radionuclides					4.49E+03	8.98E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.24E+01	1.45E+02
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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	774.442	1,244.808	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,489.616	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	1.00
Bounding:	2.30		

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
 SNF ID #: 251
 Fuel Units & Descr: 77 - ELEMENT
 Heavy Metal Mass: BOL=15.02kg ; EOL=14.63kg
 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
 Casir usage:
 18"x10"
 0.69

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	8.5173E-10	367.524	735.048	0.00E+00	3.13E-07	6.26E-07	0.0150	1.188E+14
Am-241	1.8331E-03	367.524	735.048	0.00E+00	6.74E-01	1.35E+00	0.0250	2.614E+13
Am-242m	1.4129E-06	367.524	735.048	0.00E+00	5.19E-04	1.04E-03	0.0375	2.226E+13
Am-243	1.4774E-07	367.524	735.048	0.00E+00	5.43E-05	1.09E-04	0.0575	2.285E+13
C-14	1.2871E-04	367.524	735.048	0.00E+00	4.73E-02	9.46E-02	0.0850	1.416E+13
Cf-254	2.8120E-06	367.524	735.048	0.00E+00	1.03E-03	2.07E-03	0.1250	1.028E+13
Cm-243	1.7940E-07	367.524	735.048	0.00E+00	6.59E-05	1.32E-04	0.2250	1.201E+13
Cm-244	1.6962E-06	367.524	735.048	0.00E+00	6.23E-04	1.25E-03	0.3750	6.094E+12
Co-60	1.2839E+00	367.524	735.048	0.00E+00	4.72E+02	9.44E+02	0.5750	8.102E+13
Cs-134	9.0541E-02	367.524	735.048	0.00E+00	3.33E+01	6.66E+01	0.8500	3.477E+12
Cs-135	3.2195E-05	367.524	735.048	0.00E+00	1.18E-02	2.37E-02	1.2500	7.061E+13
Cs-137	2.7564E+00	367.524	735.048	0.00E+00	1.01E+03	2.03E+03	1.7500	4.708E+10
Eu-154	1.5368E-02	367.524	735.048	0.00E+00	5.65E+00	1.13E+01	2.2500	7.588E+10
Eu-155	2.9293E-02	367.524	735.048	0.00E+00	1.08E+01	2.15E+01	2.7500	6.021E+08
Fe-55	7.7158E-01	367.524	735.048	0.00E+00	2.84E+02	5.67E+02	3.5000	7.009E+07
H-3	1.1111E-02	367.524	735.048	0.00E+00	4.08E+00	8.17E+00	5.0000	3.945E+02
I-129	7.3684E-07	367.524	735.048	0.00E+00	2.71E-04	5.42E-04	7.0000	4.466E+01
Kr-85	2.5263E-01	367.524	735.048	0.00E+00	9.28E+01	1.86E+02	11.0000	5.089E+00
Np-237	1.2427E-06	367.524	735.048	0.00E+00	4.57E-04	9.13E-04		
Pa-231	3.8511E-09	367.524	735.048	0.00E+00	1.42E-06	2.83E-06		
Pb-210	7.3880E-15	367.524	735.048	0.00E+00	2.72E-12	5.43E-12		
Pm-147	2.1023E+00	367.524	735.048	0.00E+00	7.73E+02	1.55E+03		
Pu-238	1.0383E-03	367.524	735.048	0.00E+00	3.82E-01	7.63E-01		
Pu-239	5.5293E-03	367.524	735.048	0.00E+00	2.03E+00	4.06E+00		
Pu-240	2.1278E-03	367.524	735.048	0.00E+00	7.82E-01	1.56E+00		
Pu-241	1.0195E-01	367.524	735.048	0.00E+00	3.75E+01	7.49E+01		
Pu-242	2.3128E-07	367.524	735.048	0.00E+00	8.50E-05	1.70E-04		
Ra-226	5.2782E-14	367.524	735.048	0.00E+00	1.94E-11	3.88E-11		
Ra-228	1.9338E-10	367.524	735.048	0.00E+00	7.11E-08	1.42E-07		
Ru-106	9.1684E-02	367.524	735.048	0.00E+00	3.37E+01	6.74E+01		
Se-79	1.3018E-05	367.524	735.048	0.00E+00	4.78E-03	9.57E-03		
Sn-126	1.2167E-05	367.524	735.048	0.00E+00	4.47E-03	8.94E-03		
Sr-90	2.6045E+00	367.524	735.048	0.00E+00	9.57E+02	1.91E+03		
Tc-99	4.4241E-04	367.524	735.048	0.00E+00	1.63E-01	3.25E-01		
Th-229	1.3713E-10	367.524	735.048	0.00E+00	5.04E-08	1.01E-07		
Th-230	1.8090E-11	367.524	735.048	0.00E+00	6.65E-09	1.33E-08		
Th-232	2.5278E-10	367.524	735.048	0.00E+00	9.29E-08	1.86E-07		
Tl-208	1.6947E-08	367.524	735.048	0.00E+00	6.23E-06	1.25E-05		
U-232	4.8737E-08	367.524	735.048	0.00E+00	1.79E-05	3.58E-05		
U-233	1.2203E-07	367.524	735.048	0.00E+00	4.48E-05	8.97E-05		
U-234	1.5925E-07	367.524	735.048	0.00E+00	5.85E-05	1.17E-04		
U-235	-2.6194E-06	367.524	0.000	6.49E-03	5.53E-03	6.49E-03		
U-236	1.2693E-05	367.524	735.048	0.00E+00	4.67E-03	9.33E-03		
U-238	-3.6331E-08	367.524	0.000	4.04E-03	4.02E-03	4.04E-03		
Y-90	2.6060E+00	367.524	735.048	0.00E+00	9.58E+02	1.92E+03		
Other Radionuclides					1.33E+03	2.65E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.14E+01	4.28E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	219.504	367.524	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		735.048	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.72	1.67	1.00
Bounding:	1.44		

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
 SNF ID #: 265
 Fuel Units & Descr: 156 - ELEMENT
 Heavy Metal Mass: BOL=30.12kg ; EOL=29.76kg
 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"
 1.41

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	8.5173E-10	342.513	685.026	0.00E+00	2.92E-07	5.83E-07	0.0150	1.107E+14
Am-241	1.8331E-03	342.513	685.026	0.00E+00	6.28E-01	1.26E+00	0.0250	2.436E+13
Am-242m	1.4129E-06	342.513	685.026	0.00E+00	4.84E-04	9.68E-04	0.0375	2.075E+13
Am-243	1.4774E-07	342.513	685.026	0.00E+00	5.06E-05	1.01E-04	0.0575	2.129E+13
C-14	1.2871E-04	342.513	685.026	0.00E+00	4.41E-02	8.82E-02	0.0850	1.319E+13
Cl-36	2.8120E-06	342.513	685.026	0.00E+00	9.63E-04	1.93E-03	0.1250	5.980E+12
Cm-243	1.7940E-07	342.513	685.026	0.00E+00	6.14E-05	1.23E-04	0.2250	1.119E+13
Cm-244	1.6962E-06	342.513	685.026	0.00E+00	5.81E-04	1.16E-03	0.3750	5.679E+12
Co-60	1.2839E+00	342.513	685.026	0.00E+00	4.40E+02	8.80E+02	0.5750	7.550E+13
Cs-134	9.0541E-02	342.513	685.026	0.00E+00	3.10E+01	6.20E+01	0.8500	3.240E+12
Cs-135	3.2195E-05	342.513	685.026	0.00E+00	1.10E-02	2.21E-02	1.2500	6.581E+13
Cs-137	2.7564E+00	342.513	685.026	0.00E+00	9.44E+02	1.89E+03	1.7500	4.387E+10
Eu-154	1.5368E-02	342.513	685.026	0.00E+00	5.26E+00	1.05E+01	2.2500	7.071E+10
Eu-155	2.9293E-02	342.513	685.026	0.00E+00	1.00E+01	2.01E+01	2.7500	5.611E+08
Fe-55	7.7158E-01	342.513	685.026	0.00E+00	2.64E+02	5.29E+02	3.5000	6.532E+07
H-3	1.1111E-02	342.513	685.026	0.00E+00	3.81E+00	7.61E+00	5.0000	3.777E+02
I-129	7.3684E-07	342.513	685.026	0.00E+00	2.52E-04	5.05E-04	7.0000	4.278E+01
Kr-85	2.5263E-01	342.513	685.026	0.00E+00	8.65E+01	1.73E+02	11.0000	4.876E+00
Np-237	1.2427E-06	342.513	685.026	0.00E+00	4.26E-04	8.51E-04		
Pa-231	3.8511E-09	342.513	685.026	0.00E+00	1.32E-06	2.64E-06		
Pb-210	7.3880E-15	342.513	685.026	0.00E+00	2.53E-12	5.06E-12		
Pm-147	2.1023E+00	342.513	685.026	0.00E+00	7.20E+02	1.44E+03		
Pu-238	1.0383E-03	342.513	685.026	0.00E+00	3.56E-01	7.11E-01		
Pu-239	5.5293E-03	342.513	685.026	0.00E+00	1.89E+00	3.79E+00		
Pu-240	2.1278E-03	342.513	685.026	0.00E+00	7.29E-01	1.46E+00		
Pu-241	1.0195E-01	342.513	685.026	0.00E+00	3.49E+01	6.98E+01		
Pu-242	2.3128E-07	342.513	685.026	0.00E+00	7.92E-05	1.58E-04		
Ra-226	5.2782E-14	342.513	685.026	0.00E+00	1.81E-11	3.62E-11		
Ra-228	1.9338E-10	342.513	685.026	0.00E+00	6.62E-08	1.32E-07		
Ru-106	9.1684E-02	342.513	685.026	0.00E+00	3.14E+01	6.28E+01		
Sr-90	1.3018E-05	342.513	685.026	0.00E+00	4.46E-03	8.92E-03		
Sn-126	1.2167E-05	342.513	685.026	0.00E+00	4.17E-03	8.33E-03		
Sr-90	2.6045E+00	342.513	685.026	0.00E+00	8.92E+02	1.78E+03		
Tc-99	4.4241E-04	342.513	685.026	0.00E+00	1.52E-01	3.03E-01		
Th-229	1.3713E-10	342.513	685.026	0.00E+00	4.70E-08	9.39E-08		
Th-230	1.8090E-11	342.513	685.026	0.00E+00	6.20E-09	1.24E-08		
Th-232	2.5278E-10	342.513	685.026	0.00E+00	8.66E-08	1.73E-07		
Ti-208	1.6947E-08	342.513	685.026	0.00E+00	5.80E-06	1.16E-05		
U-232	4.8737E-08	342.513	685.026	0.00E+00	1.67E-05	3.34E-05		
U-233	1.2203E-07	342.513	685.026	0.00E+00	4.18E-05	8.36E-05		
U-234	1.5925E-07	342.513	685.026	0.00E+00	5.45E-05	1.09E-04		
U-235	-2.6194E-06	342.513	0.000	1.29E-02	1.20E-02	1.29E-02		
U-236	1.2693E-05	342.513	685.026	0.00E+00	4.35E-03	8.70E-03		
U-238	-3.6331E-08	342.513	0.000	8.12E-03	8.11E-03	8.12E-03		
Y-90	2.6060E+00	342.513	685.026	0.00E+00	8.93E+02	1.79E+03		
Other Radionuclides					1.23E+03	2.47E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.99E+01	3.99E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.78958118	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		342.513	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		685.026	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.33		1.00
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
 SNF ID #: 237
 Fuel Units & Descr: 203 - ELEMENT
 Heavy Metal Mass: BOL=39.99kg ; EOL=37.58kg
 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"
 1.83

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)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	2,306.045	4,612.090	0.00E+00	1.96E-06	3.93E-06	Avg. MeV	
Am-241	1.8331E-03	2,306.045	4,612.090	0.00E+00	4.23E+00	8.45E+00	0.0150	7.454E+14
Am-242m	1.4129E-06	2,306.045	4,612.090	0.00E+00	3.26E-03	6.52E-03	0.0250	1.640E+14
Am-243	1.4774E-07	2,306.045	4,612.090	0.00E+00	3.41E-04	6.81E-04	0.0375	1.397E+14
C-14	1.2871E-04	2,306.045	4,612.090	0.00E+00	2.97E-01	5.94E-01	0.0575	1.434E+14
Cl-36	2.8120E-06	2,306.045	4,612.090	0.00E+00	6.48E-03	1.30E-02	0.0850	8.882E+13
Cm-243	1.7940E-07	2,306.045	4,612.090	0.00E+00	4.14E-04	8.27E-04	0.1250	6.450E+13
Cm-244	1.6962E-06	2,306.045	4,612.090	0.00E+00	3.91E-03	7.82E-03	0.2250	7.535E+13
Co-60	1.2839E+00	2,306.045	4,612.090	0.00E+00	2.96E+03	5.92E+03	0.3750	3.824E+13
Cs-134	9.0541E-02	2,306.045	4,612.090	0.00E+00	2.09E+02	4.18E+02	0.5750	5.083E+14
Cs-135	3.2195E-05	2,306.045	4,612.090	0.00E+00	7.42E-02	1.48E-01	0.8500	2.182E+13
Cs-137	2.7564E+00	2,306.045	4,612.090	0.00E+00	6.36E+03	1.27E+04	1.2500	4.431E+14
Eu-154	1.5368E-02	2,306.045	4,612.090	0.00E+00	3.54E+01	7.09E+01	1.7500	2.954E+11
Eu-155	2.9293E-02	2,306.045	4,612.090	0.00E+00	6.76E+01	1.35E+02	2.2500	4.761E+11
Fe-55	7.7158E-01	2,306.045	4,612.090	0.00E+00	1.78E+03	3.56E+03	2.7500	3.778E+09
H-3	1.1111E-02	2,306.045	4,612.090	0.00E+00	2.56E+01	5.12E+01	3.5000	4.398E+08
I-129	7.3684E-07	2,306.045	4,612.090	0.00E+00	1.70E-03	3.40E-03	5.0000	2.442E+03
Kr-85	2.5263E-01	2,306.045	4,612.090	0.00E+00	5.83E+02	1.17E+03	7.0000	2.764E+02
Np-237	1.2427E-06	2,306.045	4,612.090	0.00E+00	2.87E-03	5.73E-03	11.0000	3.149E+01
Pa-231	3.8511E-09	2,306.045	4,612.090	0.00E+00	8.88E-06	1.78E-05		
Pb-210	7.3880E-15	2,306.045	4,612.090	0.00E+00	1.70E-11	3.41E-11		
Pm-147	2.1023E+00	2,306.045	4,612.090	0.00E+00	4.85E+03	9.70E+03		
Pu-238	1.0383E-03	2,306.045	4,612.090	0.00E+00	2.39E+00	4.79E+00		
Pu-239	5.5293E-03	2,306.045	4,612.090	0.00E+00	1.28E+01	2.55E+01		
Pu-240	2.1278E-03	2,306.045	4,612.090	0.00E+00	4.91E+00	9.81E+00		
Pu-241	1.0195E-01	2,306.045	4,612.090	0.00E+00	2.35E+02	4.70E+02		
Pu-242	2.3128E-07	2,306.045	4,612.090	0.00E+00	5.33E-04	1.07E-03		
Ra-226	5.2782E-14	2,306.045	4,612.090	0.00E+00	1.22E-10	2.43E-10		
Ra-228	1.9338E-10	2,306.045	4,612.090	0.00E+00	4.46E-07	8.92E-07		
Ru-106	9.1684E-02	2,306.045	4,612.090	0.00E+00	2.11E+02	4.23E+02		
Se-79	1.3018E-05	2,306.045	4,612.090	0.00E+00	3.00E-02	6.00E-02		
Sn-126	1.2167E-05	2,306.045	4,612.090	0.00E+00	2.81E-02	5.61E-02		
Sr-90	2.6045E+00	2,306.045	4,612.090	0.00E+00	6.01E+03	1.20E+04		
Tc-99	4.4241E-04	2,306.045	4,612.090	0.00E+00	1.02E+00	2.04E+00		
Th-229	1.3713E-10	2,306.045	4,612.090	0.00E+00	3.16E-07	6.32E-07		
Th-230	1.8090E-11	2,306.045	4,612.090	0.00E+00	4.17E-08	8.34E-08		
Th-232	2.5278E-10	2,306.045	4,612.090	0.00E+00	5.83E-07	1.17E-06		
Ti-208	1.6947E-08	2,306.045	4,612.090	0.00E+00	3.91E-05	7.82E-05		
U-232	4.8737E-08	2,306.045	4,612.090	0.00E+00	1.12E-04	2.25E-04		
U-233	1.2203E-07	2,306.045	4,612.090	0.00E+00	2.81E-04	5.63E-04		
U-234	1.5925E-07	2,306.045	4,612.090	0.00E+00	3.67E-04	7.34E-04		
U-235	-2.6194E-06	2,306.045	0.000	1.71E-02	1.11E-02	1.71E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.2693E-05	2,306.045	4,612.090	0.00E+00	2.93E-02	5.85E-02	1.34E+02	2.68E+02
U-238	-3.6331E-08	2,306.045	0.000	1.08E-02	1.07E-02	1.08E-02	Total	Total
Y-90	2.6060E+00	2,306.045	4,612.090	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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.79695431	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		2,306.045	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,612.090	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	1.69		1.00
Bounding:	3.38		

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
 SNF ID #: 264
 Fuel Units & Descr: 104 - ELEMENT
 Heavy Metal Mass: BOL=19.93kg ; EOL=19.77kg
 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"
 0.94

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	148.919	297.837	0.00E+00	1.27E-07	2.54E-07	Avg. MeV	
Am-241	1.8331E-03	148.919	297.837	0.00E+00	2.73E-01	5.46E-01	0.0150	4.814E+13
Am-242m	1.4129E-06	148.919	297.837	0.00E+00	2.10E-04	4.21E-04	0.0250	1.059E+13
Am-243	1.4774E-07	148.919	297.837	0.00E+00	2.20E-05	4.40E-05	0.0375	9.020E+12
C-14	1.2871E-04	148.919	297.837	0.00E+00	1.92E-02	3.83E-02	0.0575	9.259E+12
Ci-36	2.8120E-06	148.919	297.837	0.00E+00	4.19E-04	8.38E-04	0.0850	5.736E+12
Cm-243	1.7940E-07	148.919	297.837	0.00E+00	2.67E-05	5.34E-05	0.1250	4.165E+12
Cm-244	1.6962E-06	148.919	297.837	0.00E+00	2.53E-04	5.05E-04	0.2250	4.866E+12
Co-60	1.2839E+00	148.919	297.837	0.00E+00	1.91E+02	3.82E+02	0.3750	2.469E+13
Cs-134	9.0541E-02	148.919	297.837	0.00E+00	1.35E+01	2.70E+01	0.5750	3.289E+12
Cs-135	3.2195E-05	148.919	297.837	0.00E+00	4.79E-03	9.59E-03	0.8500	1.409E+12
Cs-137	2.7564E+00	148.919	297.837	0.00E+00	4.10E+02	8.21E+02	1.2500	2.861E+13
Eu-154	1.5368E-02	148.919	297.837	0.00E+00	2.29E+00	4.58E+00	1.7500	1.907E+10
Eu-155	2.9293E-02	148.919	297.837	0.00E+00	4.36E+00	8.72E+00	2.2500	3.074E+10
Fe-55	7.7158E-01	148.919	297.837	0.00E+00	1.15E+02	2.30E+02	2.7500	2.439E+08
H-3	1.1111E-02	148.919	297.837	0.00E+00	1.65E+00	3.31E+00	3.5000	2.840E+07
I-129	7.3684E-07	148.919	297.837	0.00E+00	1.10E-04	2.19E-04	5.0000	1.684E+02
Kr-85	2.5263E-01	148.919	297.837	0.00E+00	3.76E+01	7.52E+01	7.0000	1.909E+01
Np-237	1.2427E-06	148.919	297.837	0.00E+00	1.85E-04	3.70E-04	11.0000	2.176E+00
Pa-231	3.8511E-09	148.919	297.837	0.00E+00	5.74E-07	1.15E-06		
Pb-210	7.3880E-15	148.919	297.837	0.00E+00	1.10E-12	2.20E-12		
Pm-147	2.1023E+00	148.919	297.837	0.00E+00	3.13E+02	6.26E+02		
Pu-238	1.0383E-03	148.919	297.837	0.00E+00	1.55E-01	3.09E-01		
Pu-239	5.5293E-03	148.919	297.837	0.00E+00	8.23E-01	1.65E+00		
Pu-240	2.1278E-03	148.919	297.837	0.00E+00	3.17E-01	6.34E-01		
Pu-241	1.0195E-01	148.919	297.837	0.00E+00	1.52E+01	3.04E+01		
Pu-242	2.3128E-07	148.919	297.837	0.00E+00	3.44E-05	6.89E-05		
Ra-226	5.2782E-14	148.919	297.837	0.00E+00	7.86E-12	1.57E-11		
Ra-228	1.9338E-10	148.919	297.837	0.00E+00	2.88E-08	5.76E-08		
Ru-106	9.1684E-02	148.919	297.837	0.00E+00	1.37E+01	2.73E+01		
Se-79	1.3018E-05	148.919	297.837	0.00E+00	1.94E-03	3.88E-03		
Sn-126	1.2167E-05	148.919	297.837	0.00E+00	1.81E-03	3.62E-03		
Sr-90	2.6045E+00	148.919	297.837	0.00E+00	3.88E+02	7.76E+02		
Tc-99	4.4241E-04	148.919	297.837	0.00E+00	6.59E-02	1.32E-01		
Th-229	1.3713E-10	148.919	297.837	0.00E+00	2.04E-08	4.08E-08		
Th-230	1.8090E-11	148.919	297.837	0.00E+00	2.69E-09	5.39E-09		
Th-232	2.5278E-10	148.919	297.837	0.00E+00	3.76E-08	7.53E-08		
Tl-208	1.6947E-08	148.919	297.837	0.00E+00	2.52E-06	5.05E-06		
U-232	4.8737E-08	148.919	297.837	0.00E+00	7.26E-06	1.45E-05		
U-233	1.2203E-07	148.919	297.837	0.00E+00	1.82E-05	3.63E-05		
U-234	1.5925E-07	148.919	297.837	0.00E+00	2.37E-05	4.74E-05		
U-235	-2.6194E-06	148.919	0.000	8.61E-03	8.22E-03	8.61E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.2693E-05	148.919	297.837	0.00E+00	1.89E-03	3.78E-03	8.67E+00	1.73E+01
U-238	-3.6331E-08	148.919	0.000	5.36E-03	5.35E-03	5.36E-03	Total	Total
Y-90	2.6060E+00	148.919	297.837	0.00E+00	3.88E+02	7.76E+02		
Other Radionuclides					5.37E+02	1.07E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.67E+00	1.73E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20.00002088	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		148.919	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		297.837	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:	0.44		

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 1Fuel decay start date: 2026
 SNF ID #: 256 Estimates as of: 2010
 Fuel Units & Descr: 58 - ELEMENT Template: TRIGA-AI (LW/U-Zrx, Alum., 10 to 20%, U)
 Heavy Metal Mass: BOL=10.93kg ; EOL=10.89kg 2Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.52

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	8.0632E-10	53.248	106.496	0.00E+00	4.29E-08	8.59E-08	0.0150	1.802E+13
Am-241	2.2586E-03	53.248	106.496	0.00E+00	1.20E-01	2.41E-01	0.0250	3.912E+12
Am-242m	1.9925E-06	53.248	106.496	0.00E+00	1.06E-04	2.12E-04	0.0375	4.873E+12
Am-243	2.3323E-07	53.248	106.496	0.00E+00	1.24E-05	2.48E-05	0.0575	3.736E+12
C-14	4.3308E-05	53.248	106.496	0.00E+00	2.31E-03	4.61E-03	0.0850	2.615E+12
Cl-36	4.3023E-08	53.248	106.496	0.00E+00	2.29E-06	4.58E-06	0.1250	3.911E+12
Cm-243	2.7429E-07	53.248	106.496	0.00E+00	1.46E-05	2.92E-05	0.2250	2.183E+12
Cm-244	3.1504E-06	53.248	106.496	0.00E+00	1.68E-04	3.36E-04	0.3750	9.715E+11
Co-60	3.1008E-02	53.248	106.496	0.00E+00	1.65E+00	3.30E+00	0.5750	1.232E+13
Cs-134	1.0367E-01	53.248	106.496	0.00E+00	5.52E+00	1.10E+01	0.8500	3.032E+12
Cs-135	3.1549E-05	53.248	106.496	0.00E+00	1.68E-03	3.36E-03	1.2500	3.143E+12
Cs-137	2.7564E+00	53.248	106.496	0.00E+00	1.47E+02	2.94E+02	1.7500	8.995E+10
Eu-154	1.3490E+00	53.248	106.496	0.00E+00	7.18E+01	1.44E+02	2.2500	1.093E+10
Eu-155	4.3880E-01	53.248	106.496	0.00E+00	2.34E+01	4.67E+01	2.7500	8.890E+07
Fe-55	8.6782E-03	53.248	106.496	0.00E+00	4.62E-01	9.24E-01	3.5000	1.038E+07
H-3	1.0805E-02	53.248	106.496	0.00E+00	5.75E-01	1.15E+00	5.0000	6.754E+01
I-129	7.3805E-07	53.248	106.496	0.00E+00	3.93E-05	7.86E-05	7.0000	7.657E+00
Kr-85	2.5218E-01	53.248	106.496	0.00E+00	1.34E+01	2.69E+01	11.0000	8.729E-01
Np-237	1.4463E-06	53.248	106.496	0.00E+00	7.70E-05	1.54E-04		
Pa-231	3.5970E-09	53.248	106.496	0.00E+00	1.92E-07	3.83E-07		
Pb-210	8.2511E-15	53.248	106.496	0.00E+00	4.39E-13	8.79E-13		
Pm-147	2.0767E+00	53.248	106.496	0.00E+00	1.11E+02	2.21E+02		
Pu-238	1.3514E-03	53.248	106.496	0.00E+00	7.20E-02	1.44E-01		
Pu-239	5.6947E-03	53.248	106.496	0.00E+00	3.03E-01	6.06E-01		
Pu-240	2.2647E-03	53.248	106.496	0.00E+00	1.21E-01	2.41E-01		
Pu-241	1.2574E-01	53.248	106.496	0.00E+00	6.70E+00	1.34E+01		
Pu-242	3.0602E-07	53.248	106.496	0.00E+00	1.63E-05	3.26E-05		
Ra-226	5.7353E-14	53.248	106.496	0.00E+00	3.05E-12	6.11E-12		
Ra-228	1.8150E-10	53.248	106.496	0.00E+00	9.66E-09	1.93E-08		
Ru-106	9.3744E-02	53.248	106.496	0.00E+00	4.99E+00	9.98E+00		
Se-79	1.2938E-05	53.248	106.496	0.00E+00	6.89E-04	1.38E-03		
Sn-126	1.2239E-05	53.248	106.496	0.00E+00	6.52E-04	1.30E-03		
Sr-90	2.6000E+00	53.248	106.496	0.00E+00	1.38E+02	2.77E+02		
Tc-99	4.4120E-04	53.248	106.496	0.00E+00	2.35E-02	4.70E-02		
Th-229	1.4749E-10	53.248	106.496	0.00E+00	7.85E-09	1.57E-08		
Th-230	1.9549E-11	53.248	106.496	0.00E+00	1.04E-09	2.08E-09		
Th-232	2.3744E-10	53.248	106.496	0.00E+00	1.26E-08	2.53E-08		
Ti-208	1.9459E-08	53.248	106.496	0.00E+00	1.04E-06	2.07E-06		
U-232	5.6015E-08	53.248	106.496	0.00E+00	2.98E-06	5.97E-06		
U-233	1.3132E-07	53.248	106.496	0.00E+00	6.99E-06	1.40E-05		
U-234	1.7323E-07	53.248	106.496	0.00E+00	9.22E-06	1.84E-05		
U-235	-2.6159E-06	53.248	0.000	4.70E-03	4.56E-03	4.70E-03		
U-236	1.2717E-05	53.248	106.496	0.00E+00	6.77E-04	1.35E-03		
U-238	-3.8857E-08	53.248	0.000	2.94E-03	2.94E-03	2.94E-03		
Y-90	2.6015E+00	53.248	106.496	0.00E+00	1.39E+02	2.77E+02		
Other Radionuclides					2.02E+02	4.05E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.68E+00	5.35E+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:	ALUM	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.89205598	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	53.248	38.753	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		106.496	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.13	0.73	1.00
Bounding:	0.26		

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
 SNF ID #: 258
 Fuel Units & Descr: 85 - ELEMENT
 Heavy Metal Mass: BOL=14.88kg ; 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 _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	511.192	1,022.384	0.00E+00	4.35E-07	8.71E-07	Avg. MeV	
Am-241	1.8331E-03	511.192	1,022.384	0.00E+00	9.37E-01	1.87E+00	0.0150	1.652E+14
Am-242m	1.4129E-06	511.192	1,022.384	0.00E+00	7.22E-04	1.44E-03	0.0250	3.636E+13
Am-243	1.4774E-07	511.192	1,022.384	0.00E+00	7.55E-05	1.51E-04	0.0375	3.096E+13
C-14	1.2871E-04	511.192	1,022.384	0.00E+00	6.58E-02	1.32E-01	0.0575	3.178E+13
Cl-36	2.8120E-06	511.192	1,022.384	0.00E+00	1.44E-03	2.87E-03	0.0850	1.969E+13
Cm-243	1.7940E-07	511.192	1,022.384	0.00E+00	9.17E-05	1.83E-04	0.1250	1.430E+13
Cm-244	1.6962E-06	511.192	1,022.384	0.00E+00	8.67E-04	1.73E-03	0.2250	1.670E+13
Co-60	1.2839E+00	511.192	1,022.384	0.00E+00	6.56E+02	1.31E+03	0.3750	8.476E+12
Cs-134	9.0541E-02	511.192	1,022.384	0.00E+00	4.63E+01	9.26E+01	0.5750	1.127E+14
Cs-135	3.2195E-05	511.192	1,022.384	0.00E+00	1.65E-02	3.29E-02	0.8500	4.836E+12
Cs-137	2.7564E+00	511.192	1,022.384	0.00E+00	1.41E+03	2.82E+03	1.2500	9.822E+13
Eu-154	1.5368E-02	511.192	1,022.384	0.00E+00	7.86E+00	1.57E+01	1.7500	6.548E+10
Eu-155	2.9293E-02	511.192	1,022.384	0.00E+00	1.50E+01	2.99E+01	2.2500	1.055E+11
Fe-55	7.7158E-01	511.192	1,022.384	0.00E+00	3.94E+02	7.89E+02	2.7500	8.374E+08
H-3	1.1111E-02	511.192	1,022.384	0.00E+00	5.68E+00	1.14E+01	3.5000	9.749E+07
I-129	7.3684E-07	511.192	1,022.384	0.00E+00	3.77E-04	7.53E-04	5.0000	5.450E+02
Kr-85	2.5263E-01	511.192	1,022.384	0.00E+00	1.29E+02	2.58E+02	7.0000	6.169E+01
Np-237	1.2427E-06	511.192	1,022.384	0.00E+00	6.35E-04	1.27E-03	11.0000	7.029E+00
Pa-231	3.8511E-09	511.192	1,022.384	0.00E+00	1.97E-06	3.94E-06		
Pb-210	7.3880E-15	511.192	1,022.384	0.00E+00	3.78E-12	7.55E-12		
Pm-147	2.1023E+00	511.192	1,022.384	0.00E+00	1.07E+03	2.15E+03		
Pu-238	1.0383E-03	511.192	1,022.384	0.00E+00	5.31E-01	1.06E+00		
Pu-239	5.5293E-03	511.192	1,022.384	0.00E+00	2.83E+00	5.65E+00		
Pu-240	2.1278E-03	511.192	1,022.384	0.00E+00	1.09E+00	2.18E+00		
Pu-241	1.0195E-01	511.192	1,022.384	0.00E+00	5.21E+01	1.04E+02		
Pu-242	2.3128E-07	511.192	1,022.384	0.00E+00	1.18E-04	2.36E-04		
Ra-226	5.2782E-14	511.192	1,022.384	0.00E+00	2.70E-11	5.40E-11		
Ra-228	1.9338E-10	511.192	1,022.384	0.00E+00	9.89E-08	1.98E-07		
Ru-106	9.1684E-02	511.192	1,022.384	0.00E+00	4.69E+01	9.37E+01		
Se-79	1.3018E-05	511.192	1,022.384	0.00E+00	6.65E-03	1.33E-02		
Sn-126	1.2167E-05	511.192	1,022.384	0.00E+00	6.22E-03	1.24E-02		
Sr-90	2.6045E+00	511.192	1,022.384	0.00E+00	1.33E+03	2.66E+03		
Tc-99	4.4241E-04	511.192	1,022.384	0.00E+00	2.26E-01	4.52E-01		
Th-229	1.3713E-10	511.192	1,022.384	0.00E+00	7.01E-08	1.40E-07		
Th-230	1.8090E-11	511.192	1,022.384	0.00E+00	9.25E-09	1.85E-08		
Th-232	2.5278E-10	511.192	1,022.384	0.00E+00	1.29E-07	2.58E-07		
Ti-208	1.6947E-08	511.192	1,022.384	0.00E+00	8.66E-06	1.73E-05		
U-232	4.8737E-08	511.192	1,022.384	0.00E+00	2.49E-05	4.98E-05		
U-233	1.2203E-07	511.192	1,022.384	0.00E+00	6.24E-05	1.25E-04		
U-234	1.5925E-07	511.192	1,022.384	0.00E+00	8.14E-05	1.63E-04		
U-235	-2.6194E-06	511.192	0.000	6.43E-03	5.09E-03	6.43E-03		
U-236	1.2693E-05	511.192	1,022.384	0.00E+00	6.49E-03	1.30E-02		
U-238	-3.6331E-08	511.192	0.000	4.00E-03	3.98E-03	4.00E-03		
Y-90	2.6060E+00	511.192	1,022.384	0.00E+00	1.33E+03	2.66E+03		
Other Radionuclides					1.84E+03	3.69E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.98E+01	5.95E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		511.192	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		1,022.384	

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
 SNF ID #: 447
 Fuel Units & Descr: 58 - ELEMENT
 Heavy Metal Mass: BOL=11.31kg : EOL=11.27kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 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

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
	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	8.0632E-10	220.455	440.909	0.00E+00	1.78E-07	3.56E-07		
Am-241	2.2586E-03	220.455	440.909	0.00E+00	4.98E-01	9.96E-01	0.0150	7.460E+13
Am-242m	1.9925E-06	220.455	440.909	0.00E+00	4.39E-04	8.79E-04	0.0250	1.620E+13
Am-243	2.3323E-07	220.455	440.909	0.00E+00	5.14E-05	1.03E-04	0.0375	2.018E+13
C-14	4.3308E-05	220.455	440.909	0.00E+00	9.55E-03	1.91E-02	0.0575	1.547E+13
Cf-36	4.3023E-08	220.455	440.909	0.00E+00	9.48E-06	1.90E-05	0.0850	1.083E+13
Cm-243	2.7429E-07	220.455	440.909	0.00E+00	6.05E-05	1.21E-04	0.1250	1.619E+13
Cm-244	3.1504E-06	220.455	440.909	0.00E+00	6.95E-04	1.39E-03	0.2250	9.038E+12
Co-60	3.1008E-02	220.455	440.909	0.00E+00	6.84E+00	1.37E+01	0.3750	4.022E+12
Cs-134	1.0367E-01	220.455	440.909	0.00E+00	2.29E+01	4.57E+01	0.5750	5.100E+13
Cs-135	3.1549E-05	220.455	440.909	0.00E+00	6.96E-03	1.39E-02	0.8500	1.255E+13
Cs-137	2.7564E+00	220.455	440.909	0.00E+00	6.08E+02	1.22E+03	1.2500	1.301E+13
Eu-154	1.3490E+00	220.455	440.909	0.00E+00	2.97E+02	5.95E+02	1.7500	3.724E+11
Eu-155	4.3880E-01	220.455	440.909	0.00E+00	9.67E+01	1.93E+02	2.2500	4.527E+10
Fe-55	8.6782E-03	220.455	440.909	0.00E+00	1.91E+00	3.83E+00	2.7500	3.677E+08
H-3	1.0805E-02	220.455	440.909	0.00E+00	2.38E+00	4.76E+00	3.5000	4.299E+07
I-129	7.3805E-07	220.455	440.909	0.00E+00	1.63E-04	3.25E-04	5.0000	2.585E+02
Kr-85	2.5218E-01	220.455	440.909	0.00E+00	5.56E+01	1.11E+02	7.0000	2.927E+01
Np-237	1.4463E-06	220.455	440.909	0.00E+00	3.19E-04	6.38E-04	11.0000	3.334E+00
Pa-231	3.5970E-09	220.455	440.909	0.00E+00	7.93E-07	1.59E-06		
Pb-210	8.2511E-15	220.455	440.909	0.00E+00	1.82E-12	3.64E-12		
Pm-147	2.0767E+00	220.455	440.909	0.00E+00	4.58E+02	9.16E+02		
Pu-238	1.3514E-03	220.455	440.909	0.00E+00	2.98E-01	5.96E-01		
Pu-239	5.6947E-03	220.455	440.909	0.00E+00	1.26E+00	2.51E+00		
Pu-240	2.2647E-03	220.455	440.909	0.00E+00	4.99E-01	9.99E-01		
Pu-241	1.2574E-01	220.455	440.909	0.00E+00	2.77E+01	5.54E+01		
Pu-242	3.0602E-07	220.455	440.909	0.00E+00	6.75E-05	1.35E-04		
Ra-226	5.7353E-14	220.455	440.909	0.00E+00	1.26E-11	2.53E-11		
Ra-228	1.8150E-10	220.455	440.909	0.00E+00	4.00E-08	8.00E-08		
Ru-106	9.3744E-02	220.455	440.909	0.00E+00	2.07E+01	4.13E+01		
Se-79	1.2938E-05	220.455	440.909	0.00E+00	2.85E-03	5.70E-03		
Sn-126	1.2239E-05	220.455	440.909	0.00E+00	2.70E-03	5.40E-03		
Sr-90	2.6000E+00	220.455	440.909	0.00E+00	5.73E+02	1.15E+03		
Tc-99	4.4120E-04	220.455	440.909	0.00E+00	9.73E-02	1.95E-01		
Th-229	1.4749E-10	220.455	440.909	0.00E+00	3.25E-08	6.50E-08		
Th-230	1.9549E-11	220.455	440.909	0.00E+00	4.31E-09	8.62E-09		
Th-232	2.3744E-10	220.455	440.909	0.00E+00	5.23E-08	1.05E-07		
Tl-208	1.9459E-08	220.455	440.909	0.00E+00	4.29E-06	8.58E-06		
U-232	5.6015E-08	220.455	440.909	0.00E+00	1.23E-05	2.47E-05		
U-233	1.3132E-07	220.455	440.909	0.00E+00	2.90E-05	5.79E-05		
U-234	1.7323E-07	220.455	440.909	0.00E+00	3.82E-05	7.64E-05		
U-235	-2.6159E-06	220.455	0.000	4.89E-03	4.31E-03	4.89E-03		
U-236	1.2717E-05	220.455	440.909	0.00E+00	2.80E-03	5.61E-03		
U-238	-3.8857E-08	220.455	0.000	3.04E-03	3.03E-03	3.04E-03		
Y-90	2.6015E+00	220.455	440.909	0.00E+00	5.74E+02	1.15E+03		
Other Radionuclides					8.38E+02	1.68E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.11E+01	2.22E+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:	ALUM (1100)	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	220.455	38.753	
Bounding:		440.909	

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:	0.53	0.18	0.98
Bounding:	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: TRIGA STD
 SNF ID #: 314
 Fuel Units & Descr: 66 - ELEMENT
 Heavy Metal Mass: BOL=12.34kg ; EOL=12.20kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1987
 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: 20 years

Estimated
 Canister usage:
 18"x10"
 0.59

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	2.4556E-09	420.998	841.996	0.00E+00	1.03E-06	2.07E-06	0.0150	8.641E+13
Am-241	3.8752E-03	420.998	841.996	0.00E+00	1.63E+00	3.26E+00	0.0250	1.784E+13
Am-242m	1.8617E-06	420.998	841.996	0.00E+00	7.84E-04	1.57E-03	0.0375	1.868E+13
Am-243	2.3293E-07	420.998	841.996	0.00E+00	9.81E-05	1.96E-04	0.0575	1.726E+13
C-14	4.3233E-05	420.998	841.996	0.00E+00	1.82E-02	3.64E-02	0.0850	1.051E+13
Cl-36	4.3023E-08	420.998	841.996	0.00E+00	1.81E-05	3.62E-05	0.1250	1.180E+13
Co-243	1.9053E-07	420.998	841.996	0.00E+00	8.02E-05	1.60E-04	0.2250	9.524E+12
Co-244	1.7744E-06	420.998	841.996	0.00E+00	7.47E-04	1.49E-03	0.3750	3.913E+12
Co-60	4.3188E-03	420.998	841.996	0.00E+00	1.82E+00	3.64E+00	0.5750	6.235E+13
Cs-134	6.7188E-04	420.998	841.996	0.00E+00	2.83E-01	5.66E-01	0.8500	6.633E+12
Cs-135	3.1549E-05	420.998	841.996	0.00E+00	1.33E-02	2.66E-02	1.2500	7.146E+12
Cs-137	1.9489E+00	420.998	841.996	0.00E+00	8.20E+02	1.64E+03	1.7500	2.141E+11
Eu-154	4.0301E-01	420.998	841.996	0.00E+00	1.70E+02	3.39E+02	2.2500	3.394E+06
Eu-155	5.4000E-02	420.998	841.996	0.00E+00	2.27E+01	4.55E+01	2.7500	5.647E+05
Fe-55	1.5955E-04	420.998	841.996	0.00E+00	6.72E-02	1.34E-01	3.5000	3.882E+03
H-3	4.6571E-03	420.998	841.996	0.00E+00	1.96E+00	3.92E+00	5.0000	4.808E+02
I-129	7.3805E-07	420.998	841.996	0.00E+00	3.11E-04	6.21E-04	7.0000	5.429E+01
Kr-85	9.5684E-02	420.998	841.996	0.00E+00	4.03E+01	8.06E+01	11.0000	6.176E+00
Np-237	1.4618E-06	420.998	841.996	0.00E+00	6.15E-04	1.23E-03		
Pa-231	6.4782E-09	420.998	841.996	0.00E+00	2.73E-06	5.45E-06		
Pb-210	6.3158E-14	420.998	841.996	0.00E+00	2.66E-11	5.32E-11		
Pm-147	3.9564E-02	420.998	841.996	0.00E+00	1.67E+01	3.33E+01		
Pu-238	1.2008E-03	420.998	841.996	0.00E+00	5.06E-01	1.01E+00		
Pu-239	5.6917E-03	420.998	841.996	0.00E+00	2.40E+00	4.79E+00		
Pu-240	2.2617E-03	420.998	841.996	0.00E+00	9.52E-01	1.90E+00		
Pu-241	6.1113E-02	420.998	841.996	0.00E+00	2.57E+01	5.15E+01		
Pu-242	3.0602E-07	420.998	841.996	0.00E+00	1.29E-04	2.58E-04		
Ra-226	2.6707E-13	420.998	841.996	0.00E+00	1.12E-10	2.25E-10		
Ra-228	2.2556E-10	420.998	841.996	0.00E+00	9.50E-08	1.90E-07		
Ru-106	3.1293E-06	420.998	841.996	0.00E+00	1.32E-03	2.63E-03		
Se-79	1.2935E-05	420.998	841.996	0.00E+00	5.45E-03	1.09E-02		
Sn-126	1.2238E-05	420.998	841.996	0.00E+00	5.15E-03	1.03E-02		
Sr-90	1.8195E+00	420.998	841.996	0.00E+00	7.66E+02	1.53E+03		
Tc-99	4.4120E-04	420.998	841.996	0.00E+00	1.86E-01	3.71E-01		
Th-229	3.3308E-10	420.998	841.996	0.00E+00	1.40E-07	2.80E-07		
Th-230	4.6526E-11	420.998	841.996	0.00E+00	1.96E-08	3.92E-08		
Th-232	2.3744E-10	420.998	841.996	0.00E+00	1.00E-07	2.00E-07		
Ti-208	1.8195E-08	420.998	841.996	0.00E+00	7.86E-06	1.53E-05		
U-232	4.9098E-08	420.998	841.996	0.00E+00	2.07E-05	4.13E-05		
U-233	1.3140E-07	420.998	841.996	0.00E+00	5.53E-05	1.11E-04		
U-234	2.2571E-07	420.998	841.996	0.00E+00	9.50E-05	1.90E-04		
U-235	-2.6159E-06	420.998	0.000	5.28E-03	4.18E-03	5.28E-03		
U-236	1.2719E-05	420.998	841.996	0.00E+00	5.35E-03	1.07E-02		
U-238	-3.8857E-08	420.998	0.000	3.33E-03	3.31E-03	3.33E-03		
Y-90	1.8211E+00	420.998	841.996	0.00E+00	7.67E+02	1.53E+03		
Other Radionuclides					8.82E+02	1.76E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.09E+01	2.19E+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:	ALUM (1100)	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.78609626	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	420.998	132.296	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		841.996	Bounding burnup assumed to be twice nominal burnup.

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.92	0.31
Bounding:	1.85	

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
 SNF ID #: 235
 Fuel Units & Descr: 65 - ELEMENT
 Heavy Metal Mass: BOL=12.03kg ; EOL=11.94kg
 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"
 0.59

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	80.657	161.314	0.00E+00	4.96E-07	9.92E-07	0.0150	1.138E+13
Am-241	4.8165E-03	80.657	161.314	0.00E+00	3.88E-01	7.77E-01	0.0250	2.355E+12
Am-242m	1.7383E-06	80.657	161.314	0.00E+00	1.40E-04	2.80E-04	0.0375	2.222E+12
Am-243	2.3263E-07	80.657	161.314	0.00E+00	1.88E-05	3.75E-05	0.0575	2.239E+12
C-14	4.3158E-05	80.657	161.314	0.00E+00	3.48E-03	6.96E-03	0.0850	1.336E+12
Cl-36	4.3023E-08	80.657	161.314	0.00E+00	3.47E-06	6.94E-06	0.1250	1.154E+12
Cm-243	1.3229E-07	80.657	161.314	0.00E+00	1.07E-05	2.13E-05	0.2250	1.194E+12
Cm-244	1.0000E-06	80.657	161.314	0.00E+00	8.07E-05	1.61E-04	0.3750	5.066E+11
Co-60	6.0120E-04	80.657	161.314	0.00E+00	4.85E-02	9.70E-02	0.5750	8.346E+11
Cs-134	4.3534E-06	80.657	161.314	0.00E+00	3.51E-04	7.02E-04	0.8500	4.258E+11
Cs-135	3.1549E-05	80.657	161.314	0.00E+00	2.54E-03	5.09E-03	1.2500	4.179E+11
Cs-137	1.3788E+00	80.657	161.314	0.00E+00	1.11E+02	2.22E+02	1.7500	1.344E+10
Eu-154	1.2041E-01	80.657	161.314	0.00E+00	9.71E+00	1.94E+01	2.2500	2.653E+05
Eu-155	6.6451E-03	80.657	161.314	0.00E+00	5.36E-01	1.07E+00	2.7500	8.972E+04
Fe-55	2.9338E-06	80.657	161.314	0.00E+00	2.37E-04	4.73E-04	3.5000	2.310E+02
H-3	2.0075E-03	80.657	161.314	0.00E+00	1.62E-01	3.24E-01	5.0000	9.728E+01
I-129	7.3805E-07	80.657	161.314	0.00E+00	5.95E-05	1.19E-04	7.0000	1.098E+01
Kr-85	3.6301E-02	80.657	161.314	0.00E+00	2.93E+00	5.86E+00	11.0000	1.249E+00
Np-237	1.4977E-06	80.657	161.314	0.00E+00	1.21E-04	2.42E-04		
Pa-231	1.1275E-08	80.657	161.314	0.00E+00	9.09E-07	1.82E-06		
Pb-210	3.8932E-13	80.657	161.314	0.00E+00	3.14E-11	6.28E-11		
Pm-147	7.5383E-04	80.657	161.314	0.00E+00	6.08E-02	1.22E-01		
Pu-238	1.0668E-03	80.657	161.314	0.00E+00	8.60E-02	1.72E-01		
Pu-239	5.6902E-03	80.657	161.314	0.00E+00	4.59E-01	9.18E-01		
Pu-240	2.2571E-03	80.657	161.314	0.00E+00	1.82E-01	3.64E-01		
Pu-241	2.9699E-02	80.657	161.314	0.00E+00	2.40E+00	4.79E+00		
Pu-242	3.0602E-07	80.657	161.314	0.00E+00	2.47E-05	4.94E-05		
Ra-226	1.0704E-12	80.657	161.314	0.00E+00	8.63E-11	1.73E-10		
Ra-228	2.3654E-10	80.657	161.314	0.00E+00	1.91E-08	3.82E-08		
Ru-106	1.0444E-10	80.657	161.314	0.00E+00	8.42E-09	1.68E-08		
Se-79	1.2934E-05	80.657	161.314	0.00E+00	1.04E-03	2.09E-03		
Sn-126	1.2236E-05	80.657	161.314	0.00E+00	9.87E-04	1.97E-03		
Sr-90	1.2740E+00	80.657	161.314	0.00E+00	1.03E+02	2.06E+02		
Tc-99	4.4120E-04	80.657	161.314	0.00E+00	3.56E-02	7.12E-02		
Th-229	6.4226E-10	80.657	161.314	0.00E+00	5.18E-08	1.04E-07		
Th-230	1.0594E-10	80.657	161.314	0.00E+00	8.54E-09	1.71E-08		
Th-232	2.3744E-10	80.657	161.314	0.00E+00	1.92E-08	3.83E-08		
Ti-208	1.5774E-08	80.657	161.314	0.00E+00	1.27E-06	2.54E-06		
U-232	4.2511E-08	80.657	161.314	0.00E+00	3.43E-06	6.86E-06		
U-233	1.3155E-07	80.657	161.314	0.00E+00	1.06E-05	2.12E-05		
U-234	3.0030E-07	80.657	161.314	0.00E+00	2.42E-05	4.84E-05		
U-235	-2.6144E-06	80.657	0.000	5.20E-03	4.99E-03	5.20E-03		
U-236	1.2720E-05	80.657	161.314	0.00E+00	1.03E-03	2.05E-03		
U-238	-3.8857E-08	80.657	0.000	3.23E-03	3.23E-03	3.23E-03		
Y-90	1.2744E+00	80.657	161.314	0.00E+00	1.03E+02	2.06E+02		
Other Radionuclides					1.23E+02	2.46E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.36E+00	2.71E+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:	ALUM (1100)	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	58.598	80.657	
Bounding:		161.314	

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:	0.18	1.38
Bounding:	0.36	

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
 SNF ID #: 244
 Fuel Units & Descr: 114 - ELEMENT
 Heavy Metal Mass: BOL=22.23kg ; EOL=19.69kg
 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"
 1.03

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	4.1459E-09	2,426.803	4,853.605	0.00E+00	1.01E-05	2.01E-05	0.0150	4.308E+14
Am-241	3.5850E-03	2,426.803	4,853.605	0.00E+00	8.70E+00	1.74E+01	0.0250	8.957E+13
Am-242m	1.2899E-06	2,426.803	4,853.605	0.00E+00	3.13E-03	6.26E-03	0.0375	7.771E+13
Am-243	1.4747E-07	2,426.803	4,853.605	0.00E+00	3.58E-04	7.16E-04	0.0575	8.368E+13
C-14	1.2839E-04	2,426.803	4,853.605	0.00E+00	3.12E-01	6.23E-01	0.0850	5.044E+13
Cl-36	2.8120E-06	2,426.803	4,853.605	0.00E+00	6.82E-03	1.36E-02	0.1250	3.291E+13
Cm-243	1.1038E-07	2,426.803	4,853.605	0.00E+00	2.68E-04	5.36E-04	0.2250	4.338E+13
Cm-244	7.8917E-07	2,426.803	4,853.605	0.00E+00	1.92E-03	3.83E-03	0.3750	1.894E+13
Co-60	9.2647E-02	2,426.803	4,853.605	0.00E+00	2.25E+02	4.50E+02	0.5750	3.141E+14
Cs-134	1.0940E-04	2,426.803	4,853.605	0.00E+00	2.65E-01	5.31E-01	0.8500	3.372E+12
Cs-135	3.2195E-05	2,426.803	4,853.605	0.00E+00	7.81E-02	1.56E-01	1.2500	3.462E+13
Cs-137	1.7368E+00	2,426.803	4,853.605	0.00E+00	4.21E+03	8.43E+03	1.7500	8.779E+13
Eu-154	3.0677E-03	2,426.803	4,853.605	0.00E+00	7.44E+00	1.49E+01	2.2500	1.851E+08
Eu-155	1.7925E-03	2,426.803	4,853.605	0.00E+00	4.35E+00	8.70E+00	2.7500	3.129E+06
Fe-55	3.7444E-03	2,426.803	4,853.605	0.00E+00	9.09E+00	1.82E+01	3.5000	6.507E+03
H-3	3.6180E-03	2,426.803	4,853.605	0.00E+00	8.78E+00	1.76E+01	5.0000	2.531E+03
I-129	7.3684E-07	2,426.803	4,853.605	0.00E+00	1.79E-03	3.58E-03	7.0000	2.856E+02
Kr-85	6.9368E-02	2,426.803	4,853.605	0.00E+00	1.68E+02	3.37E+02	11.0000	3.248E+01
Np-237	1.2662E-06	2,426.803	4,853.605	0.00E+00	3.07E-03	6.15E-03		
Pa-231	9.1654E-09	2,426.803	4,853.605	0.00E+00	2.22E-05	4.45E-05		
Pb-210	1.3728E-13	2,426.803	4,853.605	0.00E+00	3.33E-10	6.66E-10		
Pm-147	1.0702E-02	2,426.803	4,853.605	0.00E+00	2.60E+01	5.19E+01		
Pu-238	8.8692E-04	2,426.803	4,853.605	0.00E+00	2.15E+00	4.30E+00		
Pu-239	5.5263E-03	2,426.803	4,853.605	0.00E+00	1.34E+01	2.68E+01		
Pu-240	2.1233E-03	2,426.803	4,853.605	0.00E+00	5.15E+00	1.03E+01		
Pu-241	3.8962E-02	2,426.803	4,853.605	0.00E+00	9.46E+01	1.89E+02		
Pu-242	2.3128E-07	2,426.803	4,853.605	0.00E+00	5.61E-04	1.12E-03		
Ra-226	4.6752E-13	2,426.803	4,853.605	0.00E+00	1.13E-09	2.27E-09		
Ra-228	2.4827E-10	2,426.803	4,853.605	0.00E+00	6.03E-07	1.21E-06		
Ru-106	9.8526E-08	2,426.803	4,853.605	0.00E+00	2.39E-04	4.78E-04		
Sa-79	1.3015E-05	2,426.803	4,853.605	0.00E+00	3.16E-02	6.32E-02		
Sn-126	1.2165E-05	2,426.803	4,853.605	0.00E+00	2.95E-02	5.90E-02		
Sr-90	1.6195E+00	2,426.803	4,853.605	0.00E+00	3.93E+03	7.86E+03		
Tc-99	4.4241E-04	2,426.803	4,853.605	0.00E+00	1.07E+00	2.15E+00		
Th-229	4.2451E-10	2,426.803	4,853.605	0.00E+00	1.03E-06	2.06E-06		
Th-230	6.1398E-11	2,426.803	4,853.605	0.00E+00	1.49E-07	2.98E-07		
Th-232	2.5278E-10	2,426.803	4,853.605	0.00E+00	6.13E-07	1.23E-06		
Tl-208	1.5098E-08	2,426.803	4,853.605	0.00E+00	3.66E-05	7.33E-05		
U-232	4.0662E-08	2,426.803	4,853.605	0.00E+00	9.87E-05	1.97E-04		
U-233	1.2217E-07	2,426.803	4,853.605	0.00E+00	2.96E-04	5.93E-04		
U-234	2.2391E-07	2,426.803	4,853.605	0.00E+00	5.43E-04	1.09E-03		
U-235	-2.6194E-06	2,426.803	0.000	9.61E-03	3.25E-03	9.61E-03		
U-236	1.2695E-05	2,426.803	4,853.605	0.00E+00	3.08E-02	6.16E-02		
U-238	-3.6331E-08	2,426.803	0.000	5.98E-03	5.89E-03	5.98E-03		
Y-90	1.6195E+00	2,426.803	4,853.605	0.00E+00	3.93E+03	7.86E+03		
Other Radionuclides					4.18E+03	8.35E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.15E+01	1.03E+02
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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	758,288	2,426.803	
Bounding:		4,853.605	

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	3.20	
Bounding:	6.40		

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 1Fuel decay start date: 1994
 SNF ID #: 370 Estimates as of: 2010
 Fuel Units & Descr: 40 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=7.12kg ; EOL=6.86kg 2Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 15 years

Estimated
 Canister usage:
 18"x10"
 0.36

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	1.9744E-09	248.198	496.396	0.00E+00	4.90E-07	9.80E-07		
Am-241	2.8150E-03	248.198	496.396	0.00E+00	6.99E-01	1.40E+00	0.0150	5.630E+13
Am-242m	1.3501E-06	248.198	496.396	0.00E+00	3.35E-04	6.70E-04	0.0250	1.177E+13
Am-243	1.4761E-07	248.198	496.396	0.00E+00	3.66E-05	7.33E-05	0.0375	1.016E+13
C-14	1.2854E-04	248.198	496.396	0.00E+00	3.19E-02	6.38E-02	0.0575	1.090E+13
Cf-36	2.8120E-06	248.198	496.396	0.00E+00	6.98E-04	1.40E-03	0.0850	6.594E+12
Cm-243	1.4075E-07	248.198	496.396	0.00E+00	3.49E-05	6.99E-05	0.1250	4.318E+12
Cm-244	1.1570E-06	248.198	496.396	0.00E+00	2.87E-04	5.74E-04	0.2250	5.646E+12
Co-60	3.4481E-01	248.198	496.396	0.00E+00	8.56E+01	1.71E+02	0.3750	2.503E+12
Cs-134	3.1474E-03	248.198	496.396	0.00E+00	7.81E-01	1.56E+00	0.5750	4.061E+13
Cs-135	3.2195E-05	248.198	496.396	0.00E+00	7.99E-03	1.60E-02	0.8500	5.138E+11
Cs-137	2.1880E+00	248.198	496.396	0.00E+00	5.43E+02	1.09E+03	1.2500	1.287E+13
Eu-154	6.8647E-03	248.198	496.396	0.00E+00	1.70E+00	3.41E+00	1.7500	1.227E+10
Eu-155	7.2481E-03	248.198	496.396	0.00E+00	1.80E+00	3.60E+00	2.2500	7.744E+07
Fe-55	5.3744E-02	248.198	496.396	0.00E+00	1.33E+01	2.67E+01	2.7500	8.775E+05
H-3	6.3414E-03	248.198	496.396	0.00E+00	1.57E+00	3.15E+00	3.5000	4.969E+04
I-129	7.3684E-07	248.198	496.396	0.00E+00	1.83E-04	3.66E-04	5.0000	6.628E+02
Kr-85	1.3236E-01	248.198	496.396	0.00E+00	3.29E+01	6.57E+01	7.0000	2.970E+01
Np-237	1.2504E-06	248.198	496.396	0.00E+00	3.10E-04	6.21E-04	11.0000	3.380E+00
Pa-231	5.9774E-09	248.198	496.396	0.00E+00	1.48E-06	2.97E-06		
Pb-210	3.3534E-14	248.198	496.396	0.00E+00	8.32E-12	1.66E-11		
Pm-147	1.5002E-01	248.198	496.396	0.00E+00	3.72E+01	7.45E+01		
Pu-238	9.5970E-04	248.198	496.396	0.00E+00	2.38E-01	4.76E-01		
Pu-239	5.5278E-03	248.198	496.396	0.00E+00	1.37E+00	2.74E+00		
Pu-240	2.1248E-03	248.198	496.396	0.00E+00	5.27E-01	1.05E+00		
Pu-241	6.3023E-02	248.198	496.396	0.00E+00	1.56E+01	3.13E+01		
Pu-242	2.3128E-07	248.198	496.396	0.00E+00	5.74E-05	1.15E-04		
Ra-226	1.6346E-13	248.198	496.396	0.00E+00	4.06E-11	8.11E-11		
Ra-228	2.3173E-10	248.198	496.396	0.00E+00	5.75E-08	1.15E-07		
Ru-106	9.5038E-05	248.198	496.396	0.00E+00	2.36E-02	4.72E-02		
Se-79	1.3017E-05	248.198	496.396	0.00E+00	3.23E-03	6.46E-03		
Sn-126	1.2165E-05	248.198	496.396	0.00E+00	3.02E-03	6.04E-03		
Sr-90	2.0541E+00	248.198	496.396	0.00E+00	5.10E+02	1.02E+03		
Tc-99	4.4241E-04	248.198	496.396	0.00E+00	1.10E-01	2.20E-01		
Th-229	2.5218E-10	248.198	496.396	0.00E+00	6.26E-08	1.25E-07		
Th-230	3.3654E-11	248.198	496.396	0.00E+00	8.35E-09	1.67E-08		
Th-232	2.5278E-10	248.198	496.396	0.00E+00	6.27E-08	1.25E-07		
Ti-208	1.6511E-08	248.198	496.396	0.00E+00	4.10E-06	8.20E-06		
U-232	4.4722E-08	248.198	496.396	0.00E+00	1.11E-05	2.22E-05		
U-233	1.2209E-07	248.198	496.396	0.00E+00	3.03E-05	6.06E-05		
U-234	1.8662E-07	248.198	496.396	0.00E+00	4.63E-05	9.26E-05		
U-235	-2.6194E-06	248.198	0.000	3.03E-03	2.38E-03	3.03E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.2693E-05	248.198	496.396	0.00E+00	3.15E-03	6.30E-03	7.57E+00	1.51E+01
U-238	-3.6331E-08	248.198	0.000	1.92E-03	1.91E-03	1.92E-03	Total	Total
Y-90	2.0541E+00	248.198	496.396	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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.66292135	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	173.479	248.198	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	291.920	496.396	

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

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
 SNF ID #: 353
 Fuel Units & Descr: 2 - ELEMENT
 Heavy Metal Mass: BOL=36kg ; EOL=34kg
 ROD Storage Sits: 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							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	1.9744E-09	12.410	24.820	0.00E+00	2.45E-08	4.90E-08		
Am-241	2.8150E-03	12.410	24.820	0.00E+00	3.49E-02	6.99E-02	0.0150	2.815E+12
Am-242m	1.3501E-06	12.410	24.820	0.00E+00	1.68E-05	3.35E-05	0.0250	5.895E+11
Am-243	1.4761E-07	12.410	24.820	0.00E+00	1.83E-06	3.66E-06	0.0375	5.080E+11
C-14	1.2854E-04	12.410	24.820	0.00E+00	1.60E-03	3.19E-03	0.0575	5.451E+11
Ct-36	2.8120E-06	12.410	24.820	0.00E+00	3.49E-05	6.98E-05	0.0850	3.297E+11
Cm-243	1.4075E-07	12.410	24.820	0.00E+00	1.75E-06	3.49E-06	0.1250	2.159E+11
Cm-244	1.1570E-06	12.410	24.820	0.00E+00	1.44E-05	2.87E-05	0.2250	2.823E+11
Co-60	3.4481E-01	12.410	24.820	0.00E+00	4.28E+00	8.56E+00	0.3750	1.251E+11
Cs-134	3.1474E-03	12.410	24.820	0.00E+00	3.91E-02	7.81E-02	0.5750	2.030E+12
Cs-135	3.2195E-05	12.410	24.820	0.00E+00	4.00E-04	7.99E-04	0.8500	2.569E+10
Cs-137	2.1880E+00	12.410	24.820	0.00E+00	2.72E+01	5.43E+01	1.2500	6.437E+11
Eu-154	6.8647E-03	12.410	24.820	0.00E+00	8.52E-02	1.70E-01	1.7500	6.135E+08
Eu-155	7.2481E-03	12.410	24.820	0.00E+00	8.99E-02	1.80E-01	2.2500	3.872E+06
Fe-55	5.3744E-02	12.410	24.820	0.00E+00	6.67E-01	1.33E+00	2.7500	4.387E+04
H-3	6.3414E-03	12.410	24.820	0.00E+00	7.87E-02	1.57E-01	3.5000	2.484E+03
I-129	7.3684E-07	12.410	24.820	0.00E+00	9.14E-06	1.83E-05	5.0000	1.314E+01
Kr-85	1.3236E-01	12.410	24.820	0.00E+00	1.64E+00	3.29E+00	7.0000	1.485E+00
Np-237	1.2504E-06	12.410	24.820	0.00E+00	1.55E-05	3.10E-05	11.0000	1.690E-01
Pa-231	5.9774E-09	12.410	24.820	0.00E+00	7.42E-08	1.48E-07		
Pb-210	3.3534E-14	12.410	24.820	0.00E+00	4.16E-13	8.32E-13		
Pm-147	1.5002E-01	12.410	24.820	0.00E+00	1.86E+00	3.72E+00		
Pu-238	9.5970E-04	12.410	24.820	0.00E+00	1.19E-02	2.38E-02		
Pu-239	5.5278E-03	12.410	24.820	0.00E+00	6.86E-02	1.37E-01		
Pu-240	2.1248E-03	12.410	24.820	0.00E+00	2.64E-02	5.27E-02		
Pu-241	6.3023E-02	12.410	24.820	0.00E+00	7.82E-01	1.56E+00		
Pu-242	2.3128E-07	12.410	24.820	0.00E+00	2.87E-06	5.74E-06		
Ra-226	1.6346E-13	12.410	24.820	0.00E+00	2.03E-12	4.06E-12		
Ra-228	2.3173E-10	12.410	24.820	0.00E+00	2.88E-09	5.75E-09		
Ru-106	9.5038E-05	12.410	24.820	0.00E+00	1.18E-03	2.36E-03		
Se-79	1.3017E-05	12.410	24.820	0.00E+00	1.62E-04	3.23E-04		
Sn-126	1.2165E-05	12.410	24.820	0.00E+00	1.51E-04	3.02E-04		
Sr-90	2.0541E+00	12.410	24.820	0.00E+00	2.55E+01	5.10E+01		
Tc-99	4.4241E-04	12.410	24.820	0.00E+00	5.49E-03	1.10E-02		
Th-229	2.5218E-10	12.410	24.820	0.00E+00	3.13E-09	6.26E-09		
Th-230	3.3654E-11	12.410	24.820	0.00E+00	4.18E-10	8.35E-10		
Th-232	2.5278E-10	12.410	24.820	0.00E+00	3.14E-09	6.27E-09		
Th-208	1.6511E-08	12.410	24.820	0.00E+00	2.05E-07	4.10E-07		
U-232	4.4722E-08	12.410	24.820	0.00E+00	5.55E-07	1.11E-06		
U-233	1.2209E-07	12.410	24.820	0.00E+00	1.52E-06	3.03E-06		
U-234	1.8662E-07	12.410	24.820	0.00E+00	2.32E-06	4.63E-06		
U-235	2.6194E-06	12.410	0.000	1.51E-04	1.19E-04	1.51E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.2693E-05	12.410	24.820	0.00E+00	1.58E-04	3.15E-04	3.78E-01	7.57E-01
U-238	3.6331E-08	12.410	0.000	9.61E-05	9.57E-05	9.61E-05	Total	Total
Y-90	2.0541E+00	12.410	24.820	0.00E+00	2.55E+01	5.10E+01		
Other Radionuclides					2.68E+01	5.37E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.66292135	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	12.144	12.410	
Bounding:	14.596	24.820	

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:	1.02	1.02		1.00
Bounding:	2.04	1.70		

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 1 Fuel decay start date: 1989
 SNF ID #: 233 Estimates as of: 2010
 Fuel Units & Descr: 90 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=17.55kg ; EOL=17.19kg 2 Template Burnup(MWd): 6.65
 ROD Storage Site: HANFORD Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 20 years

Estimated
 Canister usage:
 18"x10"
 0.81

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	2.6436E-09	343.659	687.317	0.00E+00	9.08E-07	1.82E-06	Avg. MeV	
Am-241	3.1429E-03	343.659	687.317	0.00E+00	1.08E+00	2.16E+00	0.0150	6.888E+13
Am-242m	1.3195E-06	343.659	687.317	0.00E+00	4.53E-04	9.07E-04	0.0250	1.434E+13
Am-243	1.4753E-07	343.659	687.317	0.00E+00	5.07E-05	1.01E-04	0.0375	1.242E+13
C-14	1.2847E-04	343.659	687.317	0.00E+00	4.41E-02	8.83E-02	0.0575	1.336E+13
Cl-36	2.8120E-06	343.659	687.317	0.00E+00	9.66E-04	1.93E-03	0.0850	8.067E+12
Cm-243	1.2465E-07	343.659	687.317	0.00E+00	4.28E-05	8.57E-05	0.1250	5.272E+12
Cm-244	9.5564E-07	343.659	687.317	0.00E+00	3.28E-04	6.57E-04	0.2250	6.927E+12
Co-60	1.7880E-01	343.659	687.317	0.00E+00	6.14E+01	1.23E+02	0.3750	3.036E+12
Cs-134	5.8692E-04	343.659	687.317	0.00E+00	2.02E-01	4.03E-01	0.5750	4.993E+13
Cs-135	3.2195E-05	343.659	687.317	0.00E+00	1.11E-02	2.21E-02	0.8500	5.628E+11
Cs-137	1.9489E+00	343.659	687.317	0.00E+00	6.70E+02	1.34E+03	1.2500	9.326E+12
Eu-154	4.5895E-03	343.659	687.317	0.00E+00	1.58E+00	3.15E+00	1.7500	1.446E+10
Eu-155	3.6045E-03	343.659	687.317	0.00E+00	1.24E+00	2.48E+00	2.2500	4.980E+07
Fe-55	1.4185E-02	343.659	687.317	0.00E+00	4.87E+00	9.75E+00	2.7500	5.488E+05
H-3	4.7895E-03	343.659	687.317	0.00E+00	1.65E+00	3.29E+00	3.5000	3.060E+03
I-129	7.3684E-07	343.659	687.317	0.00E+00	2.53E-04	5.06E-04	5.0000	3.679E+02
Kr-85	9.5820E-02	343.659	687.317	0.00E+00	3.29E+01	6.59E+01	7.0000	4.157E+01
Np-237	1.2552E-06	343.659	687.317	0.00E+00	4.31E-04	8.63E-04	11.0000	4.731E+00
Pa-231	7.0406E-09	343.659	687.317	0.00E+00	2.42E-06	4.84E-06		
Pb-210	5.8000E-14	343.659	687.317	0.00E+00	1.99E-11	3.99E-11		
Pm-147	4.0075E-02	343.659	687.317	0.00E+00	1.38E+01	2.75E+01		
Pu-238	9.2256E-04	343.659	687.317	0.00E+00	3.17E-01	6.34E-01		
Pu-239	5.5278E-03	343.659	687.317	0.00E+00	1.90E+00	3.80E+00		
Pu-240	2.1248E-03	343.659	687.317	0.00E+00	7.30E-01	1.46E+00		
Pu-241	4.9549E-02	343.659	687.317	0.00E+00	1.70E+01	3.41E+01		
Pu-242	2.3128E-07	343.659	687.317	0.00E+00	7.95E-05	1.59E-04		
Ra-226	2.4526E-13	343.659	687.317	0.00E+00	8.43E-11	1.69E-10		
Ra-228	2.4015E-10	343.659	687.317	0.00E+00	8.25E-08	1.65E-07		
Ru-106	3.0602E-06	343.659	687.317	0.00E+00	1.05E-03	2.10E-03		
Se-79	1.3015E-05	343.659	687.317	0.00E+00	4.47E-03	8.95E-03		
Sn-126	1.2165E-05	343.659	687.317	0.00E+00	4.18E-03	8.36E-03		
Sr-90	1.8226E+00	343.659	687.317	0.00E+00	6.26E+02	1.25E+03		
Tc-99	4.4241E-04	343.659	687.317	0.00E+00	1.52E-01	3.04E-01		
Th-229	3.0962E-10	343.659	687.317	0.00E+00	1.06E-07	2.13E-07		
Th-230	4.2346E-11	343.659	687.317	0.00E+00	1.46E-08	2.91E-08		
Th-232	2.5278E-10	343.659	687.317	0.00E+00	8.69E-08	1.74E-07		
Th-208	1.5820E-08	343.659	687.317	0.00E+00	5.44E-06	1.09E-05		
U-232	4.2647E-08	343.659	687.317	0.00E+00	1.47E-05	2.93E-05		
U-233	1.2211E-07	343.659	687.317	0.00E+00	4.20E-05	8.39E-05		
U-234	1.9955E-07	343.659	687.317	0.00E+00	6.86E-05	1.37E-04		
U-235	-2.6194E-06	343.659	0.000	7.59E-03	6.68E-03	7.59E-03		
U-236	1.2693E-05	343.659	687.317	0.00E+00	4.36E-03	8.72E-03		
U-238	-3.6331E-08	343.659	0.000	4.72E-03	4.71E-03	4.72E-03	8.60E+00	1.72E+01
Y-90	1.8241E+00	343.659	687.317	0.00E+00	6.27E+02	1.25E+03	Total	Total
Other Radionuclides					6.62E+02	1.32E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20.00000115	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	256.563	343.659	
Bounding:		687.317	

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:	0.57	1.34	
Bounding:	1.15		

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
 SNF ID #: 267
 Fuel Units & Descr: 222 - ELEMENT
 Heavy Metal Mass: BOL=42.22kg ; EOL=41.29kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 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"
 2.00

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	8.0632E-10	889.993	1,779.986	0.00E+00	7.18E-07	1.44E-06	0.0150	3.012E+14
Am-241	2.2586E-03	889.993	1,779.986	0.00E+00	2.01E+00	4.02E+00	0.0250	6.539E+13
Am-242m	1.9925E-06	889.993	1,779.986	0.00E+00	1.77E-03	3.55E-03	0.0375	8.145E+13
Am-243	2.3323E-07	889.993	1,779.986	0.00E+00	2.08E-04	4.15E-04	0.0575	6.244E+13
C-14	4.3308E-05	889.993	1,779.986	0.00E+00	3.85E-02	7.71E-02	0.0850	4.370E+13
Cl-36	4.3023E-08	889.993	1,779.986	0.00E+00	3.83E-05	7.66E-05	0.1250	6.537E+13
Cm-243	2.7429E-07	889.993	1,779.986	0.00E+00	2.44E-04	4.88E-04	0.2250	3.649E+13
Cm-244	3.1504E-06	889.993	1,779.986	0.00E+00	2.80E-03	5.61E-03	0.3750	1.624E+13
Co-60	3.1008E-02	889.993	1,779.986	0.00E+00	2.76E+01	5.52E+01	0.5750	2.059E+14
Cs-134	1.0367E-01	889.993	1,779.986	0.00E+00	9.23E+01	1.85E+02	0.8500	5.067E+13
Cs-135	3.1549E-05	889.993	1,779.986	0.00E+00	2.81E-02	5.62E-02	1.2500	5.253E+13
Cs-137	2.7564E+00	889.993	1,779.986	0.00E+00	2.45E+03	4.91E+03	1.7500	1.503E+12
Eu-154	1.3490E+00	889.993	1,779.986	0.00E+00	1.20E+03	2.40E+03	2.2500	1.828E+11
Eu-155	4.3880E-01	889.993	1,779.986	0.00E+00	3.91E+02	7.81E+02	2.7500	1.484E+09
Fe-55	8.6782E-03	889.993	1,779.986	0.00E+00	7.72E+00	1.54E+01	3.5000	1.735E+08
H-3	1.0805E-02	889.993	1,779.986	0.00E+00	9.62E+00	1.92E+01	5.0000	1.042E+03
I-129	7.3805E-07	889.993	1,779.986	0.00E+00	6.57E-04	1.31E-03	7.0000	1.179E+02
Kr-85	2.5218E-01	889.993	1,779.986	0.00E+00	2.24E+02	4.49E+02	11.0000	1.343E+01
Np-237	1.4463E-06	889.993	1,779.986	0.00E+00	1.29E-03	2.57E-03		
Pa-231	3.5970E-09	889.993	1,779.986	0.00E+00	3.20E-06	6.40E-06		
Pb-210	8.2511E-15	889.993	1,779.986	0.00E+00	7.34E-12	1.47E-11		
Pm-147	2.0767E+00	889.993	1,779.986	0.00E+00	1.85E+03	3.70E+03		
Pu-238	1.3514E-03	889.993	1,779.986	0.00E+00	1.20E+00	2.41E+00		
Pu-239	5.6947E-03	889.993	1,779.986	0.00E+00	5.07E+00	1.01E+01		
Pu-240	2.2647E-03	889.993	1,779.986	0.00E+00	2.02E+00	4.03E+00		
Pu-241	1.2574E-01	889.993	1,779.986	0.00E+00	1.12E+02	2.24E+02		
Pu-242	3.0602E-07	889.993	1,779.986	0.00E+00	2.72E-04	5.45E-04		
Ra-226	5.7353E-14	889.993	1,779.986	0.00E+00	5.10E-11	1.02E-10		
Ra-228	1.8150E-10	889.993	1,779.986	0.00E+00	1.62E-07	3.23E-07		
Ru-106	9.3744E-02	889.993	1,779.986	0.00E+00	8.34E+01	1.67E+02		
Se-79	1.2938E-05	889.993	1,779.986	0.00E+00	1.15E-02	2.30E-02		
Sn-126	1.2239E-05	889.993	1,779.986	0.00E+00	1.09E-02	2.18E-02		
Sr-90	2.6000E+00	889.993	1,779.986	0.00E+00	2.31E+03	4.63E+03		
Tc-99	4.4120E-04	889.993	1,779.986	0.00E+00	3.93E-01	7.85E-01		
Th-229	1.4749E-10	889.993	1,779.986	0.00E+00	1.31E-07	2.63E-07		
Th-230	1.9549E-11	889.993	1,779.986	0.00E+00	1.74E-08	3.48E-08		
Th-232	2.3744E-10	889.993	1,779.986	0.00E+00	2.11E-07	4.23E-07		
Tl-208	1.9459E-08	889.993	1,779.986	0.00E+00	1.73E-05	3.46E-05		
U-232	5.6015E-08	889.993	1,779.986	0.00E+00	4.99E-05	9.97E-05		
U-233	1.3132E-07	889.993	1,779.986	0.00E+00	1.17E-04	2.34E-04		
U-234	1.7323E-07	889.993	1,779.986	0.00E+00	1.54E-04	3.08E-04		
U-235	-2.6159E-06	889.993	0.000	1.82E-02	1.58E-02	1.82E-02		
U-236	1.2717E-05	889.993	1,779.986	0.00E+00	1.13E-02	2.26E-02		
U-238	-3.8857E-08	889.993	0.000	1.14E-02	1.13E-02	1.14E-02		
Y-90	2.6015E+00	889.993	1,779.986	0.00E+00	2.32E+03	4.63E+03		
Other Radionuclides					3.38E+03	6.77E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.47E+01	8.94E+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:	ALUM (1100)	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.89809973	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	102.859	889.993	
Bounding:		1,779.986	

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:	0.57	8.65	
Bounding:	1.14		

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
 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 _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	286.382	572.764	0.00E+00	2.44E-07	4.88E-07	Avg. MeV	
Am-241	1.8331E-03	286.382	572.764	0.00E+00	5.25E-01	1.05E+00	0.0150	9.257E+13
Am-242m	1.4129E-06	286.382	572.764	0.00E+00	4.05E-04	8.09E-04	0.0250	2.037E+13
Am-243	1.4774E-07	286.382	572.764	0.00E+00	4.23E-05	8.46E-05	0.0375	1.735E+13
C-14	1.2871E-04	286.382	572.764	0.00E+00	3.69E-02	7.37E-02	0.0575	1.781E+13
Cl-36	2.8120E-06	286.382	572.764	0.00E+00	8.05E-04	1.61E-03	0.0850	1.103E+13
Cm-243	1.7940E-07	286.382	572.764	0.00E+00	5.14E-05	1.03E-04	0.1250	8.010E+12
Cm-244	1.6962E-06	286.382	572.764	0.00E+00	4.86E-04	9.72E-04	0.2250	9.357E+12
Co-60	1.2839E+00	286.382	572.764	0.00E+00	3.68E+02	7.35E+02	0.3750	4.749E+12
Cs-134	9.0541E-02	286.382	572.764	0.00E+00	2.59E+01	5.19E+01	0.5750	6.313E+13
Cs-135	3.2195E-05	286.382	572.764	0.00E+00	9.22E-03	1.84E-02	0.8500	2.709E+12
Cs-137	2.7564E+00	286.382	572.764	0.00E+00	7.89E+02	1.58E+03	1.2500	5.502E+13
Eu-154	1.5368E-02	286.382	572.764	0.00E+00	4.40E+00	8.80E+00	1.7500	3.668E+10
Eu-155	2.9293E-02	286.382	572.764	0.00E+00	8.39E+00	1.68E+01	2.2500	5.912E+10
Fe-55	7.7158E-01	286.382	572.764	0.00E+00	2.21E+02	4.42E+02	2.7500	4.691E+08
H-3	1.1111E-02	286.382	572.764	0.00E+00	3.18E+00	6.36E+00	3.5000	5.461E+07
I-129	7.3684E-07	286.382	572.764	0.00E+00	2.11E-04	4.22E-04	5.0000	3.060E+02
Kr-85	2.5263E-01	286.382	572.764	0.00E+00	7.23E+01	1.45E+02	7.0000	3.464E+01
Np-237	1.2427E-06	286.382	572.764	0.00E+00	3.56E-04	7.12E-04	11.0000	3.947E+00
Pa-231	3.8511E-09	286.382	572.764	0.00E+00	1.10E-06	2.21E-06		
Pb-210	7.3880E-15	286.382	572.764	0.00E+00	2.12E-12	4.23E-12		
Pm-147	2.1023E+00	286.382	572.764	0.00E+00	6.02E+02	1.20E+03		
Pu-238	1.0383E-03	286.382	572.764	0.00E+00	2.97E-01	5.95E-01		
Pu-239	5.5293E-03	286.382	572.764	0.00E+00	1.58E+00	3.17E+00		
Pu-240	2.1278E-03	286.382	572.764	0.00E+00	6.09E-01	1.22E+00		
Pu-241	1.0195E-01	286.382	572.764	0.00E+00	2.92E+01	5.84E+01		
Pu-242	2.3128E-07	286.382	572.764	0.00E+00	6.62E-05	1.32E-04		
Ra-226	5.2782E-14	286.382	572.764	0.00E+00	1.51E-11	3.02E-11		
Ra-228	1.9338E-10	286.382	572.764	0.00E+00	5.54E-08	1.11E-07		
Ru-106	9.1684E-02	286.382	572.764	0.00E+00	2.63E+01	5.25E+01		
Se-79	1.3018E-05	286.382	572.764	0.00E+00	3.73E-03	7.46E-03		
Sn-126	1.2167E-05	286.382	572.764	0.00E+00	3.48E-03	6.97E-03		
Sr-90	2.6045E+00	286.382	572.764	0.00E+00	7.46E+02	1.49E+03		
Tc-99	4.4241E-04	286.382	572.764	0.00E+00	1.27E-01	2.53E-01		
Th-229	1.3713E-10	286.382	572.764	0.00E+00	3.93E-08	7.85E-08		
Th-230	1.8090E-11	286.382	572.764	0.00E+00	5.18E-09	1.04E-08		
Th-232	2.5278E-10	286.382	572.764	0.00E+00	7.24E-08	1.45E-07		
Tl-208	1.6947E-08	286.382	572.764	0.00E+00	4.85E-06	9.71E-06		
U-232	4.8737E-08	286.382	572.764	0.00E+00	1.40E-05	2.79E-05		
U-233	1.2203E-07	286.382	572.764	0.00E+00	3.49E-05	6.99E-05		
U-234	1.5925E-07	286.382	572.764	0.00E+00	4.56E-05	9.12E-05		
U-235	2.6194E-06	286.382	0.000	3.95E-03	3.20E-03	3.95E-03		
U-236	1.2693E-05	286.382	572.764	0.00E+00	3.64E-03	7.27E-03		
U-238	-3.6331E-08	286.382	0.000	2.54E-03	2.53E-03	2.54E-03		
Y-90	2.6060E+00	286.382	572.764	0.00E+00	7.46E+02	1.49E+03		
Other Radionuclides					1.03E+03	2.06E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.67E+01	3.33E+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 (304)	SST	
BOL HM Constituents:	U-ZrHx	U	
BOL Enrichment %:	19.49184744	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	273.960	286.382	
Bounding:		572.764	

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:	0.90	1.05	
Bounding:	1.79		

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 (ACPR) 1Fuel decay start date: 2035
 SNF ID #: 895 Estimates as of: 2010
 Fuel Units & Desc: 182 - ELEMENT Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=48.36kg ; EOL=48.36kg 2Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
3Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 1.64

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	8.5173E-10	923.247	1,846.493	0.00E+00	7.86E-07	1.57E-06	0.0150	2.984E+14
Am-241	1.8331E-03	923.247	1,846.493	0.00E+00	1.69E+00	3.38E+00	0.0250	6.567E+13
Am-242m	1.4129E-06	923.247	1,846.493	0.00E+00	1.30E-03	2.61E-03	0.0375	5.592E+13
Am-243	1.4774E-07	923.247	1,846.493	0.00E+00	1.36E-04	2.73E-04	0.0575	5.740E+13
C-14	1.2871E-04	923.247	1,846.493	0.00E+00	1.19E-01	2.38E-01	0.0850	3.556E+13
Ci-36	2.8120E-06	923.247	1,846.493	0.00E+00	2.60E-03	5.19E-03	0.1250	2.582E+13
Cm-243	1.7940E-07	923.247	1,846.493	0.00E+00	1.66E-04	3.31E-04	0.2250	3.017E+13
Cm-244	1.6962E-06	923.247	1,846.493	0.00E+00	1.57E-03	3.13E-03	0.3750	1.531E+13
Co-60	1.2839E+00	923.247	1,846.493	0.00E+00	1.19E+03	2.37E+03	0.5750	2.035E+14
Cs-134	9.0541E-02	923.247	1,846.493	0.00E+00	8.36E+01	1.67E+02	0.8500	8.734E+12
Cs-135	3.2195E-05	923.247	1,846.493	0.00E+00	2.97E-02	5.94E-02	1.2500	1.774E+14
Cs-137	2.7564E+00	923.247	1,846.493	0.00E+00	2.54E+03	5.09E+03	1.7500	1.183E+11
Eu-154	1.5368E-02	923.247	1,846.493	0.00E+00	1.42E+01	2.84E+01	2.2500	1.906E+11
Eu-155	2.9293E-02	923.247	1,846.493	0.00E+00	2.70E+01	5.41E+01	2.7500	1.512E+09
Fe-55	7.7158E-01	923.247	1,846.493	0.00E+00	7.12E+02	1.42E+03	3.5000	1.761E+08
H-3	1.1111E-02	923.247	1,846.493	0.00E+00	1.03E+01	2.05E+01	5.0000	9.976E+02
I-129	7.3684E-07	923.247	1,846.493	0.00E+00	6.80E-04	1.36E-03	7.0000	1.130E+02
Kr-85	2.5263E-01	923.247	1,846.493	0.00E+00	2.33E+02	4.66E+02	11.0000	1.287E+01
Np-237	1.2427E-06	923.247	1,846.493	0.00E+00	1.15E-03	2.29E-03		
Pa-231	3.8511E-09	923.247	1,846.493	0.00E+00	3.56E-06	7.11E-06		
Pb-210	7.3880E-15	923.247	1,846.493	0.00E+00	6.82E-12	1.36E-11		
Pm-147	2.1023E+00	923.247	1,846.493	0.00E+00	1.94E+03	3.88E+03		
Pu-238	1.0383E-03	923.247	1,846.493	0.00E+00	9.59E-01	1.92E+00		
Pu-239	5.5293E-03	923.247	1,846.493	0.00E+00	5.10E+00	1.02E+01		
Pu-240	2.1278E-03	923.247	1,846.493	0.00E+00	1.96E+00	3.93E+00		
Pu-241	1.0195E-01	923.247	1,846.493	0.00E+00	9.41E+01	1.88E+02		
Pu-242	2.3128E-07	923.247	1,846.493	0.00E+00	2.14E-04	4.27E-04		
Ra-226	5.2782E-14	923.247	1,846.493	0.00E+00	4.87E-11	9.75E-11		
Ra-228	1.9338E-10	923.247	1,846.493	0.00E+00	1.79E-07	3.57E-07		
Ru-106	9.1684E-02	923.247	1,846.493	0.00E+00	8.46E+01	1.69E+02		
Se-79	1.3018E-05	923.247	1,846.493	0.00E+00	1.20E-02	2.40E-02		
Sn-126	1.2167E-05	923.247	1,846.493	0.00E+00	1.12E-02	2.25E-02		
Sr-90	2.6045E+00	923.247	1,846.493	0.00E+00	2.40E+03	4.81E+03		
Tc-99	4.4241E-04	923.247	1,846.493	0.00E+00	4.08E-01	8.17E-01		
Th-229	1.3713E-10	923.247	1,846.493	0.00E+00	1.27E-07	2.53E-07		
Th-230	1.8090E-11	923.247	1,846.493	0.00E+00	1.67E-08	3.34E-08		
Th-232	2.5278E-10	923.247	1,846.493	0.00E+00	2.33E-07	4.67E-07		
Th-208	1.6947E-08	923.247	1,846.493	0.00E+00	1.56E-05	3.13E-05		
U-232	4.8737E-08	923.247	1,846.493	0.00E+00	4.50E-05	9.00E-05		
U-233	1.2203E-07	923.247	1,846.493	0.00E+00	1.13E-04	2.25E-04		
U-234	1.5925E-07	923.247	1,846.493	0.00E+00	1.47E-04	2.94E-04		
U-235	-2.6194E-06	923.247	0.000	2.08E-02	1.84E-02	2.08E-02		
U-236	1.2693E-05	923.247	1,846.493	0.00E+00	1.17E-02	2.34E-02		
U-238	-3.6331E-08	923.247	0.000	1.30E-02	1.30E-02	1.30E-02		
Y-90	2.6060E+00	923.247	1,846.493	0.00E+00	2.41E+03	4.81E+03		
Other Radionuclides					3.33E+03	6.66E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.37E+01	1.07E+02
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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.95031243	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	923.247	923.247	Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding:	200.006	1,846.493	Bounding burnup assumed to be twice nominal burnup.

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.56	
Bounding:	1.12	9.23

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 (ARRR) 1Fuel decay start date: 2035
 SNF ID #: 780 Estimates as of: 2010
 Fuel Units & Descr: 15 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=10.28kg ; EOL=8.18kg 2Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.14

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	2,000.380	4,000.759	0.00E+00	1.70E-06	3.41E-06	Avg. MeV	
Am-241	1.8331E-03	2,000.380	4,000.759	0.00E+00	3.67E+00	7.33E+00	0.0150	6.466E+14
Am-242m	1.4129E-06	2,000.380	4,000.759	0.00E+00	2.83E-03	5.65E-03	0.0250	1.423E+14
Am-243	1.4774E-07	2,000.380	4,000.759	0.00E+00	2.96E-04	5.91E-04	0.0375	1.212E+14
C-14	1.2871E-04	2,000.380	4,000.759	0.00E+00	2.57E-01	5.15E-01	0.0575	1.244E+14
Cl-36	2.8120E-06	2,000.380	4,000.759	0.00E+00	5.63E-03	1.13E-02	0.0850	7.705E+13
Cm-243	1.7940E-07	2,000.380	4,000.759	0.00E+00	3.59E-04	7.18E-04	0.1250	5.595E+13
Cm-244	1.6962E-06	2,000.380	4,000.759	0.00E+00	3.39E-03	6.79E-03	0.2250	6.536E+13
Co-60	1.2839E+00	2,000.380	4,000.759	0.00E+00	2.57E+03	5.14E+03	0.3750	3.317E+13
Cs-134	9.0541E-02	2,000.380	4,000.759	0.00E+00	1.81E+02	3.62E+02	0.5750	4.410E+14
Cs-135	3.2195E-05	2,000.380	4,000.759	0.00E+00	6.44E-02	1.29E-01	0.8500	1.892E+13
Cs-137	2.7564E+00	2,000.380	4,000.759	0.00E+00	5.51E+03	1.10E+04	1.2500	3.843E+14
Eu-154	1.5368E-02	2,000.380	4,000.759	0.00E+00	3.07E+01	6.15E+01	1.7500	2.562E+11
Eu-155	2.9293E-02	2,000.380	4,000.759	0.00E+00	5.86E+01	1.17E+02	2.2500	4.130E+11
Fe-55	7.7158E-01	2,000.380	4,000.759	0.00E+00	1.54E+03	3.09E+03	2.7500	3.277E+09
H-3	1.1111E-02	2,000.380	4,000.759	0.00E+00	2.22E+01	4.45E+01	3.5000	3.815E+08
I-129	7.3684E-07	2,000.380	4,000.759	0.00E+00	1.47E-03	2.95E-03	5.0000	2.103E+03
Kr-85	2.5263E-01	2,000.380	4,000.759	0.00E+00	5.05E+02	1.01E+03	7.0000	2.380E+02
Np-237	1.2427E-06	2,000.380	4,000.759	0.00E+00	2.49E-03	4.97E-03	11.0000	2.711E+01
Pa-231	3.8511E-09	2,000.380	4,000.759	0.00E+00	7.70E-06	1.54E-05		
Pb-210	7.3880E-15	2,000.380	4,000.759	0.00E+00	1.48E-11	2.96E-11		
Pm-147	2.1023E+00	2,000.380	4,000.759	0.00E+00	4.21E+03	8.41E+03		
Pu-238	1.0383E-03	2,000.380	4,000.759	0.00E+00	2.08E+00	4.15E+00		
Pu-239	5.5293E-03	2,000.380	4,000.759	0.00E+00	1.11E+01	2.21E+01		
Pu-240	2.1278E-03	2,000.380	4,000.759	0.00E+00	4.26E+00	8.51E+00		
Pu-241	1.0195E-01	2,000.380	4,000.759	0.00E+00	2.04E+02	4.08E+02		
Pu-242	2.3128E-07	2,000.380	4,000.759	0.00E+00	4.63E-04	9.25E-04		
Ra-226	5.2782E-14	2,000.380	4,000.759	0.00E+00	1.06E-10	2.11E-10		
Ra-228	1.9338E-10	2,000.380	4,000.759	0.00E+00	3.87E-07	7.74E-07		
Ru-106	9.1684E-02	2,000.380	4,000.759	0.00E+00	1.83E+02	3.67E+02		
Se-79	1.3018E-05	2,000.380	4,000.759	0.00E+00	2.60E-02	5.21E-02		
Sn-126	1.2167E-05	2,000.380	4,000.759	0.00E+00	2.43E-02	4.87E-02		
Sr-90	2.6045E+00	2,000.380	4,000.759	0.00E+00	5.21E+03	1.04E+04		
Tc-99	4.4241E-04	2,000.380	4,000.759	0.00E+00	8.85E-01	1.77E+00		
Th-229	1.3713E-10	2,000.380	4,000.759	0.00E+00	2.74E-07	5.49E-07		
Th-230	1.8090E-11	2,000.380	4,000.759	0.00E+00	3.62E-08	7.24E-08		
Th-232	2.5278E-10	2,000.380	4,000.759	0.00E+00	5.06E-07	1.01E-06		
Ti-208	1.6947E-08	2,000.380	4,000.759	0.00E+00	3.39E-05	6.78E-05		
U-232	4.8737E-08	2,000.380	4,000.759	0.00E+00	9.75E-05	1.95E-04		
U-233	1.2203E-07	2,000.380	4,000.759	0.00E+00	2.44E-04	4.88E-04		
U-234	1.5925E-07	2,000.380	4,000.759	0.00E+00	3.19E-04	6.37E-04		
U-235	-2.6194E-06	2,000.380	0.000	4.36E-03	0.00E+00	4.36E-03		
U-236	1.2693E-05	2,000.380	4,000.759	0.00E+00	2.54E-02	5.08E-02		
U-238	-3.6331E-08	2,000.380	0.000	2.77E-03	2.70E-03	2.77E-03		
Y-90	2.6060E+00	2,000.380	4,000.759	0.00E+00	5.21E+03	1.04E+04		
Other Radionuclides					7.21E+03	1.44E+04		

Thermal Power	
Nominal Heat	Bounding
Output (Watts)	Heat Output (Watts)
1.16E+02	2.33E+02
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-ZrHX	U	
BOL Enrichment %:	19.64963504	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	581.164	2,000.380	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,000.759	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	5.71	3.44	1.06
Bounding:	11.42		

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: TRIGA STD (AUSTRIA) ¹Fuel decay start date: 2010
 SNF ID #: 469 Estimates as of: 2010
 Fuel Units & Descr: 30 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=5.85kg ; EOL=5.64kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.27

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	8.5173E-10	197.604	395.207	0.00E+00	1.68E-07	3.37E-07	0.0150	6.388E+13
Am-241	1.8331E-03	197.604	395.207	0.00E+00	3.62E-01	7.24E-01	0.0250	1.406E+13
Am-242m	1.4129E-06	197.604	395.207	0.00E+00	2.79E-04	5.58E-04	0.0375	1.197E+13
Am-243	1.4774E-07	197.604	395.207	0.00E+00	2.92E-05	5.84E-05	0.0575	1.229E+13
C-14	1.2871E-04	197.604	395.207	0.00E+00	2.54E-02	5.09E-02	0.0850	7.611E+12
Cf-252	2.8120E-06	197.604	395.207	0.00E+00	5.56E-04	1.11E-03	0.1250	5.527E+12
Cm-243	1.7940E-07	197.604	395.207	0.00E+00	3.54E-05	7.09E-05	0.2250	6.457E+12
Cm-244	1.6962E-06	197.604	395.207	0.00E+00	3.35E-04	6.70E-04	0.3750	3.276E+12
Co-60	1.2839E+00	197.604	395.207	0.00E+00	2.54E+02	5.07E+02	0.5750	4.356E+13
Cs-134	9.0541E-02	197.604	395.207	0.00E+00	1.79E+01	3.58E+01	0.8500	1.869E+12
Cs-135	3.2195E-05	197.604	395.207	0.00E+00	6.36E-03	1.27E-02	1.2500	3.797E+12
Cs-137	2.7564E+00	197.604	395.207	0.00E+00	5.45E+02	1.09E+03	1.7500	2.531E+10
Eu-154	1.5368E-02	197.604	395.207	0.00E+00	3.04E+00	6.07E+00	2.2500	4.080E+10
Eu-155	2.9293E-02	197.604	395.207	0.00E+00	5.79E+00	1.16E+01	2.7500	3.237E+08
Fe-55	7.7158E-01	197.604	395.207	0.00E+00	1.52E+02	3.05E+02	3.5000	3.768E+07
H-3	1.1111E-02	197.604	395.207	0.00E+00	2.20E+00	4.39E+00	5.0000	2.107E+02
I-129	7.3684E-07	197.604	395.207	0.00E+00	1.46E-04	2.91E-04	7.0000	2.386E+01
Kr-85	2.5263E-01	197.604	395.207	0.00E+00	4.99E+01	9.98E+01	11.0000	2.718E+00
Np-237	1.2427E-06	197.604	395.207	0.00E+00	2.46E-04	4.91E-04		
Pa-231	3.8511E-09	197.604	395.207	0.00E+00	7.61E-07	1.52E-06		
Pb-210	7.3880E-15	197.604	395.207	0.00E+00	1.46E-12	2.92E-12		
Pm-147	2.1023E+00	197.604	395.207	0.00E+00	4.15E+02	8.31E+02		
Pu-238	1.0383E-03	197.604	395.207	0.00E+00	2.05E-01	4.10E-01		
Pu-239	5.5293E-03	197.604	395.207	0.00E+00	1.09E+00	2.19E+00		
Pu-240	2.1278E-03	197.604	395.207	0.00E+00	4.20E-01	8.41E-01		
Pu-241	1.0195E-01	197.604	395.207	0.00E+00	2.01E+01	4.03E+01		
Pu-242	2.3128E-07	197.604	395.207	0.00E+00	4.57E-05	9.14E-05		
Ra-226	5.2782E-14	197.604	395.207	0.00E+00	1.04E-11	2.09E-11		
Ra-228	1.9338E-10	197.604	395.207	0.00E+00	3.82E-08	7.64E-08		
Ru-106	9.1684E-02	197.604	395.207	0.00E+00	1.81E+01	3.62E+01		
Se-79	1.3018E-05	197.604	395.207	0.00E+00	2.57E-03	5.14E-03		
Sn-126	1.2167E-05	197.604	395.207	0.00E+00	2.40E-03	4.81E-03		
Sr-90	2.6045E+00	197.604	395.207	0.00E+00	5.15E+02	1.03E+03		
Tc-99	4.4241E-04	197.604	395.207	0.00E+00	8.74E-02	1.75E-01		
Th-229	1.3713E-10	197.604	395.207	0.00E+00	2.71E-08	5.42E-08		
Th-230	1.8090E-11	197.604	395.207	0.00E+00	3.57E-09	7.15E-09		
Th-232	2.5278E-10	197.604	395.207	0.00E+00	5.00E-08	9.99E-08		
Tl-208	1.6947E-08	197.604	395.207	0.00E+00	3.35E-06	6.70E-06		
U-232	4.8737E-08	197.604	395.207	0.00E+00	9.63E-06	1.93E-05		
U-233	1.2203E-07	197.604	395.207	0.00E+00	2.41E-05	4.82E-05		
U-234	1.5925E-07	197.604	395.207	0.00E+00	3.15E-05	6.29E-05		
U-235	-2.6194E-06	197.604	0.000	2.53E-03	2.01E-03	2.53E-03		
U-236	1.2693E-05	197.604	395.207	0.00E+00	2.51E-03	5.02E-03		
U-238	-3.6331E-08	197.604	0.000	1.57E-03	1.57E-03	1.57E-03		
Y-90	2.6060E+00	197.604	395.207	0.00E+00	5.15E+02	1.03E+03		
Other Radionuclides					7.12E+02	1.42E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.15E+01	2.30E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20.00000041	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	57.014	197.604	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		395.207	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.99	3.47	1.00
Bounding:	1.98		

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 (AUSTRIA)
 SNF ID #: 462
 Fuel Units & Descr: 66 - ELEMENT
 Heavy Metal Mass: BOL=11.88kg ; EOL=11.81kg
 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							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	62.998	125.996	0.00E+00	5.08E-08	1.02E-07	0.0150	2.132E+13
Am-241	2.2586E-03	62.998	125.996	0.00E+00	1.42E-01	2.85E-01	0.0250	4.628E+12
Am-242m	1.9925E-06	62.998	125.996	0.00E+00	1.26E-04	2.51E-04	0.0375	5.765E+12
Am-243	2.3323E-07	62.998	125.996	0.00E+00	1.47E-05	2.94E-05	0.0575	4.420E+12
C-14	4.3308E-05	62.998	125.996	0.00E+00	2.73E-03	5.46E-03	0.0850	3.094E+12
Cl-36	4.3023E-08	62.998	125.996	0.00E+00	2.71E-06	5.42E-06	0.1250	4.627E+12
Cm-243	2.7429E-07	62.998	125.996	0.00E+00	1.73E-05	3.46E-05	0.2250	2.583E+12
Cm-244	3.1504E-06	62.998	125.996	0.00E+00	1.98E-04	3.97E-04	0.3750	1.149E+12
Co-60	3.1008E-02	62.998	125.996	0.00E+00	1.95E+00	3.91E+00	0.5750	1.457E+13
Cs-134	1.0367E-01	62.998	125.996	0.00E+00	6.53E+00	1.31E+01	0.8500	3.587E+12
Cs-135	3.1549E-05	62.998	125.996	0.00E+00	1.99E-03	3.98E-03	1.2500	3.719E+12
Cs-137	2.7564E+00	62.998	125.996	0.00E+00	1.74E+02	3.47E+02	1.7500	1.064E+11
Eu-154	1.3490E+00	62.998	125.996	0.00E+00	8.50E+01	1.70E+02	2.2500	1.294E+10
Eu-155	4.3880E-01	62.998	125.996	0.00E+00	2.76E+01	5.53E+01	2.7500	1.051E+08
Fe-55	8.6782E-03	62.998	125.996	0.00E+00	5.47E-01	1.09E+00	3.5000	1.228E+07
H-3	1.0805E-02	62.998	125.996	0.00E+00	6.81E-01	1.36E+00	5.0000	7.925E+01
I-129	7.3805E-07	62.998	125.996	0.00E+00	4.65E-05	9.30E-05	7.0000	8.982E+00
Kr-85	2.5218E-01	62.998	125.996	0.00E+00	1.59E+01	3.18E+01	11.0000	1.024E+00
Np-237	1.4463E-06	62.998	125.996	0.00E+00	9.11E-05	1.82E-04		
Pa-231	3.5970E-09	62.998	125.996	0.00E+00	2.27E-07	4.53E-07		
Pb-210	8.2511E-15	62.998	125.996	0.00E+00	5.20E-13	1.04E-12		
Pm-147	2.0767E+00	62.998	125.996	0.00E+00	1.31E+02	2.62E+02		
Pu-238	1.3514E-03	62.998	125.996	0.00E+00	8.51E-02	1.70E-01		
Pu-239	5.6947E-03	62.998	125.996	0.00E+00	3.59E-01	7.18E-01		
Pu-240	2.2647E-03	62.998	125.996	0.00E+00	1.43E-01	2.85E-01		
Pu-241	1.2574E-01	62.998	125.996	0.00E+00	7.92E+00	1.58E+01		
Pu-242	3.0602E-07	62.998	125.996	0.00E+00	1.93E-05	3.86E-05		
Ra-226	5.7353E-14	62.998	125.996	0.00E+00	3.61E-12	7.23E-12		
Ra-228	1.8150E-10	62.998	125.996	0.00E+00	1.14E-08	2.29E-08		
Ru-106	9.3744E-02	62.998	125.996	0.00E+00	5.91E+00	1.18E+01		
Se-79	1.2938E-05	62.998	125.996	0.00E+00	8.15E-04	1.63E-03		
Sn-126	1.2239E-05	62.998	125.996	0.00E+00	7.71E-04	1.54E-03		
Sr-90	2.6000E+00	62.998	125.996	0.00E+00	1.64E+02	3.28E+02		
Tc-99	4.4120E+04	62.998	125.996	0.00E+00	2.78E+02	5.56E+02		
Th-229	1.4749E-10	62.998	125.996	0.00E+00	9.29E-09	1.86E-08		
Th-230	1.9549E-11	62.998	125.996	0.00E+00	1.23E-09	2.46E-09		
Th-232	2.3744E-10	62.998	125.996	0.00E+00	1.50E-08	2.99E-08		
Tl-208	1.9459E-08	62.998	125.996	0.00E+00	1.23E-06	2.45E-06		
U-232	5.6015E-08	62.998	125.996	0.00E+00	3.53E-06	7.06E-06		
U-233	1.3132E-07	62.998	125.996	0.00E+00	8.27E-06	1.65E-05		
U-234	1.7323E-07	62.998	125.996	0.00E+00	1.09E-05	2.18E-05		
U-235	-2.6159E-06	62.998	0.000	5.13E-03	4.97E-03	5.13E-03		
U-236	1.2717E-05	62.998	125.996	0.00E+00	8.01E-04	1.60E-03		
U-238	-3.8857E-08	62.998	0.000	3.19E-03	3.19E-03	3.19E-03		
Y-90	2.6015E+00	62.998	125.996	0.00E+00	1.64E+02	3.28E+02		
Other Radionuclides					2.39E+02	4.79E+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 (1100)	ALUM	
BOL HM Constituents:	U-ZHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	57.891	62.998	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		125.996	

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

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 (BRAZIL)
 SNF ID #: 1063
 Fuel Units & Descr: 9 - ELEMENT
 Heavy Metal Mass: BOL=1.76kg ; EOL=1.74kg
 ROD Storage Sits: 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	
							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	17.104	34.208	0.00E+00	1.46E-08	2.91E-08	0.0150	5.529E+12
Am-241	1.8331E-03	17.104	34.208	0.00E+00	3.14E-02	6.27E-02	0.0250	1.217E+12
Am-242m	1.4129E-06	17.104	34.208	0.00E+00	2.42E-05	4.83E-05	0.0375	1.036E+12
Am-243	1.4774E-07	17.104	34.208	0.00E+00	2.53E-06	5.05E-06	0.0575	1.063E+12
C-14	1.2871E-04	17.104	34.208	0.00E+00	2.20E-03	4.40E-03	0.0850	6.588E+11
Cl-36	2.8120E-06	17.104	34.208	0.00E+00	4.81E-05	9.62E-05	0.1250	4.784E+11
Cm-243	1.7940E-07	17.104	34.208	0.00E+00	3.07E-06	6.14E-06	0.2250	5.589E+11
Cm-244	1.6962E-06	17.104	34.208	0.00E+00	2.90E-05	5.80E-05	0.3750	2.836E+11
Co-60	1.2839E+00	17.104	34.208	0.00E+00	2.20E+01	4.39E+01	0.5750	3.770E+12
Cs-134	9.0541E-02	17.104	34.208	0.00E+00	1.55E+00	3.10E+00	0.8500	1.618E+11
Cs-135	3.2195E-05	17.104	34.208	0.00E+00	5.51E-04	1.10E-03	1.2500	3.286E+12
Cs-137	2.7564E+00	17.104	34.208	0.00E+00	4.71E+01	9.43E+01	7.0000	2.154E+00
Eu-154	1.5368E-02	17.104	34.208	0.00E+00	2.63E-01	5.26E-01	2.2500	3.531E+09
Eu-155	2.9293E-02	17.104	34.208	0.00E+00	5.01E-01	1.00E+00	2.7500	2.802E+07
Fe-55	7.7158E-01	17.104	34.208	0.00E+00	1.32E+01	2.64E+01	3.5000	3.262E+06
H-3	1.1111E-02	17.104	34.208	0.00E+00	1.90E-01	3.80E-01	5.0000	1.902E+01
I-129	7.3684E-07	17.104	34.208	0.00E+00	1.26E-05	2.52E-05	7.0000	2.154E+00
Kr-85	2.5263E-01	17.104	34.208	0.00E+00	4.32E+00	8.64E+00	11.0000	2.455E-01
Np-237	1.2427E-06	17.104	34.208	0.00E+00	2.13E-05	4.25E-05		
Pa-231	3.8511E-09	17.104	34.208	0.00E+00	6.59E-08	1.32E-07		
Pb-210	7.3880E-15	17.104	34.208	0.00E+00	1.26E-13	2.53E-13		
Pm-147	2.1023E+00	17.104	34.208	0.00E+00	3.60E+01	7.19E+01		
Pu-238	1.0383E-03	17.104	34.208	0.00E+00	1.78E-02	3.55E-02		
Pu-239	5.5293E-03	17.104	34.208	0.00E+00	9.46E-02	1.89E-01		
Pu-240	2.1278E-03	17.104	34.208	0.00E+00	3.64E-02	7.28E-02		
Pu-241	1.0195E-01	17.104	34.208	0.00E+00	1.74E+00	3.49E+00		
Pu-242	2.3128E-07	17.104	34.208	0.00E+00	3.96E-06	7.91E-06		
Ra-226	5.2782E-14	17.104	34.208	0.00E+00	9.03E-13	1.81E-12		
Ra-228	1.9338E-10	17.104	34.208	0.00E+00	3.31E-09	6.62E-09		
Ru-106	9.1684E-02	17.104	34.208	0.00E+00	1.57E+00	3.14E+00		
Se-79	1.3018E-05	17.104	34.208	0.00E+00	2.23E-04	4.45E-04		
Sn-126	1.2167E-05	17.104	34.208	0.00E+00	2.08E-04	4.16E-04		
Sr-90	2.6045E+00	17.104	34.208	0.00E+00	4.45E+01	8.91E+01		
Tc-99	4.4241E-04	17.104	34.208	0.00E+00	7.57E-03	1.51E-02		
Th-229	1.3713E-10	17.104	34.208	0.00E+00	2.35E-09	4.69E-09		
Th-230	1.8090E-11	17.104	34.208	0.00E+00	3.09E-10	6.19E-10		
Th-232	2.5278E-10	17.104	34.208	0.00E+00	4.32E-09	8.65E-09		
Tl-208	1.6947E-08	17.104	34.208	0.00E+00	2.90E-07	5.80E-07		
U-232	4.8737E-08	17.104	34.208	0.00E+00	8.34E-07	1.67E-06		
U-233	1.2203E-07	17.104	34.208	0.00E+00	2.09E-06	4.17E-06		
U-234	1.5925E-07	17.104	34.208	0.00E+00	2.72E-06	5.45E-06		
U-235	2.6194E-06	17.104	0.000	7.59E-04	7.14E-04	7.59E-04		
U-236	1.2693E-05	17.104	34.208	0.00E+00	2.17E-04	4.34E-04		
U-238	-3.6331E-08	17.104	0.000	4.72E-04	4.71E-04	4.72E-04		
Y-90	2.6060E+00	17.104	34.208	0.00E+00	4.46E+01	8.91E+01		
Other Radionuclides					6.17E+01	1.23E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.95E-01	1.99E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nomina:	17.104	13.746	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		34.208	Bounding burnup assumed to be twice nominal burnup.

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

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 (BRAZIL)
 SNF ID #: 471
 Fuel Units & Descr: 59 - ELEMENT
 Heavy Metal Mass: BOL=11.09kg ; EOL=10.58kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2006
 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"
 0.53

Radionuclide	m	x _n	x _b	b			Gamma Sources	
				Y _n	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	8.0632E-10	478.691	957.382	0.00E+00	3.86E-07	7.72E-07	0.0150	1.620E+14
Am-241	2.2586E-03	478.691	957.382	0.00E+00	1.08E+00	2.16E+00	0.0250	3.517E+13
Am-242m	1.9925E-06	478.691	957.382	0.00E+00	9.54E-04	1.91E-03	0.0375	4.381E+13
Am-243	2.3323E-07	478.691	957.382	0.00E+00	1.12E-04	2.23E-04	0.0575	3.358E+13
C-14	4.3308E-05	478.691	957.382	0.00E+00	2.07E-02	4.15E-02	0.0850	2.351E+13
Cl-36	4.3023E-08	478.691	957.382	0.00E+00	2.06E-05	4.12E-05	0.1250	3.516E+13
Cm-243	2.7429E-07	478.691	957.382	0.00E+00	1.31E-04	2.63E-04	0.2250	1.963E+13
Cm-244	3.1504E-06	478.691	957.382	0.00E+00	1.51E-03	3.02E-03	0.3750	8.734E+12
Co-60	3.1008E-02	478.691	957.382	0.00E+00	1.48E+01	2.97E+01	0.5750	1.107E+14
Cs-134	1.0367E-01	478.691	957.382	0.00E+00	4.96E+01	9.93E+01	0.8500	2.726E+13
Cs-135	3.1549E-05	478.691	957.382	0.00E+00	1.51E-02	3.02E-02	1.2500	2.826E+13
Cs-137	2.7564E+00	478.691	957.382	0.00E+00	1.32E+03	2.64E+03	1.7500	8.087E+11
Eu-154	1.3490E-01	478.691	957.382	0.00E+00	6.46E+02	1.29E+03	2.2500	9.830E+10
Eu-155	4.3880E-00	478.691	957.382	0.00E+00	2.10E+02	4.20E+02	2.7500	7.983E+08
Fe-55	8.6782E-03	478.691	957.382	0.00E+00	4.15E+00	8.31E+00	3.5000	9.334E+07
H-3	1.0805E-02	478.691	957.382	0.00E+00	5.17E+00	1.03E+01	5.0000	5.530E+02
I-129	7.3805E-07	478.691	957.382	0.00E+00	3.53E-04	7.07E-04	7.0000	6.259E+01
Kr-85	2.5218E-01	478.691	957.382	0.00E+00	1.21E+02	2.41E+02	11.0000	7.129E+02
Np-237	1.4463E-06	478.691	957.382	0.00E+00	6.92E-04	1.38E-03		
Pa-231	3.5970E-09	478.691	957.382	0.00E+00	1.72E-06	3.44E-06		
Pb-210	8.2511E-15	478.691	957.382	0.00E+00	3.95E-12	7.90E-12		
Pm-147	2.0767E+00	478.691	957.382	0.00E+00	9.94E+02	1.99E+03		
Pu-238	1.3514E-03	478.691	957.382	0.00E+00	6.47E-01	1.29E+00		
Pu-239	5.6947E-03	478.691	957.382	0.00E+00	2.73E+00	5.45E+00		
Pu-240	2.2647E-03	478.691	957.382	0.00E+00	1.08E+00	2.17E+00		
Pu-241	1.2574E-01	478.691	957.382	0.00E+00	6.02E+01	1.20E+02		
Pu-242	3.0602E-07	478.691	957.382	0.00E+00	1.46E-04	2.93E-04		
Ra-226	5.7353E-14	478.691	957.382	0.00E+00	2.75E-11	5.49E-11		
Ra-228	1.8150E-10	478.691	957.382	0.00E+00	8.69E-08	1.74E-07		
Ru-106	9.3744E-02	478.691	957.382	0.00E+00	4.49E+01	8.97E+01		
Se-79	1.2938E-05	478.691	957.382	0.00E+00	6.19E-03	1.24E-02		
Sn-126	1.2239E-05	478.691	957.382	0.00E+00	5.86E-03	1.17E-02		
Sr-90	2.6000E+00	478.691	957.382	0.00E+00	1.24E+03	2.49E+03		
Tc-99	4.4120E-04	478.691	957.382	0.00E+00	2.11E-01	4.22E-01		
Th-229	1.4749E-10	478.691	957.382	0.00E+00	7.06E-08	1.41E-07		
Th-230	1.9549E-11	478.691	957.382	0.00E+00	9.36E-09	1.87E-08		
Th-232	2.3744E-10	478.691	957.382	0.00E+00	1.14E-07	2.27E-07		
Tl-208	1.9459E-08	478.691	957.382	0.00E+00	9.31E-06	1.86E-05		
U-232	5.6015E-08	478.691	957.382	0.00E+00	2.68E-05	5.36E-05		
U-233	1.3132E-07	478.691	957.382	0.00E+00	6.29E-05	1.26E-04		
U-234	1.7323E-07	478.691	957.382	0.00E+00	8.29E-05	1.66E-04		
U-235	2.6159E-06	478.691	0.00	4.75E-03	3.49E-03	4.75E-03		
U-236	1.2717E-05	478.691	957.382	0.00E+00	6.09E-03	1.22E-02		
U-238	3.8857E-08	478.691	0.00	2.99E-03	2.97E-03	2.99E-03		
Y-90	2.6015E+00	478.691	957.382	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:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.81043128	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	108.045	478.691	
Bounding:		957.382	

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:	1.17	4.43
Bounding:	2.34	

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 (CORNELL) 1 Fuel decay start date: 1976
 SNF ID #: 1047 Estimates as of: 2010
 Fuel Units & Descr: 7 - ELEMENT Template: TRIGA-AI (LW/U-Zrx, Alum., 10 to 20%, U)
 Heavy Metal Mass: BOL=1.26kg ; EOL=1.26kg 2 Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.0018
Template Decay Time: 25 years

Estimated
Canister usage:
18"x10"
0.06

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	3.8271E-09	0.001	0.001	0.00E+00	4.83E-12	4.83E-12	0.0150	1.275E+08
Am-241	4.4195E-03	0.001	0.001	0.00E+00	5.58E-06	5.58E-06	0.0250	2.356E+07
Am-242m	1.8195E-06	0.001	0.001	0.00E+00	2.30E-09	2.30E-09	0.0375	2.362E+07
Am-243	2.3278E-07	0.001	0.001	0.00E+00	2.94E-10	2.94E-10	0.0575	2.264E+07
C-14	4.3203E-05	0.001	0.001	0.00E+00	5.45E-08	5.45E-08	0.0850	1.517E+07
Cl-36	4.3023E-08	0.001	0.001	0.00E+00	5.43E-11	5.43E-11	0.1250	1.692E+07
Cm-243	1.6872E-07	0.001	0.001	0.00E+00	2.13E-10	2.13E-10	0.2250	2.321E+07
Cm-244	1.4660E-06	0.001	0.001	0.00E+00	1.85E-09	1.85E-09	0.3750	5.149E+06
Co-60	2.2376E-03	0.001	0.001	0.00E+00	2.82E-06	2.82E-06	0.5750	8.285E+06
Cs-134	1.2525E-04	0.001	0.001	0.00E+00	1.58E-07	1.58E-07	0.8500	6.837E+06
Cs-135	3.1549E-05	0.001	0.001	0.00E+00	3.98E-08	3.98E-08	1.2500	7.175E+06
Cs-137	1.7368E+00	0.001	0.001	0.00E+00	2.19E-03	2.19E-03	1.7500	2.197E+05
Eu-154	2.6947E-01	0.001	0.001	0.00E+00	3.40E-04	3.40E-04	2.2500	6.895E+00
Eu-155	2.6857E-02	0.001	0.001	0.00E+00	3.39E-05	3.39E-05	2.7500	2.823E+00
Fe-55	4.2105E-05	0.001	0.001	0.00E+00	5.31E-08	5.31E-08	3.5000	1.832E+00
H-3	3.5173E-03	0.001	0.001	0.00E+00	4.44E-06	4.44E-06	5.0000	7.870E-01
I-129	7.3805E-07	0.001	0.001	0.00E+00	9.31E-10	9.31E-10	7.0000	9.061E-02
Kr-85	6.9263E-02	0.001	0.001	0.00E+00	8.74E-05	8.74E-05	11.0000	1.042E-02
Np-237	1.4752E-06	0.001	0.001	0.00E+00	1.86E-09	1.86E-09		
Pa-231	8.3970E-09	0.001	0.001	0.00E+00	1.06E-11	1.06E-11		
Pb-210	1.4995E-13	0.001	0.001	0.00E+00	1.89E-16	1.89E-16		
Pm-147	1.0567E-02	0.001	0.001	0.00E+00	1.33E-05	1.33E-05		
Pu-238	1.1543E-03	0.001	0.001	0.00E+00	1.46E-06	1.46E-06		
Pu-239	5.6917E-03	0.001	0.001	0.00E+00	7.18E-06	7.18E-06		
Pu-240	2.2602E-03	0.001	0.001	0.00E+00	2.85E-06	2.85E-06		
Pu-241	4.8045E-02	0.001	0.001	0.00E+00	6.06E-05	6.06E-05		
Pu-242	3.0602E-07	0.001	0.001	0.00E+00	3.86E-10	3.86E-10		
Ra-226	5.1293E-13	0.001	0.001	0.00E+00	6.47E-16	6.47E-16		
Ra-228	2.3323E-10	0.001	0.001	0.00E+00	2.94E-13	2.94E-13		
Ru-106	1.0075E-07	0.001	0.001	0.00E+00	1.27E-10	1.27E-10		
Se-79	1.2935E-05	0.001	0.001	0.00E+00	1.63E-08	1.63E-08		
Sn-126	1.2238E-05	0.001	0.001	0.00E+00	1.54E-08	1.54E-08		
Sr-90	1.6165E+00	0.001	0.001	0.00E+00	2.04E-03	2.04E-03		
Tc-99	4.4120E-04	0.001	0.001	0.00E+00	5.57E-07	5.57E-07		
Th-229	4.5684E-10	0.001	0.001	0.00E+00	5.77E-13	5.77E-13		
Th-230	6.8271E-11	0.001	0.001	0.00E+00	8.62E-14	8.62E-14		
Th-232	2.3744E-10	0.001	0.001	0.00E+00	3.00E-13	3.00E-13		
Tl-208	1.7368E-08	0.001	0.001	0.00E+00	2.19E-11	2.19E-11		
U-232	4.6797E-08	0.001	0.001	0.00E+00	5.91E-11	5.91E-11		
U-233	1.3146E-07	0.001	0.001	0.00E+00	1.66E-10	1.66E-10		
U-234	2.5729E-07	0.001	0.001	0.00E+00	3.25E-10	3.25E-10		
U-235	-2.6159E-06	0.001	0.000	5.40E-04	5.40E-04	5.40E-04		
U-236	1.2719E-05	0.001	0.001	0.00E+00	1.61E-08	1.61E-08		
U-238	-3.8857E-08	0.001	0.000	3.40E-04	3.40E-04	3.40E-04		
Y-90	1.6165E+00	0.001	0.001	0.00E+00	2.04E-03	2.04E-03		
Other Radionuclides					2.38E-03	2.38E-03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.09E-05	5.09E-05
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:	ALUM	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.81136943	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	0.001		Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	0.001		Bounding burnup taken directly from SFD (converted to MWd).

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.00	0.00	1.00
Bounding:	0.00	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 (DOW) 1 Fuel decay start date: 2035
 SNF ID #: 970 Estimates as of: 2010
 Fuel Units & Descr: 1 - ELEMENT Template: TRIGA-AI (LW/U-Zrx, Alum., 10 to 20%, U)
 Heavy Metal Mass: BOL=18kg ; EOL=18kg 2 Template Burnup(MWD): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.01

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec
Ac-227	8.0632E-10	1.909	3.818	0.00E+00	1.54E-09	3.08E-09	Avg. MeV	
Am-241	2.2586E-03	1.909	3.818	0.00E+00	4.31E-03	8.62E-03	0.0150	6.460E+11
Am-242m	1.9925E-06	1.909	3.818	0.00E+00	3.80E-06	7.61E-06	0.0250	1.403E+11
Am-243	2.3323E-07	1.909	3.818	0.00E+00	4.45E-07	8.91E-07	0.0375	1.747E+11
C-14	4.3308E-05	1.909	3.818	0.00E+00	8.27E-05	1.65E-04	0.0575	1.339E+11
Cl-36	4.3023E-08	1.909	3.818	0.00E+00	8.21E-08	1.64E-07	0.0850	9.375E+10
Cm-243	2.7429E-07	1.909	3.818	0.00E+00	5.24E-07	1.05E-06	0.1250	1.402E+11
Cm-244	3.1504E-06	1.909	3.818	0.00E+00	6.01E-06	1.20E-05	0.2250	7.827E+10
Co-60	3.1008E-02	1.909	3.818	0.00E+00	5.92E-02	1.18E-01	0.3750	3.483E+10
Cs-134	1.0367E-01	1.909	3.818	0.00E+00	1.98E-01	3.96E-01	0.5750	4.416E+11
Cs-135	3.1549E-05	1.909	3.818	0.00E+00	6.02E-05	1.20E-04	0.8500	1.087E+11
Cs-137	2.7564E+00	1.909	3.818	0.00E+00	5.26E+00	1.05E+01	1.2500	1.127E+11
Eu-154	1.3490E+00	1.909	3.818	0.00E+00	2.58E+00	5.15E+00	1.7500	3.225E+09
Eu-155	4.3880E-01	1.909	3.818	0.00E+00	8.38E-01	1.68E+00	2.2500	3.920E+08
Fe-55	8.6782E-03	1.909	3.818	0.00E+00	1.66E-02	3.31E-02	2.7500	3.184E+06
H-3	1.0805E-02	1.909	3.818	0.00E+00	2.06E-02	4.13E-02	3.5000	3.722E+05
I-129	7.3805E-07	1.909	3.818	0.00E+00	1.41E-06	2.82E-06	5.0000	2.290E+00
Kr-85	2.5218E-01	1.909	3.818	0.00E+00	4.81E-01	9.63E-01	7.0000	2.594E-01
Np-237	1.4463E-06	1.909	3.818	0.00E+00	2.76E-06	5.52E-06	11.0000	2.955E-02
Pa-231	3.5970E-09	1.909	3.818	0.00E+00	6.87E-09	1.37E-08		
Pb-210	8.2511E-15	1.909	3.818	0.00E+00	1.58E-14	3.15E-14		
Pm-147	2.0767E+00	1.909	3.818	0.00E+00	3.96E+00	7.93E+00		
Pu-238	1.3514E-03	1.909	3.818	0.00E+00	2.58E-03	5.16E-03		
Pu-239	5.6947E-03	1.909	3.818	0.00E+00	1.09E-02	2.17E-02		
Pu-240	2.2647E-03	1.909	3.818	0.00E+00	4.32E-03	8.65E-03		
Pu-241	1.2574E-01	1.909	3.818	0.00E+00	2.40E-01	4.80E-01		
Pu-242	3.0602E-07	1.909	3.818	0.00E+00	5.84E-07	1.17E-06		
Ra-226	5.7353E-14	1.909	3.818	0.00E+00	1.09E-13	2.19E-13		
Ra-228	1.8150E-10	1.909	3.818	0.00E+00	3.46E-10	6.93E-10		
Ru-106	9.3744E-02	1.909	3.818	0.00E+00	1.79E-01	3.58E-01		
Se-79	1.2938E-05	1.909	3.818	0.00E+00	2.47E-05	4.94E-05		
Sn-126	1.2239E-05	1.909	3.818	0.00E+00	2.34E-05	4.67E-05		
Sr-90	2.6000E+00	1.909	3.818	0.00E+00	4.96E+00	9.93E+00		
Tc-99	4.4120E-04	1.909	3.818	0.00E+00	8.42E-04	1.68E-03		
Th-229	1.4749E-10	1.909	3.818	0.00E+00	2.82E-10	5.63E-10		
Th-230	1.9549E-11	1.909	3.818	0.00E+00	3.73E-11	7.46E-11		
Th-232	2.3744E-10	1.909	3.818	0.00E+00	4.53E-10	9.07E-10		
Tl-208	1.9459E-08	1.909	3.818	0.00E+00	3.71E-08	7.43E-08		
U-232	5.6015E-08	1.909	3.818	0.00E+00	1.07E-07	2.14E-07		
U-233	1.3132E-07	1.909	3.818	0.00E+00	2.51E-07	5.01E-07		
U-234	1.7323E-07	1.909	3.818	0.00E+00	3.31E-07	6.61E-07		
U-235	-2.6159E-06	1.909	0.000	7.67E-05	7.17E-05	7.67E-05		
U-236	1.2717E-05	1.909	3.818	0.00E+00	2.43E-05	4.86E-05		
U-238	-3.8857E-08	1.909	0.000	4.86E-05	4.85E-05	4.86E-05		
Y-90	2.6015E+00	1.909	3.818	0.00E+00	4.97E+00	9.93E+00		
Other Radionuclides					7.26E+00	1.45E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.59E-02	1.92E-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:	ALUM	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.72222222	10 to 20	

Burnup Summary (MWD) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	1.754	1.909	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		3.818	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.29	1.09	1.00
Bounding:	0.57		

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 (ENGLAND)
 SNF ID #: 485
 Fuel Units & Desc: 84 - ELEMENT
 Heavy Metal Mass: BOL=16.19kg ; EOL=15.83kg
 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"
 0.76

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	8.5173E-10	394.391	788.783	0.00E+00	3.36E-07	6.72E-07	0.0150	1.275E+14
Am-241	1.8331E-03	394.391	788.783	0.00E+00	7.23E-01	1.45E+00	0.0250	2.805E+13
Am-242m	1.4129E-06	394.391	788.783	0.00E+00	5.57E-04	1.11E-03	0.0375	2.389E+13
Am-243	1.4774E-07	394.391	788.783	0.00E+00	5.83E-05	1.17E-04	0.0575	2.452E+13
C-14	1.2871E-04	394.391	788.783	0.00E+00	5.08E-02	1.02E-01	0.0850	1.519E+13
Cf-254	2.8120E-06	394.391	788.783	0.00E+00	1.11E-03	2.22E-03	0.1250	1.103E+13
Cm-243	1.7940E-07	394.391	788.783	0.00E+00	7.08E-05	1.42E-04	0.2250	1.289E+13
Cm-244	1.6962E-06	394.391	788.783	0.00E+00	6.69E-04	1.34E-03	0.3750	6.539E+12
Co-60	1.2839E+00	394.391	788.783	0.00E+00	5.06E+02	1.01E+03	0.5750	8.694E+12
Cs-134	9.0541E-02	394.391	788.783	0.00E+00	3.57E+01	7.14E+01	0.8500	3.731E+12
Cs-135	3.2195E-05	394.391	788.783	0.00E+00	1.27E-02	2.54E-02	1.2500	7.578E+13
Cs-137	2.7564E+00	394.391	788.783	0.00E+00	1.09E+03	2.17E+03	1.7500	5.052E+10
Eu-154	1.5368E-02	394.391	788.783	0.00E+00	6.06E+00	1.21E+01	2.2500	8.142E+10
Eu-155	2.9293E-02	394.391	788.783	0.00E+00	1.16E+01	2.31E+01	2.7500	6.461E+08
Fe-55	7.7158E-01	394.391	788.783	0.00E+00	3.04E+02	6.09E+02	3.5000	7.521E+07
H-3	1.1111E-02	394.391	788.783	0.00E+00	4.38E+00	8.76E+00	5.0000	4.234E+02
I-129	7.3684E-07	394.391	788.783	0.00E+00	2.91E-04	5.81E-04	7.0000	4.794E+01
Kr-85	2.5263E-01	394.391	788.783	0.00E+00	9.96E+01	1.99E+02	11.0000	5.462E+00
Np-237	1.2427E-06	394.391	788.783	0.00E+00	4.90E-04	9.80E-04		
Pa-231	3.8511E-09	394.391	788.783	0.00E+00	1.52E-06	3.04E-06		
Pb-210	7.3880E-15	394.391	788.783	0.00E+00	2.91E-12	5.83E-12		
Pm-147	2.1023E+00	394.391	788.783	0.00E+00	8.29E+02	1.66E+03		
Pu-238	1.0383E-03	394.391	788.783	0.00E+00	4.10E-01	8.19E-01		
Pu-239	5.5293E-03	394.391	788.783	0.00E+00	2.18E+00	4.36E+00		
Pu-240	2.1278E-03	394.391	788.783	0.00E+00	8.39E-01	1.68E+00		
Pu-241	1.0195E-01	394.391	788.783	0.00E+00	4.02E+01	8.04E+01		
Pu-242	2.3128E-07	394.391	788.783	0.00E+00	9.12E-05	1.82E-04		
Ra-226	5.2782E-14	394.391	788.783	0.00E+00	2.08E-11	4.16E-11		
Ra-228	1.9338E-10	394.391	788.783	0.00E+00	7.63E-08	1.53E-07		
Ru-106	9.1684E-02	394.391	788.783	0.00E+00	3.62E+01	7.23E+01		
Se-79	1.3018E-05	394.391	788.783	0.00E+00	5.13E-03	1.03E-02		
Sn-126	1.2167E-05	394.391	788.783	0.00E+00	4.80E-03	9.60E-03		
Sr-90	2.6045E+00	394.391	788.783	0.00E+00	1.03E+03	2.05E+03		
Tc-99	4.4241E-04	394.391	788.783	0.00E+00	1.74E-01	3.49E-01		
Th-229	1.3713E-10	394.391	788.783	0.00E+00	5.41E-08	1.08E-07		
Th-230	1.8090E-11	394.391	788.783	0.00E+00	7.13E-09	1.43E-08		
Th-232	2.5278E-10	394.391	788.783	0.00E+00	9.97E-08	1.99E-07		
Th-208	1.6947E-08	394.391	788.783	0.00E+00	6.68E-06	1.34E-05		
U-232	4.8737E-08	394.391	788.783	0.00E+00	1.92E-05	3.84E-05		
U-233	1.2203E-07	394.391	788.783	0.00E+00	4.81E-05	9.63E-05		
U-234	1.5925E-07	394.391	788.783	0.00E+00	6.28E-05	1.26E-04		
U-235	-2.6194E-06	394.391	0.000	6.93E-03	5.90E-03	6.93E-03		
U-236	1.2693E-05	394.391	788.783	0.00E+00	5.01E-03	1.00E-02		
U-238	-3.6331E-08	394.391	0.000	4.36E-03	4.35E-03	4.36E-03		
Y-90	2.6060E+00	394.391	788.783	0.00E+00	1.03E+03	2.06E+03		
Other Radionuclides					1.42E+03	2.84E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.30E+01	4.59E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.80853811	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	394.391	344.804	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		788.783	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.71	0.87	1.00
Bounding:	1.43		

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 (FINLAND)
 SNF ID #: 463
 Fuel Units & Descr: 69 - ELEMENT
 Heavy Metal Mass: BOL=12.42kg ; EOL=12.34kg
 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"
 0.62

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)		
Ac-227	8.0632E-10	72.448	144.896	0.00E+00	5.84E-08	1.17E-07	Avg. MeV	
Am-241	2.2586E-03	72.448	144.896	0.00E+00	1.64E-01	3.27E-01	0.0150	2.452E+13
Am-242m	1.9925E-06	72.448	144.896	0.00E+00	1.44E-04	2.89E-04	0.0250	5.323E+12
Am-243	2.3323E-07	72.448	144.896	0.00E+00	1.69E-05	3.38E-05	0.0375	6.630E+12
C-14	4.3308E-05	72.448	144.896	0.00E+00	3.14E-03	6.28E-03	0.0575	5.083E+12
Cl-36	4.3023E-08	72.448	144.896	0.00E+00	3.12E-06	6.23E-06	0.0850	3.558E+12
Cm-243	2.7429E-07	72.448	144.896	0.00E+00	1.99E-05	3.97E-05	0.1250	5.321E+12
Cm-244	3.1504E-06	72.448	144.896	0.00E+00	2.28E-04	4.56E-04	0.2250	2.970E+12
Co-60	3.1008E-02	72.448	144.896	0.00E+00	2.25E+00	4.49E+00	0.3750	1.322E+13
Cs-134	1.0367E-01	72.448	144.896	0.00E+00	7.51E+00	1.50E+01	0.5750	1.676E+13
Cs-135	3.1549E-05	72.448	144.896	0.00E+00	2.29E-03	4.57E-03	0.8500	4.125E+12
Cs-137	2.7564E+00	72.448	144.896	0.00E+00	2.00E+02	3.99E+02	1.2500	4.276E+12
Eu-154	1.3490E+00	72.448	144.896	0.00E+00	9.77E+01	1.95E+02	1.7500	1.224E+11
Eu-155	4.3880E-01	72.448	144.896	0.00E+00	3.18E+01	6.36E+01	2.2500	1.488E+10
Fe-55	8.6782E-03	72.448	144.896	0.00E+00	6.29E-01	1.26E+00	2.7500	1.208E+08
H-3	1.0805E-02	72.448	144.896	0.00E+00	7.83E-01	1.57E+00	3.5000	1.413E+07
I-129	7.3805E-07	72.448	144.896	0.00E+00	5.35E-05	1.07E-04	5.0000	9.036E+01
Kr-85	2.5218E-01	72.448	144.896	0.00E+00	1.83E+01	3.65E+01	7.0000	1.024E+01
Np-237	1.4463E-06	72.448	144.896	0.00E+00	1.05E-04	2.10E-04	11.0000	1.167E+00
Pa-231	3.5970E-09	72.448	144.896	0.00E+00	2.61E-07	5.21E-07		
Pb-210	8.2511E-15	72.448	144.896	0.00E+00	5.98E-13	1.20E-12		
Pm-147	2.0767E+00	72.448	144.896	0.00E+00	1.50E+02	3.01E+02		
Pu-238	1.3514E-03	72.448	144.896	0.00E+00	9.79E-02	1.96E-01		
Pu-239	5.6947E-03	72.448	144.896	0.00E+00	4.13E-01	8.25E-01		
Pu-240	2.2647E-03	72.448	144.896	0.00E+00	1.64E-01	3.28E-01		
Pu-241	1.2574E-01	72.448	144.896	0.00E+00	9.11E+00	1.82E+01		
Pu-242	3.0602E-07	72.448	144.896	0.00E+00	2.22E-05	4.43E-05		
Ra-226	5.7353E-14	72.448	144.896	0.00E+00	4.16E-12	8.31E-12		
Ra-228	1.8150E-10	72.448	144.896	0.00E+00	1.31E-08	2.63E-08		
Ru-106	9.3744E-02	72.448	144.896	0.00E+00	6.79E+00	1.36E+01		
Se-79	1.2938E-05	72.448	144.896	0.00E+00	9.37E-04	1.87E-03		
Sn-126	1.2239E-05	72.448	144.896	0.00E+00	8.87E-04	1.77E-03		
Sr-90	2.6000E+00	72.448	144.896	0.00E+00	1.88E+02	3.77E+02		
Tc-99	4.4120E-04	72.448	144.896	0.00E+00	3.20E-02	6.39E-02		
Th-229	1.4749E-10	72.448	144.896	0.00E+00	1.07E-08	2.14E-08		
Th-230	1.9549E-11	72.448	144.896	0.00E+00	1.42E-09	2.83E-09		
Th-232	2.3744E-10	72.448	144.896	0.00E+00	1.72E-08	3.44E-08		
Tl-208	1.9459E-08	72.448	144.896	0.00E+00	1.41E-06	2.82E-06		
U-232	5.6015E-08	72.448	144.896	0.00E+00	4.06E-06	8.12E-06		
U-233	1.3132E-07	72.448	144.896	0.00E+00	9.51E-06	1.90E-05		
U-234	1.7323E-07	72.448	144.896	0.00E+00	1.26E-05	2.51E-05		
U-235	-2.6159E-06	72.448	0.000	5.37E-03	5.18E-03	5.37E-03		
U-236	1.2717E-05	72.448	144.896	0.00E+00	9.21E-04	1.84E-03		
U-238	-3.8857E-08	72.448	0.000	3.34E-03	3.34E-03	3.34E-03	3.64E+00	7.28E+00
Y-90	2.6015E+00	72.448	144.896	0.00E+00	1.88E+02	3.77E+02	Total	Total
Other Radionuclides					2.75E+02	5.51E+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 (1100)	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	60.523	72.448	
Bounding:		144.896	

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		

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 (FINLAND) ¹Fuel decay start date: 2010
 SNF ID #: 472 Estimates as of: 2010
 Fuel Units & Descr: 102 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=19.89kg ; EOL=19.69kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL 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 _b	b			Gamma Sources	
				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	8.5173E-10	194.740	389.480	0.00E+00	1.66E-07	3.32E-07	0.0150	6.295E+13
Am-241	1.8331E-03	194.740	389.480	0.00E+00	3.57E-01	7.14E-01	0.0250	1.385E+13
Am-242m	1.4129E-06	194.740	389.480	0.00E+00	2.75E-04	5.50E-04	0.0375	1.180E+13
Am-243	1.4774E-07	194.740	389.480	0.00E+00	2.88E-05	5.75E-05	0.0575	1.211E+13
C-14	1.2871E-04	194.740	389.480	0.00E+00	2.51E-02	5.01E-02	0.0850	7.501E+12
Cl-36	2.8120E-06	194.740	389.480	0.00E+00	5.48E-04	1.10E-03	0.1250	5.447E+12
Cm-243	1.7940E-07	194.740	389.480	0.00E+00	3.49E-05	6.99E-05	0.2250	6.363E+12
Cm-244	1.6962E-06	194.740	389.480	0.00E+00	3.30E-04	6.61E-04	0.3750	3.229E+12
Co-60	1.2839E+00	194.740	389.480	0.00E+00	2.50E+02	5.00E+02	0.5750	4.293E+12
Cs-134	9.0541E-02	194.740	389.480	0.00E+00	1.76E+01	3.53E+01	0.8500	1.842E+12
Cs-135	3.2195E-05	194.740	389.480	0.00E+00	6.27E-03	1.25E-02	1.2500	3.742E+13
Cs-137	2.7564E+00	194.740	389.480	0.00E+00	5.37E+02	1.07E+03	1.7500	2.494E+10
Eu-154	1.5368E-02	194.740	389.480	0.00E+00	2.99E+00	5.99E+00	2.2500	4.020E+10
Eu-155	2.9293E-02	194.740	389.480	0.00E+00	5.70E+00	1.14E+01	2.7500	3.190E+08
Fe-55	7.7158E-01	194.740	389.480	0.00E+00	1.50E+02	3.01E+02	3.5000	3.714E+07
H-3	1.1111E-02	194.740	389.480	0.00E+00	2.16E+00	4.33E+00	5.0000	2.164E+02
I-129	7.3684E-07	194.740	389.480	0.00E+00	1.43E-04	2.87E-04	7.0000	2.452E+01
Kr-85	2.5263E-01	194.740	389.480	0.00E+00	4.92E+01	9.84E+01	11.0000	2.795E+00
Np-237	1.2427E-06	194.740	389.480	0.00E+00	2.42E-04	4.84E-04		
Pa-231	3.8511E-09	194.740	389.480	0.00E+00	7.50E-07	1.50E-06		
Pb-210	7.3880E-15	194.740	389.480	0.00E+00	1.44E-12	2.88E-12		
Pm-147	2.1023E+00	194.740	389.480	0.00E+00	4.09E+02	8.19E+02		
Pu-238	1.0383E-03	194.740	389.480	0.00E+00	2.02E-01	4.04E-01		
Pu-239	5.5293E-03	194.740	389.480	0.00E+00	1.08E+00	2.15E+00		
Pu-240	2.1278E-03	194.740	389.480	0.00E+00	4.14E-01	8.29E-01		
Pu-241	1.0195E-01	194.740	389.480	0.00E+00	1.99E+01	3.97E+01		
Pu-242	2.3128E-07	194.740	389.480	0.00E+00	4.50E-05	9.01E-05		
Ra-226	5.2782E-14	194.740	389.480	0.00E+00	1.03E-11	2.06E-11		
Ra-228	1.9338E-10	194.740	389.480	0.00E+00	3.77E-08	7.53E-08		
Ru-106	9.1684E-02	194.740	389.480	0.00E+00	1.79E+01	3.57E+01		
Se-79	1.3018E-05	194.740	389.480	0.00E+00	2.54E-03	5.07E-03		
Sn-126	1.2167E-05	194.740	389.480	0.00E+00	2.37E-03	4.74E-03		
Sr-90	2.6045E+00	194.740	389.480	0.00E+00	5.07E+02	1.01E+03		
Tc-99	4.4241E-04	194.740	389.480	0.00E+00	8.62E-02	1.72E-01		
Th-229	1.3713E-10	194.740	389.480	0.00E+00	2.67E-08	5.34E-08		
Th-230	1.8090E-11	194.740	389.480	0.00E+00	3.52E-09	7.05E-09		
Th-232	2.5278E-10	194.740	389.480	0.00E+00	4.92E-08	9.85E-08		
Tl-208	1.6947E-08	194.740	389.480	0.00E+00	3.30E-06	6.60E-06		
U-232	4.8737E-08	194.740	389.480	0.00E+00	9.49E-06	1.90E-05		
U-233	1.2203E-07	194.740	389.480	0.00E+00	2.38E-05	4.75E-05		
U-234	1.5925E-07	194.740	389.480	0.00E+00	3.10E-05	6.20E-05		
U-235	-2.6194E-06	194.740	0.000	8.60E-03	8.09E-03	8.60E-03		
U-236	1.2693E-05	194.740	389.480	0.00E+00	2.47E-03	4.94E-03		
U-238	-3.6331E-08	194.740	0.000	5.35E-03	5.34E-03	5.35E-03		
Y-90	2.6060E+00	194.740	389.480	0.00E+00	5.07E+02	1.01E+03		
Other Radionuclides					7.02E+02	1.40E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.13E+01	2.27E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20.00000041	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	193.848	194.740	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		389.480	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	1.00
Bounding:	0.57		

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 (GA) 1Fuel decay start date: 2035
 SNF ID #: 728 Estimate as of: 2010
 Fuel Units & Descr: 52 - ELEMENT Template: TRIGA-AI (LW/U-Zrx, Alum., 10 to 20%, U)
 Heavy Metal Mass: BOL=9.41kg ; EOL=9.33kg 2Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.47

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	91.729	183.459	0.00E+00	7.40E-08	1.48E-07	Avg. MeV	
Am-241	2.2586E-03	91.729	183.459	0.00E+00	2.07E-01	4.14E-01	0.0150	3.104E+13
Am-242m	1.9925E-06	91.729	183.459	0.00E+00	1.83E-04	3.66E-04	0.0250	6.739E+12
Am-243	2.3323E-07	91.729	183.459	0.00E+00	2.14E-05	4.28E-05	0.0375	8.395E+12
C-14	4.3308E-05	91.729	183.459	0.00E+00	3.97E-03	7.95E-03	0.0575	6.436E+12
Cl-36	4.3023E-08	91.729	183.459	0.00E+00	3.95E-06	7.89E-06	0.0850	4.505E+12
Cm-243	2.7429E-07	91.729	183.459	0.00E+00	2.52E-05	5.03E-05	0.1250	6.737E+12
Cm-244	3.1504E-06	91.729	183.459	0.00E+00	2.89E-04	5.78E-04	0.2250	3.761E+12
Co-60	3.1008E-02	91.729	183.459	0.00E+00	2.84E+00	5.69E+00	0.3750	1.674E+12
Cs-134	1.0367E-01	91.729	183.459	0.00E+00	9.51E+00	1.90E+01	0.5750	2.122E+13
Cs-135	3.1549E-05	91.729	183.459	0.00E+00	2.89E-03	5.79E-03	0.8500	5.223E+12
Cs-137	2.7564E+00	91.729	183.459	0.00E+00	2.53E+02	5.06E+02	1.2500	5.415E+12
Eu-154	1.3490E+00	91.729	183.459	0.00E+00	1.24E+02	2.47E+02	1.7500	1.550E+11
Eu-155	4.3880E-01	91.729	183.459	0.00E+00	4.03E+01	8.05E+01	2.2500	1.884E+10
Fe-55	8.6782E-03	91.729	183.459	0.00E+00	7.96E-01	1.59E+00	2.7500	1.530E+08
H-3	1.0805E-02	91.729	183.459	0.00E+00	9.91E-01	1.98E+00	3.5000	1.789E+07
I-129	7.3805E-07	91.729	183.459	0.00E+00	6.77E-05	1.35E-04	5.0000	1.105E+02
Kr-85	2.5218E-01	91.729	183.459	0.00E+00	2.31E+01	4.63E+01	7.0000	1.252E+01
Np-237	1.4463E-06	91.729	183.459	0.00E+00	1.33E-04	2.65E-04	11.0000	1.426E+00
Pa-231	3.5970E-09	91.729	183.459	0.00E+00	3.30E-07	6.60E-07		
Pb-210	8.2511E-15	91.729	183.459	0.00E+00	7.57E-13	1.51E-12		
Pm-147	2.0767E+00	91.729	183.459	0.00E+00	1.90E+02	3.81E+02		
Pu-238	1.3514E-03	91.729	183.459	0.00E+00	1.24E-01	2.48E-01		
Pu-239	5.6947E-03	91.729	183.459	0.00E+00	5.22E-01	1.04E+00		
Pu-240	2.2647E-03	91.729	183.459	0.00E+00	2.08E-01	4.15E-01		
Pu-241	1.2574E-01	91.729	183.459	0.00E+00	1.15E+01	2.31E+01		
Pu-242	3.0602E-07	91.729	183.459	0.00E+00	2.81E-05	5.61E-05		
Ra-226	5.7353E-14	91.729	183.459	0.00E+00	5.26E-12	1.05E-11		
Ra-228	1.8150E-10	91.729	183.459	0.00E+00	1.66E-08	3.33E-08		
Ru-106	9.3744E-02	91.729	183.459	0.00E+00	8.60E+00	1.72E+01		
Se-79	1.2938E-05	91.729	183.459	0.00E+00	1.19E-03	2.37E-03		
Sn-126	1.2239E-05	91.729	183.459	0.00E+00	1.12E-03	2.25E-03		
Sr-90	2.6000E+00	91.729	183.459	0.00E+00	2.38E+02	4.77E+02		
Tc-99	4.4120E-04	91.729	183.459	0.00E+00	4.05E-02	8.09E-02		
Th-229	1.4749E-10	91.729	183.459	0.00E+00	1.35E-08	2.71E-08		
Th-230	1.9549E-11	91.729	183.459	0.00E+00	1.79E-09	3.59E-09		
Th-232	2.3744E-10	91.729	183.459	0.00E+00	2.18E-08	4.36E-08		
Tl-208	1.9459E-08	91.729	183.459	0.00E+00	1.78E-06	3.57E-06		
U-232	5.6015E-08	91.729	183.459	0.00E+00	5.14E-06	1.03E-05		
U-233	1.3132E-07	91.729	183.459	0.00E+00	1.20E-05	2.41E-05		
U-234	1.7323E-07	91.729	183.459	0.00E+00	1.59E-05	3.18E-05		
U-235	2.6159E-06	91.729	0.000	4.03E-03	3.79E-03	4.03E-03		
U-236	1.2717E-05	91.729	183.459	0.00E+00	1.17E-03	2.33E-03		
U-238	3.8857E-08	91.729	0.000	2.54E-03	2.53E-03	2.54E-03		
Y-90	2.6015E+00	91.729	183.459	0.00E+00	2.39E+02	4.77E+02		
Other Radionuclides					3.49E+02	6.97E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.61E+00	9.22E+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:	ALUM	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.8109242	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	91.729	79.416	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.
Bounding:		183.459	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.26	0.87	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 (GA) ¹Fuel decay start date: 1973
 SNF ID #: 870 Estimates as of: 2010
 Fuel Units & Descr: 246 - ELEMENT Template: TRIGA-AI (LW/U-Zrx, Alum., 10 to 20%, U)
 Heavy Metal Mass: BOL=46.74kg ; EOL=45.19kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.00018
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x10"
 2.22

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	1,479.313	2,958.626	0.00E+00	9.10E-06	1.82E-05		
Am-241	4.8165E-03	1,479.313	2,958.626	0.00E+00	7.13E+00	1.43E+01	0.0150	2.087E+14
Am-242m	1.7383E-06	1,479.313	2,958.626	0.00E+00	2.57E-03	5.14E-03	0.0250	4.319E+13
Am-243	2.3263E-07	1,479.313	2,958.626	0.00E+00	3.44E-04	6.88E-04	0.0375	4.075E+13
C-14	4.3158E-05	1,479.313	2,958.626	0.00E+00	6.38E-02	1.28E-01	0.0575	4.106E+13
Ci-36	4.3023E-08	1,479.313	2,958.626	0.00E+00	6.36E-05	1.27E-04	0.0850	2.451E+13
Cm-243	1.3229E-07	1,479.313	2,958.626	0.00E+00	1.96E-04	3.91E-04	0.1250	2.117E+13
Cm-244	1.0000E-06	1,479.313	2,958.626	0.00E+00	1.48E-03	2.96E-03	0.2250	2.189E+13
Co-60	6.0120E-04	1,479.313	2,958.626	0.00E+00	8.89E-01	1.78E+00	0.3750	9.292E+12
Cs-134	4.3534E-06	1,479.313	2,958.626	0.00E+00	6.44E-03	1.29E-02	0.5750	1.531E+14
Cs-135	3.1549E-05	1,479.313	2,958.626	0.00E+00	4.67E-02	9.33E-02	0.8500	7.810E+12
Cs-137	1.3788E+00	1,479.313	2,958.626	0.00E+00	2.04E+03	4.08E+03	1.2500	7.664E+12
Eu-154	1.2041E-01	1,479.313	2,958.626	0.00E+00	1.78E+02	3.56E+02	1.7500	2.466E+11
Eu-155	6.6451E-03	1,479.313	2,958.626	0.00E+00	9.83E+00	1.97E+01	2.2500	4.864E+06
Fe-55	2.9338E-06	1,479.313	2,958.626	0.00E+00	4.34E-03	8.68E-03	2.7500	1.645E+06
H-3	2.0075E-03	1,479.313	2,958.626	0.00E+00	2.97E+00	5.94E+00	3.5000	3.984E+03
I-129	7.3805E-07	1,479.313	2,958.626	0.00E+00	1.09E-03	2.18E-03	5.0000	1.676E+03
Kr-85	3.6301E-02	1,479.313	2,958.626	0.00E+00	5.37E+01	1.07E+02	7.0000	1.890E+02
Np-237	1.4977E-06	1,479.313	2,958.626	0.00E+00	2.22E-03	4.43E-03	11.0000	2.148E+01
Pa-231	1.1275E-08	1,479.313	2,958.626	0.00E+00	1.67E-05	3.34E-05		
Pb-210	3.8932E-13	1,479.313	2,958.626	0.00E+00	5.76E-10	1.15E-09		
Pm-147	7.5383E-04	1,479.313	2,958.626	0.00E+00	1.12E+00	2.23E+00		
Pu-238	1.0668E-03	1,479.313	2,958.626	0.00E+00	1.58E+00	3.16E+00		
Pu-239	5.6902E-03	1,479.313	2,958.626	0.00E+00	8.42E+00	1.68E+01		
Pu-240	2.2571E-03	1,479.313	2,958.626	0.00E+00	3.34E+00	6.68E+00		
Pu-241	2.9699E-02	1,479.313	2,958.626	0.00E+00	4.39E+01	8.79E+01		
Pu-242	3.0602E-07	1,479.313	2,958.626	0.00E+00	4.53E-04	9.05E-04		
Ra-226	1.0704E-12	1,479.313	2,958.626	0.00E+00	1.58E-09	3.17E-09		
Ra-228	2.3654E-10	1,479.313	2,958.626	0.00E+00	3.50E-07	7.00E-07		
Ru-106	1.0444E-10	1,479.313	2,958.626	0.00E+00	1.54E-07	3.09E-07		
Se-79	1.2934E-05	1,479.313	2,958.626	0.00E+00	1.91E-02	3.83E-02		
Sn-126	1.2236E-05	1,479.313	2,958.626	0.00E+00	1.81E-02	3.62E-02		
Sr-90	1.2740E+00	1,479.313	2,958.626	0.00E+00	1.88E+03	3.77E+03		
Tc-99	4.4120E-04	1,479.313	2,958.626	0.00E+00	6.53E-01	1.31E+00		
Th-229	6.4226E-10	1,479.313	2,958.626	0.00E+00	9.50E-07	1.90E-06		
Th-230	1.0594E-10	1,479.313	2,958.626	0.00E+00	1.57E-07	3.13E-07		
Th-232	2.3744E-10	1,479.313	2,958.626	0.00E+00	3.51E-07	7.03E-07		
Tl-208	1.5774E-08	1,479.313	2,958.626	0.00E+00	2.33E-05	4.67E-05		
U-232	4.2511E-08	1,479.313	2,958.626	0.00E+00	6.29E-05	1.26E-04		
U-233	1.3155E-07	1,479.313	2,958.626	0.00E+00	1.95E-04	3.89E-04		
U-234	3.0030E-07	1,479.313	2,958.626	0.00E+00	4.44E-04	8.88E-04		
U-235	-2.6144E-06	1,479.313	0.000	2.01E-02	1.62E-02	2.01E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.2720E-05	1,479.313	2,958.626	0.00E+00	1.88E-02	3.76E-02	2.49E+01	4.98E+01
U-238	-3.8857E-08	1,479.313	0.000	1.26E-02	1.25E-02	1.26E-02	Total	Total
Y-90	1.2744E+00	1,479.313	2,958.626	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:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	ALUM (1100)	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.9	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	455.528	1,479.313	
Bounding:		2,958.626	

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		

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 (GERMANY) ¹Fuel decay start date: 2010
 SNF ID #: 305 Estimates as of: 2010
 Fuel Units & Descr: 15 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=2.93kg ; EOL=2.88kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL 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	
							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	40.094	80.187	0.00E+00	3.41E-08	6.83E-08		
Am-241	1.8331E-03	40.094	80.187	0.00E+00	7.35E-02	1.47E-01	0.0150	1.296E+13
Am-242m	1.4129E-06	40.094	80.187	0.00E+00	5.68E-05	1.13E-04	0.0250	2.852E+12
Am-243	1.4774E-07	40.094	80.187	0.00E+00	5.92E-06	1.18E-05	0.0375	2.429E+12
C-14	1.2871E-04	40.094	80.187	0.00E+00	5.16E-03	1.03E-02	0.0675	2.493E+12
Cl-36	2.8120E-06	40.094	80.187	0.00E+00	1.13E-04	2.25E-04	0.0850	1.544E+12
Cm-243	1.7940E-07	40.094	80.187	0.00E+00	7.19E-06	1.44E-05	0.1250	1.121E+12
Cm-244	1.6962E-06	40.094	80.187	0.00E+00	6.80E-05	1.36E-04	0.2250	1.310E+12
Co-60	1.2839E+00	40.094	80.187	0.00E+00	5.15E+01	1.03E+02	0.3750	6.648E+11
Cs-134	9.0541E-02	40.094	80.187	0.00E+00	3.63E+00	7.26E+00	0.5750	8.838E+11
Cs-135	3.2195E-05	40.094	80.187	0.00E+00	1.29E-03	2.58E-03	0.8500	3.793E+11
Cs-137	2.7564E+00	40.094	80.187	0.00E+00	1.11E+02	2.21E+02	1.2500	7.703E+12
Eu-154	1.5368E-02	40.094	80.187	0.00E+00	6.16E-01	1.23E+00	1.7500	5.136E+09
Eu-155	2.9293E-02	40.094	80.187	0.00E+00	1.17E+00	2.35E+00	2.2500	8.278E+09
Fe-55	7.7158E-01	40.094	80.187	0.00E+00	3.09E+01	6.19E+01	2.7500	6.568E+07
H-3	1.1111E-02	40.094	80.187	0.00E+00	4.45E-01	8.91E-01	3.5000	7.646E+06
I-129	7.3684E-07	40.094	80.187	0.00E+00	2.95E-05	5.91E-05	5.0000	4.383E+01
Kr-85	2.5263E-01	40.094	80.187	0.00E+00	1.01E+01	2.03E+01	7.0000	4.965E+00
Np-237	1.2427E-06	40.094	80.187	0.00E+00	4.98E-05	9.96E-05	11.0000	5.657E-01
Pa-231	3.8511E-09	40.094	80.187	0.00E+00	1.54E-07	3.09E-07		
Pb-210	7.3880E-15	40.094	80.187	0.00E+00	2.96E-13	5.92E-13		
Pm-147	2.1023E+00	40.094	80.187	0.00E+00	8.43E+01	1.69E+02		
Pu-238	1.0383E-03	40.094	80.187	0.00E+00	4.16E-02	8.33E-02		
Pu-239	5.5293E-03	40.094	80.187	0.00E+00	2.22E-01	4.43E-01		
Pu-240	2.1278E-03	40.094	80.187	0.00E+00	8.53E-02	1.71E-01		
Pu-241	1.0195E-01	40.094	80.187	0.00E+00	4.09E+00	8.18E+00		
Pu-242	2.3128E-07	40.094	80.187	0.00E+00	9.27E-06	1.85E-05		
Ra-226	5.2782E-14	40.094	80.187	0.00E+00	2.12E-12	4.23E-12		
Ra-228	1.9338E-10	40.094	80.187	0.00E+00	7.75E-09	1.55E-08		
Ru-106	9.1684E-02	40.094	80.187	0.00E+00	3.68E+00	7.35E+00		
Se-79	1.3018E-05	40.094	80.187	0.00E+00	5.22E-04	1.04E-03		
Sn-126	1.2167E-05	40.094	80.187	0.00E+00	4.88E-04	9.76E-04		
Sr-90	2.6045E+00	40.094	80.187	0.00E+00	1.04E+02	2.09E+02		
Tc-99	4.4241E-04	40.094	80.187	0.00E+00	1.77E-02	3.55E-02		
Th-229	1.3713E-10	40.094	80.187	0.00E+00	5.50E-09	1.10E-08		
Th-230	1.8090E-11	40.094	80.187	0.00E+00	7.25E-10	1.45E-09		
Th-232	2.5278E-10	40.094	80.187	0.00E+00	1.01E-08	2.03E-08		
Ti-208	1.6947E-08	40.094	80.187	0.00E+00	6.79E-07	1.36E-06		
U-232	4.8737E-08	40.094	80.187	0.00E+00	1.95E-06	3.91E-06		
U-233	1.2203E-07	40.094	80.187	0.00E+00	4.89E-06	9.79E-06		
U-234	1.5925E-07	40.094	80.187	0.00E+00	6.38E-06	1.28E-05		
U-235	-2.6194E-06	40.094	0.000	1.26E-03	1.16E-03	1.26E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.2693E-05	40.094	80.187	0.00E+00	5.09E-04	1.02E-03	2.33E+00	4.67E+00
U-238	-3.6331E-08	40.094	0.000	7.86E-04	7.85E-04	7.86E-04	Total	Total
Y-90	2.6060E+00	40.094	80.187	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			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20.00000041	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	28.507	40.094	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		80.187	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.40	1.41	1.00
Bounding:	0.80		

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 STD (GERMANY) ¹Fuel decay start date: 2010
 SNF ID #: 465 Estimates as of: 2010
 Fuel Units & Desc: 65 - ELEMENT Template: TRIGA-AI (LW/U-Zrx, Alum., 10 to 20%, U)
 Heavy Metal Mass: BOL=11.70kg : EOL=11.57kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.00018
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.59

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	8.0632E-10	124.087	248.175	0.00E+00	1.00E-07	2.00E-07		
Am-241	2.2586E-03	124.087	248.175	0.00E+00	2.80E-01	5.61E-01	0.0150	4.199E+13
Am-242m	1.9925E-06	124.087	248.175	0.00E+00	2.47E-04	4.94E-04	0.0250	9.117E+12
Am-243	2.3323E-07	124.087	248.175	0.00E+00	2.89E-05	5.79E-05	0.0375	1.136E+13
C-14	4.3308E-05	124.087	248.175	0.00E+00	5.37E-03	1.07E-02	0.0575	8.706E+12
Cl-36	4.3023E-08	124.087	248.175	0.00E+00	5.34E-06	1.07E-05	0.0850	6.093E+12
Cm-243	2.7429E-07	124.087	248.175	0.00E+00	3.40E-05	6.81E-05	0.1250	9.114E+12
Cm-244	3.1504E-06	124.087	248.175	0.00E+00	3.91E-04	7.82E-04	0.2250	5.087E+12
Co-60	3.1008E-02	124.087	248.175	0.00E+00	3.85E+00	7.70E+00	0.3750	2.264E+12
Cs-134	1.0367E-01	124.087	248.175	0.00E+00	1.29E+01	2.57E+01	0.5750	2.870E+13
Cs-135	3.1549E-05	124.087	248.175	0.00E+00	3.91E-03	7.83E-03	0.8500	7.065E+12
Cs-137	2.7564E+00	124.087	248.175	0.00E+00	3.42E+02	6.84E+02	1.2500	7.325E+12
Eu-154	1.3490E+00	124.087	248.175	0.00E+00	1.67E+02	3.35E+02	1.7500	2.096E+11
Eu-155	4.3880E-01	124.087	248.175	0.00E+00	5.44E+01	1.09E+02	2.2500	2.548E+10
Fe-55	8.6782E-03	124.087	248.175	0.00E+00	1.08E+00	2.15E+00	2.7500	2.069E+08
H-3	1.0805E-02	124.087	248.175	0.00E+00	1.34E+00	2.68E+00	3.5000	2.420E+07
I-129	7.3805E-07	124.087	248.175	0.00E+00	9.16E-05	1.83E-04	5.0000	1.488E+02
Kr-85	2.5218E-01	124.087	248.175	0.00E+00	3.13E+01	6.26E+01	7.0000	1.686E+01
Np-237	1.4463E-06	124.087	248.175	0.00E+00	1.79E-04	3.59E-04	11.0000	1.921E+00
Pa-231	3.5970E-09	124.087	248.175	0.00E+00	4.46E-07	8.93E-07		
Pb-210	8.2511E-15	124.087	248.175	0.00E+00	1.02E-12	2.05E-12		
Pm-147	2.0767E+00	124.087	248.175	0.00E+00	2.58E+02	5.15E+02		
Pu-238	1.3514E-03	124.087	248.175	0.00E+00	1.68E-01	3.35E-01		
Pu-239	5.6947E-03	124.087	248.175	0.00E+00	7.07E-01	1.41E+00		
Pu-240	2.2647E-03	124.087	248.175	0.00E+00	2.81E-01	5.62E-01		
Pu-241	1.2574E-01	124.087	248.175	0.00E+00	1.56E+01	3.12E+01		
Pu-242	3.0602E-07	124.087	248.175	0.00E+00	3.80E-05	7.59E-05		
Ra-226	5.7353E-14	124.087	248.175	0.00E+00	7.12E-12	1.42E-11		
Ra-228	1.8150E-10	124.087	248.175	0.00E+00	2.25E-08	4.50E-08		
Ru-106	9.3744E-02	124.087	248.175	0.00E+00	1.16E+01	2.33E+01		
Se-79	1.2938E-05	124.087	248.175	0.00E+00	1.61E-03	3.21E-03		
Sn-126	1.2239E-05	124.087	248.175	0.00E+00	1.52E-03	3.04E-03		
Sr-90	2.6000E+00	124.087	248.175	0.00E+00	3.23E+02	6.45E+02		
Tc-99	4.4120E-04	124.087	248.175	0.00E+00	5.47E-02	1.09E-01		
Th-229	1.4749E-10	124.087	248.175	0.00E+00	1.83E-08	3.66E-08		
Th-230	1.9549E-11	124.087	248.175	0.00E+00	2.43E-09	4.85E-09		
Th-232	2.3744E-10	124.087	248.175	0.00E+00	2.95E-08	5.89E-08		
Tl-208	1.9459E-08	124.087	248.175	0.00E+00	2.41E-06	4.83E-06		
U-232	5.6015E-08	124.087	248.175	0.00E+00	6.95E-06	1.39E-05		
U-233	1.3132E-07	124.087	248.175	0.00E+00	1.63E-05	3.26E-05		
U-234	1.7323E-07	124.087	248.175	0.00E+00	2.15E-05	4.30E-05		
U-235	-2.6159E-06	124.087	0.000	4.99E-03	4.66E-03	4.99E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.2717E-05	124.087	248.175	0.00E+00	1.58E-03	3.16E-03	6.23E+00	1.25E+01
U-238	-3.8857E-08	124.087	0.000	3.16E-03	3.15E-03	3.16E-03	Total	Total
Y-90	2.6015E+00	124.087	248.175	0.00E+00	3.23E+02	6.46E+02		
Other Radionuclides					4.72E+02	9.43E+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-ZrHX	U	
BOL Enrichment %:	19.72222222	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	57.014	124.087	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		248.175	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.29	2.18	1.00
Bounding:	0.57		

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 (GERMANY) ¹Fuel decay start date: 2010
 SNF ID #: 474 Estimates as of: 2010
 Fuel Units & Descr: 70 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=13.65kg ; EOL=13.38kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.63

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	8.5173E-10	260.608	521.216	0.00E+00	2.22E-07	4.44E-07	0.0150	8.424E+13
Am-241	1.8331E-03	260.608	521.216	0.00E+00	4.78E-01	9.55E-01	0.0250	1.854E+13
Am-242m	1.4129E-06	260.608	521.216	0.00E+00	3.68E-04	7.36E-04	0.0375	1.579E+13
Am-243	1.4774E-07	260.608	521.216	0.00E+00	3.85E-05	7.70E-05	0.0575	1.620E+13
C-14	1.2871E-04	260.608	521.216	0.00E+00	3.35E-02	6.71E-02	0.0850	1.004E+13
Cl-36	2.8120E-06	260.608	521.216	0.00E+00	7.33E-04	1.47E-03	0.1250	7.289E+12
Cm-243	1.7940E-07	260.608	521.216	0.00E+00	4.68E-05	9.35E-05	0.2250	8.515E+12
Cm-244	1.6962E-06	260.608	521.216	0.00E+00	4.42E-04	8.84E-04	0.3750	4.321E+12
Co-60	1.2839E+00	260.608	521.216	0.00E+00	3.35E+02	6.69E+02	0.5750	5.745E+13
Cs-134	9.0541E-02	260.608	521.216	0.00E+00	2.36E+01	4.72E+01	0.8500	2.465E+12
Cs-135	3.2195E-05	260.608	521.216	0.00E+00	8.39E-03	1.68E-02	1.2500	5.007E+13
Cs-137	2.7564E+00	260.608	521.216	0.00E+00	7.18E+02	1.44E+03	1.7500	3.338E+10
Eu-154	1.5368E-02	260.608	521.216	0.00E+00	4.01E+00	8.01E+00	2.2500	5.380E+10
Eu-155	2.9293E-02	260.608	521.216	0.00E+00	7.63E+00	1.53E+01	2.7500	4.269E+08
Fe-55	7.7158E-01	260.608	521.216	0.00E+00	2.01E+02	4.02E+02	3.5000	4.970E+07
H-3	1.1111E-02	260.608	521.216	0.00E+00	2.90E+00	5.79E+00	5.0000	2.816E+02
I-129	7.3684E-07	260.608	521.216	0.00E+00	1.92E-04	3.84E-04	7.0000	3.189E+01
Kr-85	2.5263E-01	260.608	521.216	0.00E+00	6.58E+01	1.32E+02	11.0000	3.633E+00
Np-237	1.2427E-06	260.608	521.216	0.00E+00	3.24E-04	6.48E-04		
Pa-231	3.8511E-09	260.608	521.216	0.00E+00	1.00E-06	2.01E-06		
Pb-210	7.3880E-15	260.608	521.216	0.00E+00	1.93E-12	3.85E-12		
Pm-147	2.1023E+00	260.608	521.216	0.00E+00	5.48E+02	1.10E+03		
Pu-238	1.0383E-03	260.608	521.216	0.00E+00	2.71E-01	5.41E-01		
Pu-239	5.5293E-03	260.608	521.216	0.00E+00	1.44E+00	2.88E+00		
Pu-240	2.1278E-03	260.608	521.216	0.00E+00	5.55E-01	1.11E+00		
Pu-241	1.0195E-01	260.608	521.216	0.00E+00	2.66E+01	5.31E+01		
Pu-242	2.3128E-07	260.608	521.216	0.00E+00	6.03E-05	1.21E-04		
Ra-226	5.2782E-14	260.608	521.216	0.00E+00	1.38E-11	2.75E-11		
Ra-228	1.9338E-10	260.608	521.216	0.00E+00	5.04E-08	1.01E-07		
Ru-106	9.1684E-02	260.608	521.216	0.00E+00	2.39E+01	4.78E+01		
Se-79	1.3018E-05	260.608	521.216	0.00E+00	3.39E-03	6.79E-03		
Sn-126	1.2167E-05	260.608	521.216	0.00E+00	3.17E-03	6.34E-03		
Sr-90	2.6045E+00	260.608	521.216	0.00E+00	6.79E+02	1.36E+03		
Tc-99	4.4241E-04	260.608	521.216	0.00E+00	1.15E-01	2.31E-01		
Th-229	1.3713E-10	260.608	521.216	0.00E+00	3.57E-08	7.15E-08		
Th-230	1.8090E-11	260.608	521.216	0.00E+00	4.71E-09	9.43E-09		
Th-232	2.5278E-10	260.608	521.216	0.00E+00	6.59E-08	1.32E-07		
Tl-208	1.6947E-08	260.608	521.216	0.00E+00	4.42E-06	8.83E-06		
U-232	4.8737E-08	260.608	521.216	0.00E+00	1.27E-05	2.54E-05		
U-233	1.2203E-07	260.608	521.216	0.00E+00	3.18E-05	6.36E-05		
U-234	1.5925E-07	260.608	521.216	0.00E+00	4.15E-05	8.30E-05		
U-235	-2.6194E-06	260.608	0.000	5.90E-03	5.22E-03	5.90E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.2693E-05	260.608	521.216	0.00E+00	3.31E-03	6.62E-03	1.52E+01	3.03E+01
U-238	-3.6331E-08	260.608	0.000	3.67E-03	3.66E-03	3.67E-03	Total	Total
Y-90	2.6060E+00	260.608	521.216	0.00E+00	6.79E+02	1.36E+03		
Other Radionuclides					9.40E+02	1.88E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20.00000041	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	133.033	260.608	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		521.216	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	1.00
Bounding:	1.12		

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: TRIGA STD (HANFORD) 1 Fuel decay start date: 1973
 SNF ID #: 876 Estimates as of: 2010
 Fuel Units & Descr: 59 - ELEMENT Template: TRIGA-AI (LW/U-Zrx, Alum., 10 to 20%, U)
 Heavy Metal Mass: BOL=10.92kg ; EOL=10.84kg 2 Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL 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 _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	73.212	146.423	0.00E+00	4.50E-07	9.01E-07		
Am-241	4.8165E-03	73.212	146.423	0.00E+00	3.53E-01	7.05E-01	0.0150	1.033E+13
Am-242m	1.7383E-06	73.212	146.423	0.00E+00	1.27E-04	2.55E-04	0.0250	2.198E+12
Am-243	2.3263E-07	73.212	146.423	0.00E+00	1.70E-05	3.41E-05	0.0375	2.017E+12
C-14	4.3158E-05	73.212	146.423	0.00E+00	3.16E-03	6.32E-03	0.0575	2.032E+12
Cl-36	4.3023E-08	73.212	146.423	0.00E+00	3.15E-06	6.30E-06	0.0850	1.213E+12
Cm-243	1.3229E-07	73.212	146.423	0.00E+00	9.68E-06	1.94E-05	0.1250	1.048E+12
Cm-244	1.0000E-06	73.212	146.423	0.00E+00	7.32E-05	1.46E-04	0.2250	1.084E+12
Co-60	6.0120E-04	73.212	146.423	0.00E+00	4.40E-02	8.80E-02	0.3750	4.598E+11
Cs-134	4.3534E-06	73.212	146.423	0.00E+00	3.19E-04	6.37E-04	0.5750	7.576E+12
Cs-135	3.1549E-05	73.212	146.423	0.00E+00	2.31E-03	4.62E-03	0.8500	3.865E+11
Cs-137	1.3788E+00	73.212	146.423	0.00E+00	1.01E+02	2.02E+02	1.2500	3.793E+11
Eu-154	1.2041E-01	73.212	146.423	0.00E+00	8.82E+00	1.76E+01	1.7500	1.220E+10
Eu-155	6.6451E-03	73.212	146.423	0.00E+00	4.86E-01	9.73E-01	2.2500	2.408E+05
Fe-55	2.9338E-06	73.212	146.423	0.00E+00	2.15E-04	4.30E-04	2.7500	8.144E+04
H-3	2.0075E-03	73.212	146.423	0.00E+00	1.47E-01	2.94E-01	3.5000	2.096E+02
I-129	7.3805E-07	73.212	146.423	0.00E+00	5.40E-05	1.08E-04	5.0000	8.830E+01
Kr-85	3.6301E-02	73.212	146.423	0.00E+00	2.66E+00	5.32E+00	7.0000	9.969E+00
Np-237	1.4977E-06	73.212	146.423	0.00E+00	1.10E-04	2.19E-04	11.0000	1.134E+00
Pa-231	1.1275E-08	73.212	146.423	0.00E+00	8.25E-07	1.65E-06		
Pb-210	3.8932E-13	73.212	146.423	0.00E+00	2.85E-11	5.70E-11		
Pm-147	7.5383E-04	73.212	146.423	0.00E+00	5.52E-02	1.10E-01		
Pu-238	1.0668E-03	73.212	146.423	0.00E+00	7.81E-02	1.56E-01		
Pu-239	5.6902E-03	73.212	146.423	0.00E+00	4.17E-01	8.33E-01		
Pu-240	2.2571E-03	73.212	146.423	0.00E+00	1.65E-01	3.30E-01		
Pu-241	2.9699E-02	73.212	146.423	0.00E+00	2.17E+00	4.35E+00		
Pu-242	3.0602E-07	73.212	146.423	0.00E+00	2.24E-05	4.48E-05		
Ra-226	1.0704E-12	73.212	146.423	0.00E+00	7.84E-11	1.57E-10		
Ra-228	2.3654E-10	73.212	146.423	0.00E+00	1.73E-08	3.46E-08		
Ru-106	1.0444E-10	73.212	146.423	0.00E+00	7.65E-09	1.53E-08		
Se-79	1.2934E-05	73.212	146.423	0.00E+00	9.47E-04	1.89E-03		
Sn-126	1.2236E-05	73.212	146.423	0.00E+00	8.96E-04	1.79E-03		
Sr-90	1.2740E+00	73.212	146.423	0.00E+00	9.33E+01	1.87E+02		
Tc-99	4.4120E-04	73.212	146.423	0.00E+00	3.23E-02	6.46E-02		
Th-229	6.4226E-10	73.212	146.423	0.00E+00	4.70E-08	9.40E-08		
Th-230	1.0594E-10	73.212	146.423	0.00E+00	7.76E-09	1.55E-08		
Th-232	2.3744E-10	73.212	146.423	0.00E+00	1.74E-08	3.48E-08		
Tl-208	1.5774E-08	73.212	146.423	0.00E+00	1.15E-06	2.31E-06		
U-232	4.2511E-08	73.212	146.423	0.00E+00	3.11E-06	6.22E-06		
U-233	1.3155E-07	73.212	146.423	0.00E+00	9.63E-06	1.93E-05		
U-234	3.0030E-07	73.212	146.423	0.00E+00	2.20E-05	4.40E-05		
U-235	-2.6144E-06	73.212	0.000	4.72E-03	4.53E-03	4.72E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.2720E-05	73.212	146.423	0.00E+00	9.31E-04	1.86E-03	1.23E+00	2.46E+00
U-238	-3.8857E-08	73.212	0.000	2.93E-03	2.93E-03	2.93E-03	Total	Total
Y-90	1.2744E+00	73.212	146.423	0.00E+00	9.33E+01	1.87E+02		
Other Radionuclides					1.12E+02	2.23E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.23E+00	2.46E+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:	ALUM (1100)	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	53.189	73.212	
Bounding:		146.423	

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:	0.18	1.38
Bounding:	0.36	

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 (HANNOVER) ¹Fuel decay start date: 1996
 SNF ID #: 303 Estimates as of: 2010
 Fuel Units & Descr: 71 - ELEMENT Template: TRIGA-AI (LW/U-Zr, Alum., 10 to 20%, U)
 Heavy Metal Mass: BOL=13.56kg ; EOL=13.42kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.00018
 Template Decay Time: 10 years

Estimated
 Canister usage:
 18"x10"
 0.64

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
							Avg. MeV	
Ac-227	1.2892E-09	135.542	271.083	0.00E+00	1.75E-07	3.49E-07	0.0150	3.644E+13
Am-241	2.9429E-03	135.542	271.083	0.00E+00	3.99E-01	7.98E-01	0.0250	7.622E+12
Am-242m	1.9489E-06	135.542	271.083	0.00E+00	2.64E-04	5.28E-04	0.0375	9.000E+12
Am-243	2.3308E-07	135.542	271.083	0.00E+00	3.16E-05	6.32E-05	0.0575	7.443E+12
C-14	4.3278E-05	135.542	271.083	0.00E+00	5.87E-03	1.17E-02	0.0850	4.838E+12
Cl-36	4.3023E-08	135.542	271.083	0.00E+00	5.83E-06	1.17E-05	0.1250	6.695E+12
Cm-243	2.4286E-07	135.542	271.083	0.00E+00	3.29E-05	6.58E-05	0.2250	4.247E+12
Cm-244	2.6015E-06	135.542	271.083	0.00E+00	3.53E-04	7.05E-04	0.3750	1.748E+12
Co-60	1.6075E-02	135.542	271.083	0.00E+00	2.18E+00	4.36E+00	0.5750	2.604E+13
Cs-134	1.9323E-02	135.542	271.083	0.00E+00	2.62E+00	5.24E+00	0.8500	4.743E+12
Cs-135	3.1549E-05	135.542	271.083	0.00E+00	4.28E-03	8.55E-03	1.2500	5.216E+12
Cs-137	2.4556E+00	135.542	271.083	0.00E+00	3.33E+02	6.66E+02	1.7500	1.495E+11
Eu-154	9.0180E-01	135.542	271.083	0.00E+00	1.22E+02	2.44E+02	2.2500	3.558E+08
Eu-155	2.1820E-01	135.542	271.083	0.00E+00	2.96E+01	5.91E+01	2.7500	6.976E+06
Fe-55	2.2902E-03	135.542	271.083	0.00E+00	3.10E-01	6.21E-01	3.5000	8.513E+05
H-3	8.1609E-03	135.542	271.083	0.00E+00	1.11E+00	2.21E+00	5.0000	1.620E+02
I-129	7.3805E-07	135.542	271.083	0.00E+00	1.00E-04	2.00E-04	7.0000	1.833E+01
Kr-85	1.8256E-01	135.542	271.083	0.00E+00	2.47E+01	4.95E+01	11.0000	2.087E+00
Np-237	1.4505E-06	135.542	271.083	0.00E+00	1.97E-04	3.93E-04		
Pa-231	4.5564E-09	135.542	271.083	0.00E+00	6.18E-07	1.24E-06		
Pb-210	1.8842E-14	135.542	271.083	0.00E+00	2.55E-12	5.11E-12		
Pm-147	5.5459E-01	135.542	271.083	0.00E+00	7.52E+01	1.50E+02		
Pu-238	1.2992E-03	135.542	271.083	0.00E+00	1.76E-01	3.52E-01		
Pu-239	5.6932E-03	135.542	271.083	0.00E+00	7.72E-01	1.54E+00		
Pu-240	2.2632E-03	135.542	271.083	0.00E+00	3.07E-01	6.14E-01		
Pu-241	9.8857E-02	135.542	271.083	0.00E+00	1.34E+01	2.68E+01		
Pu-242	3.0602E-07	135.542	271.083	0.00E+00	4.15E-05	8.30E-05		
Ra-226	1.0823E-13	135.542	271.083	0.00E+00	1.47E-11	2.93E-11		
Ra-228	2.0406E-10	135.542	271.083	0.00E+00	2.77E-08	5.53E-08		
Ru-106	3.0180E-03	135.542	271.083	0.00E+00	4.09E-01	8.18E-01		
Se-79	1.2937E-05	135.542	271.083	0.00E+00	1.75E-03	3.51E-03		
Sn-126	1.2238E-05	135.542	271.083	0.00E+00	1.66E-03	3.32E-03		
Sr-90	2.3098E+00	135.542	271.083	0.00E+00	3.13E+02	6.26E+02		
Tc-99	4.4120E-04	135.542	271.083	0.00E+00	5.98E-02	1.20E-01		
Th-229	2.0932E-10	135.542	271.083	0.00E+00	2.84E-08	5.67E-08		
Th-230	2.7744E-11	135.542	271.083	0.00E+00	3.76E-09	7.52E-09		
Th-232	2.3744E-10	135.542	271.083	0.00E+00	3.22E-08	6.44E-08		
Ti-208	1.9459E-08	135.542	271.083	0.00E+00	2.64E-06	5.27E-06		
U-232	5.3850E-08	135.542	271.083	0.00E+00	7.30E-06	1.46E-05		
U-233	1.3135E-07	135.542	271.083	0.00E+00	1.78E-05	3.56E-05		
U-234	1.9143E-07	135.542	271.083	0.00E+00	2.59E-05	5.19E-05		
U-235	-2.6159E-06	135.542	0.000	5.86E-03	5.51E-03	5.86E-03		
U-236	1.2719E-05	135.542	271.083	0.00E+00	1.72E-03	3.45E-03		
U-238	-3.8857E-08	135.542	0.000	3.65E-03	3.64E-03	3.65E-03		
Y-90	2.3098E+00	135.542	271.083	0.00E+00	3.13E+02	6.26E+02		
Other Radionuclides					3.58E+02	7.15E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.03E+00	1.01E+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:	ALUM (1100)	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20.00391594	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	132.166	135.542	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		271.083	Bounding burnup assumed to be twice nominal burnup.

Checks		
	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 (HANNOVER) ¹Fuel decay start date: 1999
 SNF ID #: 473 Estimates as of: 2010
 Fuel Units & Descr: 5 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=.97kg ; EOL=.95kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 10 years

Estimated
 Canister usage:
 18"x10"
 0.05

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	1.3731E-09	21.479	42.957	0.00E+00	2.95E-08	5.90E-08	0.0150	5.550E+12
Am-241	2.3865E-03	21.479	42.957	0.00E+00	5.13E-02	1.03E-01	0.0250	1.176E+12
Am-242m	1.3812E-06	21.479	42.957	0.00E+00	2.97E-05	5.93E-05	0.0375	1.004E+12
Am-243	1.4767E-07	21.479	42.957	0.00E+00	3.17E-06	6.34E-06	0.0575	1.070E+12
C-14	1.2863E-04	21.479	42.957	0.00E+00	2.76E-03	5.53E-03	0.0850	6.493E+11
Cl-36	2.8120E-06	21.479	42.957	0.00E+00	6.04E-05	1.21E-04	0.1250	4.268E+11
Cm-243	1.5895E-07	21.479	42.957	0.00E+00	3.41E-06	6.83E-06	0.2250	5.538E+11
Cm-244	1.4008E-06	21.479	42.957	0.00E+00	3.01E-05	6.02E-05	0.3750	2.544E+11
Co-60	6.6541E-01	21.479	42.957	0.00E+00	1.43E+01	2.86E+01	0.5750	3.985E+12
Cs-134	1.6887E-02	21.479	42.957	0.00E+00	3.63E-01	7.25E-01	0.8500	7.114E+10
Cs-135	3.2195E-05	21.479	42.957	0.00E+00	6.92E-04	1.38E-03	1.2500	2.139E+12
Cs-137	2.4556E+00	21.479	42.957	0.00E+00	5.27E+01	1.05E+02	1.7500	1.288E+09
Eu-154	1.0268E-02	21.479	42.957	0.00E+00	2.21E-01	4.41E-01	2.2500	6.724E+07
Eu-155	1.4570E-02	21.479	42.957	0.00E+00	3.13E-01	6.26E-01	2.7500	1.113E+06
Fe-55	2.0361E-01	21.479	42.957	0.00E+00	4.37E+00	8.75E+00	3.5000	1.319E+05
H-3	8.3940E-03	21.479	42.957	0.00E+00	1.80E-01	3.61E-01	5.0000	2.302E+01
I-129	7.3684E-07	21.479	42.957	0.00E+00	1.58E-05	3.17E-05	7.0000	2.604E+00
Kr-85	1.8286E-01	21.479	42.957	0.00E+00	3.93E+00	7.86E+00	11.0000	2.965E-01
Np-237	1.2462E-06	21.479	42.957	0.00E+00	2.68E-05	5.35E-05		
Pa-231	4.9143E-09	21.479	42.957	0.00E+00	1.06E-07	2.11E-07		
Pb-210	1.7173E-14	21.479	42.957	0.00E+00	3.69E-13	7.38E-13		
Pm-147	5.6165E-01	21.479	42.957	0.00E+00	1.21E+01	2.41E+01		
Pu-238	9.9820E-04	21.479	42.957	0.00E+00	2.14E-02	4.29E-02		
Pu-239	5.5293E-03	21.479	42.957	0.00E+00	1.19E-01	2.38E-01		
Pu-240	2.1263E-03	21.479	42.957	0.00E+00	4.57E-02	9.13E-02		
Pu-241	8.0165E-02	21.479	42.957	0.00E+00	1.72E+00	3.44E+00		
Pu-242	2.3128E-07	21.479	42.957	0.00E+00	4.97E-06	9.94E-06		
Ra-226	9.9774E-14	21.479	42.957	0.00E+00	2.14E-12	4.29E-12		
Ra-228	2.1729E-10	21.479	42.957	0.00E+00	4.67E-09	9.33E-09		
Ru-106	2.9519E-03	21.479	42.957	0.00E+00	6.34E-02	1.27E-01		
Se-79	1.3017E-05	21.479	42.957	0.00E+00	2.80E-04	5.59E-04		
Sn-126	1.2167E-05	21.479	42.957	0.00E+00	2.61E-04	5.23E-04		
Sr-90	2.3128E+00	21.479	42.957	0.00E+00	4.97E+01	9.94E+01		
Tc-99	4.4241E-04	21.479	42.957	0.00E+00	9.50E-03	1.90E-02		
Th-229	1.9459E-10	21.479	42.957	0.00E+00	4.18E-09	8.36E-09		
Th-230	2.5564E-11	21.479	42.957	0.00E+00	5.49E-10	1.10E-09		
Th-232	2.5278E-10	21.479	42.957	0.00E+00	5.43E-09	1.09E-08		
Ti-208	1.6947E-08	21.479	42.957	0.00E+00	3.64E-07	7.28E-07		
U-232	4.6812E-08	21.479	42.957	0.00E+00	1.01E-06	2.01E-06		
U-233	1.2206E-07	21.479	42.957	0.00E+00	2.62E-06	5.24E-06		
U-234	1.7323E-07	21.479	42.957	0.00E+00	3.72E-06	7.44E-06		
U-235	-2.6194E-06	21.479	0.000	4.16E-04	3.60E-04	4.16E-04		
U-236	1.2693E-05	21.479	42.957	0.00E+00	2.73E-04	5.45E-04		
U-238	-3.6331E-08	21.479	0.000	2.62E-04	2.61E-04	2.62E-04		
Y-90	2.3128E+00	21.479	42.957	0.00E+00	4.97E+01	9.94E+01		
Other Radionuclides					5.27E+01	1.05E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.41E-01	1.68E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.81481481	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	2.368	21.479	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		42.957	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.65	9.07	1.00
Bounding:	1.30		

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 (HEIDELBERG)
 SNF ID #: 464
 Fuel Units & Descr: 65 - ELEMENT
 Heavy Metal Mass: BOL=11.65kg : EOL=11.40kg
 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							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	8.0632E-10	283.804	567.607	0.00E+00	2.29E-07	4.58E-07	Avg. MeV	
Am-241	2.2586E-03	283.804	567.607	0.00E+00	6.41E-01	1.28E+00	0.0150	9.604E+13
Am-242m	1.9925E-06	283.804	567.607	0.00E+00	5.65E-04	1.13E-03	0.0250	2.085E+13
Am-243	2.332E-07	283.804	567.607	0.00E+00	6.62E-05	1.32E-04	0.0375	2.597E+13
C-14	4.3308E-05	283.804	567.607	0.00E+00	1.23E-02	2.46E-02	0.0575	1.991E+13
Cl-36	4.3023E-08	283.804	567.607	0.00E+00	1.22E-05	2.44E-05	0.0850	1.394E+13
Cm-243	2.7429E-07	283.804	567.607	0.00E+00	7.78E-05	1.56E-04	0.1250	2.085E+13
Cm-244	3.1504E-06	283.804	567.607	0.00E+00	8.94E-04	1.79E-03	0.2250	1.164E+13
Co-60	3.1008E-02	283.804	567.607	0.00E+00	8.80E+00	1.76E+01	0.3750	5.178E+12
Cs-134	1.0367E-01	283.804	567.607	0.00E+00	2.94E+01	5.88E+01	0.5750	6.565E+13
Cs-135	3.1549E-05	283.804	567.607	0.00E+00	8.95E-03	1.79E-02	0.8500	1.616E+13
Cs-137	2.7564E+00	283.804	567.607	0.00E+00	7.82E+02	1.56E+03	1.2500	1.675E+13
Eu-154	1.3490E+00	283.804	567.607	0.00E+00	3.83E+02	7.66E+02	1.7500	4.794E+11
Eu-155	4.3880E-01	283.804	567.607	0.00E+00	1.25E+02	2.49E+02	2.2500	5.828E+10
Fe-55	8.6782E-03	283.804	567.607	0.00E+00	2.46E+00	4.93E+00	2.7500	4.733E+08
H-3	1.0805E-02	283.804	567.607	0.00E+00	3.07E+00	6.13E+00	3.5000	5.534E+07
I-129	7.3805E-07	283.804	567.607	0.00E+00	2.09E-04	4.19E-04	5.0000	3.310E+02
Kr-85	2.5218E-01	283.804	567.607	0.00E+00	7.16E+01	1.43E+02	7.0000	3.747E+01
Np-237	1.4463E-06	283.804	567.607	0.00E+00	4.10E-04	8.21E-04	11.0000	4.268E+00
Pa-231	3.5970E-09	283.804	567.607	0.00E+00	1.02E-06	2.04E-06		
Pb-210	8.2511E-15	283.804	567.607	0.00E+00	2.34E-12	4.68E-12		
Pm-147	2.0767E+00	283.804	567.607	0.00E+00	5.89E+02	1.18E+03		
Pu-238	1.3514E-03	283.804	567.607	0.00E+00	3.84E-01	7.67E-01		
Pu-239	5.6947E-03	283.804	567.607	0.00E+00	1.62E+00	3.23E+00		
Pu-240	2.2647E-03	283.804	567.607	0.00E+00	6.43E-01	1.29E+00		
Pu-241	1.2574E-01	283.804	567.607	0.00E+00	3.57E+01	7.14E+01		
Pu-242	3.0602E-07	283.804	567.607	0.00E+00	8.68E-05	1.74E-04		
Ra-226	5.7353E-14	283.804	567.607	0.00E+00	1.63E-11	3.26E-11		
Ra-228	1.8150E-10	283.804	567.607	0.00E+00	5.15E-08	1.03E-07		
Ru-106	9.3744E-02	283.804	567.607	0.00E+00	2.66E+01	5.32E+01		
Se-79	1.2938E-05	283.804	567.607	0.00E+00	3.67E-03	7.34E-03		
Sn-126	1.2239E-05	283.804	567.607	0.00E+00	3.47E-03	6.95E-03		
Sr-90	2.6000E+00	283.804	567.607	0.00E+00	7.38E+02	1.48E+03		
Tc-99	4.4120E-04	283.804	567.607	0.00E+00	1.25E-01	2.50E-01		
Th-229	1.4749E-10	283.804	567.607	0.00E+00	4.19E-08	8.37E-08		
Th-230	1.9549E-11	283.804	567.607	0.00E+00	5.55E-09	1.11E-08		
Th-232	2.3744E-10	283.804	567.607	0.00E+00	6.74E-08	1.35E-07		
Tl-208	1.9459E-08	283.804	567.607	0.00E+00	5.52E-06	1.10E-05		
U-232	5.6015E-08	283.804	567.607	0.00E+00	1.59E-05	3.18E-05		
U-233	1.3132E-07	283.804	567.607	0.00E+00	3.73E-05	7.45E-05		
U-234	1.7323E-07	283.804	567.607	0.00E+00	4.92E-05	9.83E-05		
U-235	-2.6159E-06	283.804	0.000	5.06E-03	4.31E-03	5.06E-03		
U-236	1.2717E-05	283.804	567.607	0.00E+00	3.61E-03	7.22E-03		
U-238	-3.8857E-08	283.804	0.000	3.13E-03	3.12E-03	3.13E-03		
Y-90	2.6015E+00	283.804	567.607	0.00E+00	7.38E+02	1.48E+03		
Other Radionuclides					1.08E+03	2.16E+03		

Thermal Power
 Nominal Heat Output (Watts): 1.43E+01
 Bounding Heat Output (Watts): 2.85E+01
 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:	ALUM (1100)	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20.08410778	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	283.804	235.766	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		567.607	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.66	0.83	1.00
Bounding:	1.32		

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 (HEIDELBERG)
 SNF ID #: 1044
 Fuel Units & Descr: 56 - ELEMENT
 Heavy Metal Mass: BOL=10.71kg ; EOL=10.56kg
 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"
 0.50

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	8.5173E-10	208.814	417.628	0.00E+00	1.78E-07	3.56E-07	0.0150	6.750E+13
Am-241	1.8331E-03	208.814	417.628	0.00E+00	3.83E-01	7.66E-01	0.0250	1.485E+13
Am-242m	1.4129E-06	208.814	417.628	0.00E+00	2.95E-04	5.90E-04	0.0375	1.265E+13
Am-243	1.4774E-07	208.814	417.628	0.00E+00	3.09E-05	6.17E-05	0.0575	1.298E+13
C-14	1.2871E-04	208.814	417.628	0.00E+00	2.69E-02	5.38E-02	0.0850	8.043E+12
Cl-36	2.8120E-06	208.814	417.628	0.00E+00	5.87E-04	1.17E-03	0.1250	5.840E+12
Cm-243	1.7940E-07	208.814	417.628	0.00E+00	3.75E-05	7.49E-05	0.2250	6.829E+12
Cm-244	1.6962E-06	208.814	417.628	0.00E+00	3.54E-04	7.08E-04	0.3750	3.462E+12
Co-60	1.2839E+00	208.814	417.628	0.00E+00	2.68E+02	5.36E+02	0.5750	4.603E+12
Cs-134	9.0541E-02	208.814	417.628	0.00E+00	1.89E+01	3.78E+01	0.8500	1.975E+12
Cs-135	3.2195E-05	208.814	417.628	0.00E+00	6.72E-03	1.34E-02	1.2500	4.012E+13
Cs-137	2.7564E+00	208.814	417.628	0.00E+00	5.76E+02	1.15E+03	1.7500	2.675E+10
Eu-154	1.5368E-02	208.814	417.628	0.00E+00	3.21E+00	6.42E+00	2.2500	4.311E+10
Eu-155	2.9293E-02	208.814	417.628	0.00E+00	6.12E+00	1.22E+01	2.7500	3.421E+08
Fe-55	7.7158E-01	208.814	417.628	0.00E+00	1.61E+02	3.22E+02	3.5000	3.982E+07
H-3	1.1111E-02	208.814	417.628	0.00E+00	2.32E+00	4.64E+00	5.0000	2.255E+02
I-129	7.3684E-07	208.814	417.628	0.00E+00	1.54E-04	3.08E-04	7.0000	2.554E+01
Kr-85	2.5263E-01	208.814	417.628	0.00E+00	5.28E+01	1.06E+02	11.0000	2.910E+00
Np-237	1.2427E-06	208.814	417.628	0.00E+00	2.59E-04	5.19E-04		
Pa-231	3.8511E-09	208.814	417.628	0.00E+00	8.04E-07	1.61E-06		
Pb-210	7.3880E-15	208.814	417.628	0.00E+00	1.54E-12	3.09E-12		
Pm-147	2.1023E+00	208.814	417.628	0.00E+00	4.39E+02	8.78E+02		
Pu-238	1.0383E-03	208.814	417.628	0.00E+00	2.17E-01	4.34E-01		
Pu-239	5.5293E-03	208.814	417.628	0.00E+00	1.15E+00	2.31E+00		
Pu-240	2.1278E-03	208.814	417.628	0.00E+00	4.44E-01	8.89E-01		
Pu-241	1.0195E-01	208.814	417.628	0.00E+00	2.13E+01	4.26E+01		
Pu-242	2.3128E-07	208.814	417.628	0.00E+00	4.83E-05	9.66E-05		
Ra-226	5.2782E-14	208.814	417.628	0.00E+00	1.10E-11	2.20E-11		
Ra-228	1.9338E-10	208.814	417.628	0.00E+00	4.04E-08	8.08E-08		
Ru-106	9.1684E-02	208.814	417.628	0.00E+00	1.91E+01	3.83E+01		
Se-79	1.3018E-05	208.814	417.628	0.00E+00	2.72E-03	5.44E-03		
Sn-126	1.2167E-05	208.814	417.628	0.00E+00	2.54E-03	5.08E-03		
Sr-90	2.6045E+00	208.814	417.628	0.00E+00	5.44E+02	1.09E+03		
Tc-99	4.4241E-04	208.814	417.628	0.00E+00	9.24E-02	1.85E-01		
Th-229	1.3713E-10	208.814	417.628	0.00E+00	2.86E-08	5.73E-08		
Th-230	1.8090E-11	208.814	417.628	0.00E+00	3.78E-09	7.55E-09		
Th-232	2.5278E-10	208.814	417.628	0.00E+00	5.28E-08	1.06E-07		
Tl-208	1.6947E-08	208.814	417.628	0.00E+00	3.54E-06	7.08E-06		
U-232	4.8737E-08	208.814	417.628	0.00E+00	1.02E-05	2.04E-05		
U-233	1.2203E-07	208.814	417.628	0.00E+00	2.55E-05	5.10E-05		
U-234	1.5925E-07	208.814	417.628	0.00E+00	3.33E-05	6.65E-05		
U-235	-2.6194E-06	208.814	0.000	4.57E-03	4.02E-03	4.57E-03		
U-236	1.2693E-05	208.814	417.628	0.00E+00	2.65E-03	5.30E-03		
U-238	-3.6331E-08	208.814	0.000	2.89E-03	2.88E-03	2.89E-03		
Y-90	2.6060E+00	208.814	417.628	0.00E+00	5.44E+02	1.09E+03		
Other Radionuclides					7.53E+02	1.51E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.22E+01	2.43E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.72849245	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	208.814	149.682	
Bounding:		417.628	

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

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 (IFE) (ENGLAND)
 SNF ID #: 1043
 Fuel Units & Descr: 2 - ELEMENT
 Heavy Metal Mass: BOL= 38kg ; EOL= 37kg
 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 _n	x _b	b	y _n	y _b	Gamma Sources	
							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	10.634	21.267	0.00E+00	9.06E-09	1.81E-08	0.0150	3.437E+12
Am-241	1.8331E-03	10.634	21.267	0.00E+00	1.95E-02	3.90E-02	0.0250	7.563E+11
Am-242m	1.4129E-06	10.634	21.267	0.00E+00	1.50E-05	3.00E-05	0.0375	6.441E+11
Am-243	1.4774E-07	10.634	21.267	0.00E+00	1.57E-06	3.14E-06	0.0575	6.611E+11
C-14	1.2871E-04	10.634	21.267	0.00E+00	1.37E-03	2.74E-03	0.0850	4.096E+11
Cl-36	2.8120E-06	10.634	21.267	0.00E+00	2.99E-05	5.98E-05	0.1250	2.974E+11
Cm-243	1.7940E-07	10.634	21.267	0.00E+00	1.91E-06	3.82E-06	0.2250	3.474E+11
Cm-244	1.6962E-06	10.634	21.267	0.00E+00	1.80E-05	3.61E-05	0.3750	1.763E+11
Co-60	1.2839E+00	10.634	21.267	0.00E+00	1.37E+01	2.73E+01	0.5750	2.344E+12
Cs-134	9.0541E-02	10.634	21.267	0.00E+00	9.63E-01	1.93E+00	8.5000	1.006E+11
Cs-135	3.2195E-05	10.634	21.267	0.00E+00	3.42E-04	6.85E-04	1.2500	2.043E+12
Cs-137	2.7564E+00	10.634	21.267	0.00E+00	2.93E+01	5.86E+01	1.7500	1.362E+09
Eu-154	1.5368E-02	10.634	21.267	0.00E+00	1.63E-01	3.27E-01	2.2500	2.195E+09
Eu-155	2.9293E-02	10.634	21.267	0.00E+00	3.11E-01	6.23E-01	2.7500	1.742E+07
Fe-55	7.7158E-01	10.634	21.267	0.00E+00	8.20E+00	1.64E+01	3.5000	2.028E+06
H-3	1.1111E-02	10.634	21.267	0.00E+00	1.18E-01	2.36E-01	5.0000	1.138E+01
I-129	7.3684E-07	10.634	21.267	0.00E+00	7.84E-06	1.57E-05	7.0000	1.288E+00
Kr-85	2.5263E-01	10.634	21.267	0.00E+00	2.69E+00	5.37E+00	11.0000	1.468E-01
Np-237	1.2427E-06	10.634	21.267	0.00E+00	1.32E-05	2.64E-05		
Pa-231	3.8511E-09	10.634	21.267	0.00E+00	4.10E-08	8.19E-08		
Pb-210	7.3880E-15	10.634	21.267	0.00E+00	7.86E-14	1.57E-13		
Pm-147	2.1023E+00	10.634	21.267	0.00E+00	2.24E+01	4.47E+01		
Pu-238	1.0383E-03	10.634	21.267	0.00E+00	1.10E-02	2.21E-02		
Pu-239	5.5293E-03	10.634	21.267	0.00E+00	5.88E-02	1.18E-01		
Pu-240	2.1278E-03	10.634	21.267	0.00E+00	2.26E-02	4.53E-02		
Pu-241	1.0195E-01	10.634	21.267	0.00E+00	1.08E+00	2.17E+00		
Pu-242	2.3128E-07	10.634	21.267	0.00E+00	2.46E-06	4.92E-06		
Ra-226	5.2782E-14	10.634	21.267	0.00E+00	5.61E-13	1.12E-12		
Ra-228	1.9338E-10	10.634	21.267	0.00E+00	2.06E-09	4.11E-09		
Ru-106	9.1684E-02	10.634	21.267	0.00E+00	9.75E-01	1.95E+00		
Se-79	1.3018E-05	10.634	21.267	0.00E+00	1.38E-04	2.77E-04		
Sn-126	1.2167E-05	10.634	21.267	0.00E+00	1.29E-04	2.59E-04		
Sr-90	2.6045E+00	10.634	21.267	0.00E+00	2.77E+01	5.54E+01		
Tc-99	4.4241E-04	10.634	21.267	0.00E+00	4.70E-03	9.41E-03		
Th-229	1.3713E-10	10.634	21.267	0.00E+00	1.46E-09	2.92E-09		
Th-230	1.8090E-11	10.634	21.267	0.00E+00	1.92E-10	3.85E-10		
Th-232	2.5278E-10	10.634	21.267	0.00E+00	2.69E-09	5.38E-09		
Tl-208	1.6947E-08	10.634	21.267	0.00E+00	1.80E-07	3.60E-07		
U-232	4.8737E-08	10.634	21.267	0.00E+00	5.18E-07	1.04E-06		
U-233	1.2203E-07	10.634	21.267	0.00E+00	1.30E-06	2.60E-06		
U-234	1.5925E-07	10.634	21.267	0.00E+00	1.69E-06	3.39E-06		
U-235	-2.6194E-06	10.634	0.000	1.62E-04	1.34E-04	1.62E-04		
U-236	1.2693E-05	10.634	21.267	0.00E+00	1.35E-04	2.70E-04		
U-238	-3.6331E-08	10.634	0.000	1.01E-04	1.01E-04	1.01E-04		
Y-90	2.6060E+00	10.634	21.267	0.00E+00	2.77E+01	5.54E+01		
Other Radionuclides					3.83E+01	7.67E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.19E-01	1.24E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.94680851	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	10.634	8.973	
Bounding:		21.267	

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:	0.83	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 (IFE) (ITALY) 1 Fuel decay start date: 1999
 SNF ID #: 929 Estimates as of: 2010
 Fuel Units & Descr: 2 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=38kg ; EOL=.37kg 2 Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 10 years

Estimated
Canister usage:
18" x 10"
0.02

Radionuclide	II. Estimates		Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
	m	x _n						Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3731E-09	13.065	26.129	26.129	0.00E+00	1.79E-08	3.59E-08	Avg. MeV	
Am-241	2.3865E-03	13.065	26.129	26.129	0.00E+00	3.12E-02	6.24E-02	0.0150	3.376E+12
Am-242m	1.3812E-06	13.065	26.129	26.129	0.00E+00	1.80E-05	3.61E-05	0.0250	7.151E+11
Am-243	1.4767E-07	13.065	26.129	26.129	0.00E+00	1.93E-06	3.86E-06	0.0375	6.108E+11
C-14	1.2863E-04	13.065	26.129	26.129	0.00E+00	1.68E-03	3.36E-03	0.0575	6.510E+11
Cl-36	2.8120E-06	13.065	26.129	26.129	0.00E+00	3.67E-05	7.35E-05	0.0850	3.950E+11
Cm-243	1.5895E-07	13.065	26.129	26.129	0.00E+00	2.08E-06	4.15E-06	0.1250	2.596E+11
Cm-244	1.4008E-06	13.065	26.129	26.129	0.00E+00	1.83E-05	3.66E-05	0.2250	3.369E+11
Co-60	6.6541E-01	13.065	26.129	26.129	0.00E+00	8.69E+00	1.74E+01	0.3750	1.547E+11
Cs-134	1.6887E-02	13.065	26.129	26.129	0.00E+00	2.21E-01	4.41E-01	0.5750	2.424E+12
Cs-135	3.2195E-05	13.065	26.129	26.129	0.00E+00	4.21E-04	8.41E-04	0.8500	4.327E+12
Cs-137	2.4556E+00	13.065	26.129	26.129	0.00E+00	3.21E+01	6.42E+01	1.2500	1.301E+12
Eu-154	1.0268E-02	13.065	26.129	26.129	0.00E+00	1.34E-01	2.68E-01	1.7500	7.832E+08
Eu-155	1.4570E-02	13.065	26.129	26.129	0.00E+00	1.90E-01	3.81E-01	2.2500	4.090E+07
Fe-55	2.0361E-01	13.065	26.129	26.129	0.00E+00	2.66E+00	5.32E+00	2.7500	6.770E+05
H-3	8.3940E-03	13.065	26.129	26.129	0.00E+00	1.10E-01	2.19E-01	3.5000	8.025E+04
I-129	7.3684E-07	13.065	26.129	26.129	0.00E+00	9.63E-06	1.93E-05	5.0000	1.387E+01
Kr-85	1.8286E-01	13.065	26.129	26.129	0.00E+00	2.39E+00	4.78E+00	7.0000	1.569E+00
Np-237	1.2462E-06	13.065	26.129	26.129	0.00E+00	1.63E-05	3.26E-05	11.0000	1.786E-01
Pa-231	4.9143E-09	13.065	26.129	26.129	0.00E+00	6.42E-08	1.28E-07		
Pb-210	1.7173E-14	13.065	26.129	26.129	0.00E+00	2.24E-13	4.49E-13		
Pm-147	5.6165E-01	13.065	26.129	26.129	0.00E+00	7.34E+00	1.47E+01		
Pu-238	9.9820E-04	13.065	26.129	26.129	0.00E+00	1.30E-02	2.61E-02		
Pu-239	5.5293E-03	13.065	26.129	26.129	0.00E+00	7.22E-02	1.44E-01		
Pu-240	2.1263E-03	13.065	26.129	26.129	0.00E+00	2.78E-02	5.56E-02		
Pu-241	8.0165E-02	13.065	26.129	26.129	0.00E+00	1.05E+00	2.09E+00		
Pu-242	2.3128E-07	13.065	26.129	26.129	0.00E+00	3.02E-06	6.04E-06		
Ra-226	9.9774E-14	13.065	26.129	26.129	0.00E+00	1.30E-12	2.61E-12		
Ra-228	2.1729E-10	13.065	26.129	26.129	0.00E+00	2.84E-09	5.68E-09		
Ru-106	2.9519E-03	13.065	26.129	26.129	0.00E+00	3.86E-02	7.71E-02		
Se-79	1.3017E-05	13.065	26.129	26.129	0.00E+00	1.70E-04	3.40E-04		
Sn-126	1.2167E-05	13.065	26.129	26.129	0.00E+00	1.59E-04	3.18E-04		
Sr-90	2.3128E+00	13.065	26.129	26.129	0.00E+00	3.02E+01	6.04E+01		
Tc-99	4.4241E-04	13.065	26.129	26.129	0.00E+00	5.78E-03	1.16E-02		
Th-229	1.9459E-10	13.065	26.129	26.129	0.00E+00	2.54E-09	5.08E-09		
Th-230	2.5564E-11	13.065	26.129	26.129	0.00E+00	3.34E-10	6.68E-10		
Th-232	2.5278E-10	13.065	26.129	26.129	0.00E+00	3.30E-09	6.60E-09		
Tl-208	1.6947E-08	13.065	26.129	26.129	0.00E+00	2.21E-07	4.43E-07		
U-232	4.6812E-08	13.065	26.129	26.129	0.00E+00	6.12E-07	1.22E-06		
U-233	1.2206E-07	13.065	26.129	26.129	0.00E+00	1.59E-06	3.19E-06		
U-234	1.7323E-07	13.065	26.129	26.129	0.00E+00	2.26E-06	4.53E-06		
U-235	2.6194E-06	13.065	0.000	0.000	1.66E-04	1.32E-04	1.66E-04		
U-236	1.2693E-05	13.065	26.129	26.129	0.00E+00	1.66E-04	3.32E-04		
U-238	-3.6331E-08	13.065	0.000	0.000	1.03E-04	1.02E-04	1.03E-04		
Y-90	2.3128E+00	13.065	26.129	26.129	0.00E+00	3.02E+01	6.04E+01		
Other Radionuclides						3.20E+01	6.41E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.12E-01	1.02E+00
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:	SST (304)	SST	This fuel matches on all parameters except enrichment (very close to 20%)
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20.10443864	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
	13.065	10.501	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		26.129	Bounding burnup assumed to be twice nominal burnup.

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

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 (MW/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (IFE) (OSU)
 SNF ID #: 1040
 Fuel Units & Descr: 2 - ELEMENT
 Heavy Metal Mass: BOL=.39kg ; EOL=.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							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	8.5173E-10	9.546	19.092	0.00E+00	8.13E-09	1.63E-08	0.0150	3.086E+12
Am-241	1.8331E-03	9.546	19.092	0.00E+00	1.75E-02	3.50E-02	0.0250	6.790E+11
Am-242m	1.4129E-06	9.546	19.092	0.00E+00	1.35E-05	2.70E-05	0.0375	5.782E+11
Am-243	1.4774E-07	9.546	19.092	0.00E+00	1.41E-06	2.82E-06	0.0575	5.935E+11
C-14	1.2871E-04	9.546	19.092	0.00E+00	1.23E-03	2.46E-03	0.0850	3.677E+11
Cl-36	2.8120E-06	9.546	19.092	0.00E+00	2.68E-05	5.37E-05	0.1250	2.670E+11
Cm-243	1.7940E-07	9.546	19.092	0.00E+00	1.71E-06	3.43E-06	0.2250	3.119E+11
Cm-244	1.6962E-06	9.546	19.092	0.00E+00	1.62E-05	3.24E-05	0.3750	1.583E+11
Co-60	1.2839E+00	9.546	19.092	0.00E+00	1.23E+01	2.45E+01	0.5750	2.104E+12
Cs-134	9.0541E-02	9.546	19.092	0.00E+00	8.64E-01	1.73E+00	0.8500	9.031E+10
Cs-135	3.2195E-05	9.546	19.092	0.00E+00	3.07E-04	6.15E-04	1.2500	1.834E+12
Cs-137	2.7564E+00	9.546	19.092	0.00E+00	2.63E+01	5.26E+01	1.7500	1.223E+09
Eu-154	1.5368E-02	9.546	19.092	0.00E+00	1.47E-01	2.93E-01	2.2500	1.971E+09
Eu-155	2.9293E-02	9.546	19.092	0.00E+00	2.80E-01	5.59E-01	2.7500	1.564E+07
Fe-55	7.7158E-01	9.546	19.092	0.00E+00	7.37E+00	1.47E+01	3.5000	1.820E+06
H-3	1.1111E-02	9.546	19.092	0.00E+00	1.06E-01	2.12E-01	5.0000	1.025E+01
I-129	7.3684E-07	9.546	19.092	0.00E+00	7.03E-06	1.41E-05	7.0000	1.160E+00
Kr-85	2.5263E-01	9.546	19.092	0.00E+00	2.41E+00	4.82E+00	11.0000	1.322E-01
Np-237	1.2427E-06	9.546	19.092	0.00E+00	1.19E-05	2.37E-05		
Pa-231	3.8511E-09	9.546	19.092	0.00E+00	3.68E-08	7.35E-08		
Pb-210	7.3880E-15	9.546	19.092	0.00E+00	7.05E-14	1.41E-13		
Pm-147	2.1023E+00	9.546	19.092	0.00E+00	2.01E+01	4.01E+01		
Pu-238	1.0383E-03	9.546	19.092	0.00E+00	9.91E-03	1.98E-02		
Pu-239	5.5293E-03	9.546	19.092	0.00E+00	5.28E-02	1.06E-01		
Pu-240	2.1278E-03	9.546	19.092	0.00E+00	2.03E-02	4.06E-02		
Pu-241	1.0195E-01	9.546	19.092	0.00E+00	9.73E-01	1.95E+00		
Pu-242	2.3128E-07	9.546	19.092	0.00E+00	2.21E-06	4.42E-06		
Ra-226	5.2782E-14	9.546	19.092	0.00E+00	5.04E-13	1.01E-12		
Ra-228	1.9338E-10	9.546	19.092	0.00E+00	1.85E-09	3.69E-09		
Ru-106	9.1684E-02	9.546	19.092	0.00E+00	8.75E-01	1.75E+00		
Se-79	1.3018E-05	9.546	19.092	0.00E+00	1.24E-04	2.49E-04		
Sn-126	1.2167E-05	9.546	19.092	0.00E+00	1.16E-04	2.32E-04		
Sr-90	2.6045E+00	9.546	19.092	0.00E+00	2.49E+01	4.97E+01		
Tc-99	4.4241E-04	9.546	19.092	0.00E+00	4.22E-03	8.45E-03		
Th-229	1.3713E-10	9.546	19.092	0.00E+00	1.31E-09	2.62E-09		
Th-230	1.8090E-11	9.546	19.092	0.00E+00	1.73E-10	3.45E-10		
Th-232	2.5278E-10	9.546	19.092	0.00E+00	2.41E-09	4.83E-09		
Tl-208	1.6947E-08	9.546	19.092	0.00E+00	1.62E-07	3.24E-07		
U-232	4.8737E-08	9.546	19.092	0.00E+00	4.65E-07	9.30E-07		
U-233	1.2203E-07	9.546	19.092	0.00E+00	1.16E-06	2.33E-06		
U-234	1.5925E-07	9.546	19.092	0.00E+00	1.52E-06	3.04E-06		
U-235	-2.6194E-06	9.546	0.000	1.68E-04	1.43E-04	1.68E-04		
U-236	1.2693E-05	9.546	19.092	0.00E+00	1.21E-04	2.42E-04		
U-238	-3.6331E-08	9.546	0.000	1.05E-04	1.05E-04	1.05E-04		
Y-90	2.6060E+00	9.546	19.092	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			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.9	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	3.801	9.546	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		19.092	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.72	2.51	1.00
Bounding:	1.44		

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 (IFE) (U OF AZ) ¹Fuel decay start date: 2035
 SNF ID #: 973 Estimates as of: 2010
 Fuel Units & Descr: 2 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=.39kg ; EOL=.38kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
³Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.02

Radionuclide	II. Estimates		b				Gamma Sources	
	m	x _n	x _b	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	11.455	22.911	0.00E+00	9.76E-09	1.95E-08	Avg. MeV	
Am-241	1.8331E-03	11.455	22.911	0.00E+00	2.10E-02	4.20E-02	0.0150	3.703E+12
Am-242m	1.4129E-06	11.455	22.911	0.00E+00	1.62E-05	3.24E-05	0.0250	8.148E+11
Am-243	1.4774E-07	11.455	22.911	0.00E+00	1.69E-06	3.38E-06	0.0375	6.939E+11
C-14	1.2871E-04	11.455	22.911	0.00E+00	1.47E-03	2.95E-03	0.0575	7.122E+11
Cl-36	2.8120E-06	11.455	22.911	0.00E+00	3.22E-05	6.44E-05	0.0850	4.412E+11
Cl-243	1.7940E-07	11.455	22.911	0.00E+00	2.06E-06	4.11E-06	0.1250	3.204E+11
Cr-244	1.6962E-06	11.455	22.911	0.00E+00	1.94E-05	3.89E-05	0.2250	3.743E+11
Co-60	1.2839E+00	11.455	22.911	0.00E+00	1.47E+01	2.94E+01	0.3750	1.899E+11
Cs-134	9.0541E-02	11.455	22.911	0.00E+00	1.04E+00	2.07E+00	0.5750	2.525E+12
Cs-135	3.2195E-05	11.455	22.911	0.00E+00	3.69E-04	7.38E-04	0.8500	1.084E+11
Cs-137	2.7564E+00	11.455	22.911	0.00E+00	3.16E+01	6.32E+01	1.2500	2.201E+12
Eu-154	1.5368E-02	11.455	22.911	0.00E+00	1.76E-01	3.52E-01	1.7500	1.467E+09
Eu-155	2.9293E-02	11.455	22.911	0.00E+00	3.36E-01	6.71E-01	2.2500	2.365E+09
Fe-55	7.7158E-01	11.455	22.911	0.00E+00	8.84E+00	1.77E+01	2.7500	1.877E+07
H-3	1.1111E-02	11.455	22.911	0.00E+00	1.27E-01	2.55E-01	3.5000	2.185E+06
I-129	7.3684E-07	11.455	22.911	0.00E+00	8.44E-06	1.69E-05	5.0000	1.225E+01
Kr-85	2.5263E-01	11.455	22.911	0.00E+00	2.89E+00	5.79E+00	7.0000	1.387E+09
Np-237	1.2427E-06	11.455	22.911	0.00E+00	1.42E-05	2.85E-05	11.0000	1.580E-01
Pa-231	3.8511E-09	11.455	22.911	0.00E+00	4.41E-08	8.82E-08		
Pb-210	7.3880E-15	11.455	22.911	0.00E+00	8.46E-14	1.69E-13		
Pm-147	2.1023E+00	11.455	22.911	0.00E+00	2.41E+01	4.82E+01		
Pu-238	1.0383E-03	11.455	22.911	0.00E+00	1.19E-02	2.38E-02		
Pu-239	5.5293E-03	11.455	22.911	0.00E+00	6.33E-02	1.27E-01		
Pu-240	2.1278E-03	11.455	22.911	0.00E+00	2.44E-02	4.87E-02		
Pu-241	1.0195E-01	11.455	22.911	0.00E+00	1.17E+00	2.34E+00		
Pu-242	2.3128E-07	11.455	22.911	0.00E+00	2.65E-06	5.30E-06		
Ra-226	5.2782E-14	11.455	22.911	0.00E+00	6.05E-13	1.21E-12		
Ra-228	1.9338E-10	11.455	22.911	0.00E+00	2.22E-09	4.43E-09		
Ru-106	9.1684E-02	11.455	22.911	0.00E+00	1.05E+00	2.10E+00		
Se-79	1.3018E-05	11.455	22.911	0.00E+00	1.49E-04	2.98E-04		
Sn-126	1.2167E-05	11.455	22.911	0.00E+00	1.39E-04	2.79E-04		
Sr-90	2.6045E+00	11.455	22.911	0.00E+00	2.98E+01	5.97E+01		
Tc-99	4.4241E-04	11.455	22.911	0.00E+00	5.07E-03	1.01E-02		
Th-229	1.3713E-10	11.455	22.911	0.00E+00	1.57E-09	3.14E-09		
Th-230	1.8090E-11	11.455	22.911	0.00E+00	2.07E-10	4.14E-10		
Th-232	2.5278E-10	11.455	22.911	0.00E+00	2.90E-09	5.79E-09		
Tl-208	1.6947E-08	11.455	22.911	0.00E+00	1.94E-07	3.88E-07		
U-232	4.8737E-08	11.455	22.911	0.00E+00	5.58E-07	1.12E-06		
U-233	1.2203E-07	11.455	22.911	0.00E+00	1.40E-06	2.80E-06		
U-234	1.5925E-07	11.455	22.911	0.00E+00	1.82E-06	3.65E-06		
U-235	-2.6194E-06	11.455	0.000	1.69E-04	1.39E-04	1.69E-04		
U-236	1.2693E-05	11.455	22.911	0.00E+00	1.45E-04	2.91E-04		
U-238	-3.6331E-08	11.455	0.000	1.05E-04	1.04E-04	1.05E-04		
Y-90	2.6060E+00	11.455	22.911	0.00E+00	2.99E+01	5.97E+01		
Other Radionuclides					4.13E+01	8.26E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.67E-01	1.33E+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 (304)	SST
BOL HM Constituents:	U-ZrHX	U
BOL Enrichment %:	20	10 to 20

Burnup Summary (MWd)²		Basis for burnup used in estimate:
From SFD	Estimated	
Nominal:	1.900	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	22.911	Bounding burnup assumed to be twice nominal burnup.

Checks		Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	
	0.86	6.03
Bounding:	1.72	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 (IFE) (U OF AZ)
 SNF ID #: 972
 Fuel Units & Decr: 1 - ELEMENT
 Heavy Metal Mass: BOL=20kg ; EOL=19kg
 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

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3731E-09	6.682	13.365	0.00E+00	9.18E-09	1.84E-08	Avg. MeV	
Am-241	2.3865E-03	6.682	13.365	0.00E+00	1.59E-02	3.19E-02	0.0150	1.727E+12
Am-242m	1.3812E-06	6.682	13.365	0.00E+00	9.23E-06	1.85E-05	0.0250	3.658E+11
Am-243	1.4767E-07	6.682	13.365	0.00E+00	9.87E-07	1.97E-06	0.0375	3.124E+11
C-14	1.2863E-04	6.682	13.365	0.00E+00	8.60E-04	1.72E-03	0.0575	3.330E+11
Cl-36	2.8120E-06	6.682	13.365	0.00E+00	1.88E-05	3.76E-05	0.0850	2.020E+11
Cm-243	1.5895E-07	6.682	13.365	0.00E+00	1.06E-06	2.12E-06	0.1250	1.328E+11
Cm-244	1.4008E-06	6.682	13.365	0.00E+00	9.36E-06	1.87E-05	0.2250	1.723E+11
Co-60	6.6541E-01	6.682	13.365	0.00E+00	4.45E+00	8.89E+00	0.3750	7.914E+10
Cs-134	1.6887E-02	6.682	13.365	0.00E+00	1.13E-01	2.26E-01	0.5750	1.240E+12
Cs-135	3.2195E-05	6.682	13.365	0.00E+00	2.15E-04	4.30E-04	0.8500	2.213E+10
Cs-137	2.4556E+00	6.682	13.365	0.00E+00	1.64E+01	3.28E+01	1.2500	6.655E+11
Eu-154	1.0268E-02	6.682	13.365	0.00E+00	6.86E-02	1.37E-01	1.7500	4.006E+08
Eu-155	1.4570E-02	6.682	13.365	0.00E+00	9.74E-02	1.95E-01	2.2500	2.092E+07
Fe-55	2.0361E-01	6.682	13.365	0.00E+00	1.36E+00	2.72E+00	2.7500	3.463E+05
H-3	8.3940E-03	6.682	13.365	0.00E+00	5.61E-02	1.12E-01	3.5000	4.105E+04
I-129	7.3684E-07	6.682	13.365	0.00E+00	4.92E-06	9.85E-06	5.0000	7.094E+00
Kr-85	1.8286E-01	6.682	13.365	0.00E+00	1.22E+00	2.44E+00	7.0000	8.024E-01
Np-237	1.2462E-06	6.682	13.365	0.00E+00	8.33E-06	1.67E-05	11.0000	9.137E-02
Pa-231	4.9143E-09	6.682	13.365	0.00E+00	3.28E-08	6.57E-08		
Pb-210	1.7173E-14	6.682	13.365	0.00E+00	1.15E-13	2.30E-13		
Pm-147	5.6165E-01	6.682	13.365	0.00E+00	3.75E+00	7.51E+00		
Pu-238	9.9820E-04	6.682	13.365	0.00E+00	6.67E-03	1.33E-02		
Pu-239	5.5293E-03	6.682	13.365	0.00E+00	3.69E-02	7.39E-02		
Pu-240	2.1263E-03	6.682	13.365	0.00E+00	1.42E-02	2.84E-02		
Pu-241	8.0165E-02	6.682	13.365	0.00E+00	5.36E-01	1.07E+00		
Pu-242	2.3128E-07	6.682	13.365	0.00E+00	1.55E-06	3.09E-06		
Ra-226	9.9774E-14	6.682	13.365	0.00E+00	6.67E-13	1.33E-12		
Ra-228	2.1729E-10	6.682	13.365	0.00E+00	1.45E-09	2.90E-09		
Ru-106	2.9519E-03	6.682	13.365	0.00E+00	1.97E-02	3.95E-02		
Se-79	1.3017E-05	6.682	13.365	0.00E+00	8.70E-05	1.74E-04		
Sr-126	1.2167E-05	6.682	13.365	0.00E+00	8.13E-05	1.63E-04		
Sr-90	2.3128E+00	6.682	13.365	0.00E+00	1.55E+01	3.09E+01		
Tc-99	4.4241E-04	6.682	13.365	0.00E+00	2.96E-03	5.91E-03		
Th-229	1.9459E-10	6.682	13.365	0.00E+00	1.30E-09	2.60E-09		
Th-230	2.5564E-11	6.682	13.365	0.00E+00	1.71E-10	3.42E-10		
Th-232	2.5278E-10	6.682	13.365	0.00E+00	1.69E-09	3.38E-09		
Th-208	1.6947E-08	6.682	13.365	0.00E+00	1.13E-07	2.26E-07		
U-232	4.6812E-08	6.682	13.365	0.00E+00	3.13E-07	6.26E-07		
U-233	1.2206E-07	6.682	13.365	0.00E+00	8.16E-07	1.63E-06		
U-234	1.7323E-07	6.682	13.365	0.00E+00	1.16E-06	2.32E-06		
U-235	-2.6194E-06	6.682	0.000	8.43E-05	6.68E-05	8.43E-05		
U-236	1.2693E-05	6.682	13.365	0.00E+00	8.48E-05	1.70E-04		
U-238	-3.6331E-08	6.682	0.000	5.24E-05	5.22E-05	5.24E-05		
Y-90	2.3128E+00	6.682	13.365	0.00E+00	1.55E+01	3.09E+01		
Other Radionuclides					1.64E+01	3.28E+01		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							2.62E-01	5.23E-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 (304)	SST	
BOL HM Constituents:	U-Zr/HX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	1.900	6.682	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		13.365	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
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 (FE) (U OF IL)
 SNF ID #: 1048
 Fuel Units & Descr: 8 - ELEMENT
 Heavy Metal Mass: BOL=1.56kg ; EOL=1.53kg
 ROD Storage Sits: 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							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	30.408	60.815	0.00E+00	2.59E-08	5.18E-08	Avg. MeV	
Am-241	1.8331E-03	30.408	60.815	0.00E+00	5.57E-02	1.11E-01	0.0150	9.829E+12
Am-242m	1.4129E-06	30.408	60.815	0.00E+00	4.30E-05	8.59E-05	0.0250	2.163E+12
Am-243	1.4774E-07	30.408	60.815	0.00E+00	4.49E-06	8.99E-06	0.0375	1.842E+12
C-14	1.2871E-04	30.408	60.815	0.00E+00	3.91E-03	7.83E-03	0.0575	1.891E+12
Cl-36	2.8120E-06	30.408	60.815	0.00E+00	8.55E-05	1.71E-04	0.0850	1.171E+12
Cm-243	1.7940E-07	30.408	60.815	0.00E+00	5.46E-06	1.09E-05	0.1250	8.505E+11
Cm-244	1.6962E-06	30.408	60.815	0.00E+00	5.16E-05	1.03E-04	0.2250	9.935E+11
Co-60	1.2839E+00	30.408	60.815	0.00E+00	3.90E+01	7.81E+01	0.3750	5.042E+11
Cs-134	9.0541E-02	30.408	60.815	0.00E+00	2.75E+00	5.51E+00	0.5750	6.703E+12
Cs-135	3.2195E-05	30.408	60.815	0.00E+00	9.79E-04	1.96E-03	0.8500	2.877E+11
Cs-137	2.7564E+00	30.408	60.815	0.00E+00	8.38E+01	1.68E+02	1.2500	5.842E+12
Eu-154	1.5368E-02	30.408	60.815	0.00E+00	4.67E-01	9.35E-01	1.7500	3.895E+09
Eu-155	2.9293E-02	30.408	60.815	0.00E+00	8.91E-01	1.78E+00	2.2500	6.278E+09
Fe-55	7.7158E-01	30.408	60.815	0.00E+00	2.35E+01	4.69E+01	2.7500	4.981E+07
H-3	1.1111E-02	30.408	60.815	0.00E+00	3.38E-01	6.76E-01	3.5000	5.799E+06
I-129	7.3684E-07	30.408	60.815	0.00E+00	2.24E-05	4.48E-05	5.0000	3.284E+01
Kr-85	2.5263E-01	30.408	60.815	0.00E+00	7.68E+00	1.54E+01	7.0000	3.718E+00
Np-237	1.2427E-06	30.408	60.815	0.00E+00	3.78E-05	7.56E-05	11.0000	4.237E-01
Pa-231	3.8511E-09	30.408	60.815	0.00E+00	1.17E-07	2.34E-07		
Pb-210	7.3880E-15	30.408	60.815	0.00E+00	2.25E-13	4.49E-13		
Pm-147	2.1023E+00	30.408	60.815	0.00E+00	6.39E+01	1.28E+02		
Pu-238	1.0383E-03	30.408	60.815	0.00E+00	3.16E-02	6.31E-02		
Pu-239	5.5293E-03	30.408	60.815	0.00E+00	1.68E-01	3.36E-01		
Pu-240	2.1278E-03	30.408	60.815	0.00E+00	6.47E-02	1.29E-01		
Pu-241	1.0195E-01	30.408	60.815	0.00E+00	3.10E+00	6.20E+00		
Pu-242	2.3128E-07	30.408	60.815	0.00E+00	7.03E-06	1.41E-05		
Ra-226	5.2782E-14	30.408	60.815	0.00E+00	1.60E-12	3.21E-12		
Ra-228	1.9338E-10	30.408	60.815	0.00E+00	5.88E-09	1.18E-08		
Ru-106	9.1684E-02	30.408	60.815	0.00E+00	2.79E+00	5.58E+00		
Se-79	1.3018E-05	30.408	60.815	0.00E+00	3.96E-04	7.92E-04		
Sn-126	1.2167E-05	30.408	60.815	0.00E+00	3.70E-04	7.40E-04		
Sr-90	2.6045E+00	30.408	60.815	0.00E+00	7.92E+01	1.58E+02		
Tc-99	4.4241E-04	30.408	60.815	0.00E+00	1.35E-02	2.69E-02		
Th-229	1.3713E-10	30.408	60.815	0.00E+00	4.17E-09	8.34E-09		
Th-230	1.8090E-11	30.408	60.815	0.00E+00	5.50E-10	1.10E-09		
Th-232	2.5278E-10	30.408	60.815	0.00E+00	7.69E-09	1.54E-08		
Ti-208	1.6947E-08	30.408	60.815	0.00E+00	5.15E-07	1.03E-06		
U-232	4.8737E-08	30.408	60.815	0.00E+00	1.48E-06	2.96E-06		
U-233	1.2203E-07	30.408	60.815	0.00E+00	3.71E-06	7.42E-06		
U-234	1.5925E-07	30.408	60.815	0.00E+00	4.84E-06	9.68E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2.6194E-06	30.408	0.000	6.74E-04	5.95E-04	6.74E-04	1.77E+00	3.54E+00
U-236	1.2693E-05	30.408	60.815	0.00E+00	3.86E-04	7.72E-04	Total	Total
U-238	-3.6331E-08	30.408	0.000	4.19E-04	4.18E-04	4.19E-04		
Y-90	2.6060E+00	30.408	60.815	0.00E+00	7.92E+01	1.58E+02		
Other Radionuclides					1.10E+02	2.19E+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:	SST (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	30.408	29.020	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		60.815	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.57	0.95	1.00
Bounding:	1.14		

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 (IFE) (UC-IRVINE)
 SNF ID #: 824
 Fuel Units & Descr: 5 - ELEMENT
 Heavy Metal Mass: BOL=.92kg ; EOL=.92kg
 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"
 0.05

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	8.5173E-10	8.932	17.864	0.00E+00	7.61E-09	1.52E-08		
Am-241	1.8331E-03	8.932	17.864	0.00E+00	1.64E-02	3.27E-02	0.0150	2.887E+12
Am-242m	1.4129E-06	8.932	17.864	0.00E+00	1.26E-05	2.52E-05	0.0250	6.353E+11
Am-243	1.4774E-07	8.932	17.864	0.00E+00	1.32E-06	2.64E-06	0.0375	5.410E+11
C-14	1.2871E-04	8.932	17.864	0.00E+00	1.15E-03	2.30E-03	0.0575	5.553E+11
Cl-36	2.8120E-06	8.932	17.864	0.00E+00	2.51E-05	5.02E-05	0.0850	3.440E+11
Cm-243	1.7940E-07	8.932	17.864	0.00E+00	1.60E-06	3.20E-06	0.1250	2.498E+11
Cm-244	1.6962E-06	8.932	17.864	0.00E+00	1.52E-05	3.03E-05	0.2250	2.919E+11
Co-60	1.2839E+00	8.932	17.864	0.00E+00	1.15E+01	2.29E+01	0.3750	1.481E+11
Cs-134	9.0541E-02	8.932	17.864	0.00E+00	8.09E-01	1.62E+00	0.5750	1.969E+12
Cs-135	3.2195E-05	8.932	17.864	0.00E+00	2.88E-04	5.75E-04	0.8500	8.450E+10
Cs-137	2.7564E+00	8.932	17.864	0.00E+00	2.46E+01	4.92E+01	1.2500	1.716E+12
Eu-154	1.5368E-02	8.932	17.864	0.00E+00	1.37E-01	2.75E-01	1.7500	1.144E+09
Eu-155	2.9293E-02	8.932	17.864	0.00E+00	2.62E-01	5.23E-01	2.2500	1.844E+09
Fe-55	7.7158E-01	8.932	17.864	0.00E+00	6.89E+00	1.38E+01	2.7500	1.463E+07
H-3	1.1111E-02	8.932	17.864	0.00E+00	9.92E-02	1.98E-01	3.5000	1.703E+06
I-129	7.3684E-07	8.932	17.864	0.00E+00	6.58E-06	1.32E-05	5.0000	9.930E+00
Kr-85	2.5263E-01	8.932	17.864	0.00E+00	2.26E+00	4.51E+00	7.0000	1.125E+00
Np-237	1.2427E-06	8.932	17.864	0.00E+00	1.11E-05	2.22E-05	11.0000	1.282E-01
Pa-231	3.8511E-09	8.932	17.864	0.00E+00	3.44E-08	6.88E-08		
Pb-210	7.3880E-15	8.932	17.864	0.00E+00	6.60E-14	1.32E-13		
Pm-147	2.1023E+00	8.932	17.864	0.00E+00	1.88E+01	3.76E+01		
Pu-238	1.0383E-03	8.932	17.864	0.00E+00	9.27E-03	1.85E-02		
Pu-239	5.5293E-03	8.932	17.864	0.00E+00	4.94E-02	9.88E-02		
Pu-240	2.1278E-03	8.932	17.864	0.00E+00	1.90E-02	3.80E-02		
Pu-241	1.0195E-01	8.932	17.864	0.00E+00	9.11E-01	1.82E+00		
Pu-242	2.3128E-07	8.932	17.864	0.00E+00	2.07E-06	4.13E-06		
Ra-226	5.2782E-14	8.932	17.864	0.00E+00	4.71E-13	9.43E-13		
Ra-228	1.9338E-10	8.932	17.864	0.00E+00	1.73E-09	3.45E-09		
Ru-106	9.1684E-02	8.932	17.864	0.00E+00	8.19E-01	1.64E+00		
Se-79	1.3018E-05	8.932	17.864	0.00E+00	1.16E-04	2.33E-04		
Sn-126	1.2167E-05	8.932	17.864	0.00E+00	1.09E-04	2.17E-04		
Sr-90	2.6045E+00	8.932	17.864	0.00E+00	2.33E+01	4.65E+01		
Tc-99	4.4241E-04	8.932	17.864	0.00E+00	3.95E-03	7.90E-03		
Th-229	1.3713E-10	8.932	17.864	0.00E+00	1.22E-09	2.45E-09		
Th-230	1.8090E-11	8.932	17.864	0.00E+00	1.62E-10	3.23E-10		
Th-232	2.5278E-10	8.932	17.864	0.00E+00	2.26E-09	4.52E-09		
Tl-208	1.6947E-08	8.932	17.864	0.00E+00	1.51E-07	3.03E-07		
U-232	4.8737E-08	8.932	17.864	0.00E+00	4.35E-07	8.71E-07		
U-233	1.2203E-07	8.932	17.864	0.00E+00	1.09E-06	2.18E-06		
U-234	1.5925E-07	8.932	17.864	0.00E+00	1.42E-06	2.84E-06		
U-235	-2.6194E-06	8.932	0.000	3.96E-04	3.73E-04	3.96E-04		
U-236	1.2693E-05	8.932	17.864	0.00E+00	1.13E-04	2.27E-04		
U-238	-3.6331E-08	8.932	0.000	2.46E-04	2.46E-04	2.46E-04		
Y-90	2.6060E+00	8.932	17.864	0.00E+00	2.33E+01	4.66E+01		
Other Radionuclides					3.22E+01	6.44E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.20E-01	1.04E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.99996708	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	8.932		Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		17.864	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	0.99
Bounding:	0.57		

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 (IFE) (UC-IRVINE) ¹Fuel decay start date: 2035
 SNF ID #: 1051 Estimates as of: 2010
 Fuel Units & Descr: 1 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=19kg ; EOL=19kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.01

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	1.867	3.735	0.00E+00	1.59E-09	3.18E-09	Avg. MeV	
Am-241	1.8331E-03	1.867	3.735	0.00E+00	3.42E-03	6.85E-03	0.0150	6.036E+11
Am-242m	1.4129E-06	1.867	3.735	0.00E+00	2.64E-06	5.28E-06	0.0250	1.328E+11
Am-243	1.4774E-07	1.867	3.735	0.00E+00	2.76E-07	5.52E-07	0.0375	1.131E+11
C-14	1.2871E-04	1.867	3.735	0.00E+00	2.40E-04	4.81E-04	0.0575	1.161E+11
Cl-36	2.8120E-06	1.867	3.735	0.00E+00	5.25E-06	1.05E-05	0.0850	7.192E+10
Cm-243	1.7940E-07	1.867	3.735	0.00E+00	3.35E-07	6.70E-07	0.1250	5.223E+10
Cm-244	1.6962E-06	1.867	3.735	0.00E+00	3.17E-06	6.33E-06	0.2250	6.101E+10
Co-60	1.2839E+00	1.867	3.735	0.00E+00	2.40E+00	4.79E+00	0.3750	3.096E+10
Cs-134	9.0541E-02	1.867	3.735	0.00E+00	1.69E-01	3.38E-01	0.5750	4.116E+11
Cs-135	3.2195E-05	1.867	3.735	0.00E+00	6.01E-05	1.20E-04	0.8500	1.766E+10
Cs-137	2.7564E+00	1.867	3.735	0.00E+00	5.15E+00	1.03E+01	1.2500	3.588E+11
Eu-154	1.5368E-02	1.867	3.735	0.00E+00	2.87E-02	5.74E-02	1.7500	2.392E+08
Eu-155	2.9293E-02	1.867	3.735	0.00E+00	5.47E-02	1.09E-01	2.2500	3.855E+08
Fe-55	7.7158E-01	1.867	3.735	0.00E+00	1.44E+00	2.88E+00	2.7500	3.059E+06
H-3	1.1111E-02	1.867	3.735	0.00E+00	2.07E-02	4.15E-02	3.5000	3.561E+05
I-129	7.3684E-07	1.867	3.735	0.00E+00	1.38E-06	2.75E-06	5.0000	2.076E+00
Kr-85	2.5263E-01	1.867	3.735	0.00E+00	4.72E-01	9.43E-01	7.0000	2.352E-01
Np-237	1.2427E-06	1.867	3.735	0.00E+00	2.32E-06	4.64E-06	11.0000	2.680E-02
Pa-231	3.8511E-09	1.867	3.735	0.00E+00	7.19E-09	1.44E-08		
Pb-210	7.3880E-15	1.867	3.735	0.00E+00	1.38E-14	2.76E-14		
Pm-147	2.1023E+00	1.867	3.735	0.00E+00	3.93E+00	7.85E+00		
Pu-238	1.0383E-03	1.867	3.735	0.00E+00	1.94E-03	3.88E-03		
Pu-239	5.5293E-03	1.867	3.735	0.00E+00	1.03E-02	2.07E-02		
Pu-240	2.1278E-03	1.867	3.735	0.00E+00	3.97E-03	7.95E-03		
Pu-241	1.0195E-01	1.867	3.735	0.00E+00	1.90E-01	3.81E-01		
Pu-242	2.3128E-07	1.867	3.735	0.00E+00	4.32E-07	8.64E-07		
Ra-226	5.2782E-14	1.867	3.735	0.00E+00	9.86E-14	1.97E-13		
Ra-228	1.9338E-10	1.867	3.735	0.00E+00	3.61E-10	7.22E-10		
Ru-106	9.1684E-02	1.867	3.735	0.00E+00	1.71E-01	3.42E-01		
Se-79	1.3018E-05	1.867	3.735	0.00E+00	2.43E-05	4.86E-05		
Sn-126	1.2167E-05	1.867	3.735	0.00E+00	2.27E-05	4.54E-05		
Sr-90	2.6045E+00	1.867	3.735	0.00E+00	4.86E+00	9.73E+00		
Tc-99	4.4241E-04	1.867	3.735	0.00E+00	8.26E-04	1.65E-03		
Th-229	1.3713E-10	1.867	3.735	0.00E+00	2.56E-10	5.12E-10		
Th-230	1.8090E-11	1.867	3.735	0.00E+00	3.38E-11	6.76E-11		
Th-232	2.5278E-10	1.867	3.735	0.00E+00	4.72E-10	9.44E-10		
Tl-208	1.6947E-08	1.867	3.735	0.00E+00	3.16E-08	6.33E-08		
U-232	4.8737E-08	1.867	3.735	0.00E+00	9.10E-08	1.82E-07		
U-233	1.2203E-07	1.867	3.735	0.00E+00	2.28E-07	4.56E-07		
U-234	1.5925E-07	1.867	3.735	0.00E+00	2.97E-07	5.95E-07		
U-235	-2.6194E-06	1.867	0.000	8.28E-05	7.79E-05	8.28E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.2693E-05	1.867	3.735	0.00E+00	2.37E-05	4.74E-05	1.09E-01	2.17E-01
U-238	-3.6331E-08	1.867	0.000	5.15E-05	5.14E-05	5.15E-05	Total	Total
Y-90	2.6060E+00	1.867	3.735	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			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST (304)	SST	
BOL HM Constituents:	U-ZrHx	U	
BOL Enrichment %:	20.00002088	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	1.867	1.432	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		3.735	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.29	0.77	1.00
Bounding:	0.57		

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 (INDONESIA)
 SNF ID #: 475
 Fuel Units & Descr: 174 - ELEMENT
 Heavy Metal Mass: BOL=33.93kg : EOL=33.25kg
 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

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	647.797	1,295.593	0.00E+00	5.52E-07	1.10E-06	Avg. MeV	
Am-241	1.8331E-03	647.797	1,295.593	0.00E+00	1.19E+00	2.37E+00	0.0150	2.094E+14
Am-242m	1.4129E-06	647.797	1,295.593	0.00E+00	9.15E-04	1.83E-03	0.0250	4.608E+13
Am-243	1.4774E-07	647.797	1,295.593	0.00E+00	9.57E-05	1.91E-04	0.0375	3.924E+13
C-14	1.2871E-04	647.797	1,295.593	0.00E+00	8.34E-02	1.67E-01	0.0575	4.028E+13
Cl-36	2.8120E-06	647.797	1,295.593	0.00E+00	1.82E-03	3.64E-03	0.0850	2.495E+13
Cm-243	1.7940E-07	647.797	1,295.593	0.00E+00	1.16E-04	2.32E-04	0.1250	1.812E+13
Cm-244	1.6962E-06	647.797	1,295.593	0.00E+00	1.10E-03	2.20E-03	0.2250	2.117E+13
Co-60	1.2839E+00	647.797	1,295.593	0.00E+00	8.32E+02	1.66E+03	0.3750	1.074E+13
Cs-134	9.0541E-02	647.797	1,295.593	0.00E+00	5.87E+01	1.17E+02	0.5750	1.428E+14
Cs-135	3.2195E-05	647.797	1,295.593	0.00E+00	2.09E-02	4.17E-02	0.8500	6.128E+12
Cs-137	2.7564E+00	647.797	1,295.593	0.00E+00	1.79E+03	3.57E+03	1.2500	1.245E+14
Eu-154	1.5368E-02	647.797	1,295.593	0.00E+00	9.96E+00	1.99E+01	1.7500	8.298E+10
Eu-155	2.9293E-02	647.797	1,295.593	0.00E+00	1.90E+01	3.80E+01	2.2500	1.337E+11
Fe-55	7.7158E-01	647.797	1,295.593	0.00E+00	5.00E+02	1.00E+03	2.7500	1.061E+09
H-3	1.1111E-02	647.797	1,295.593	0.00E+00	7.20E+00	1.44E+01	3.5000	1.235E+08
I-129	7.3684E-07	647.797	1,295.593	0.00E+00	4.77E-04	9.55E-04	5.0000	7.000E+02
Kr-85	2.5263E-01	647.797	1,295.593	0.00E+00	1.64E+02	3.27E+02	7.0000	7.926E+01
Np-237	1.2427E-06	647.797	1,295.593	0.00E+00	8.05E-04	1.61E-03	11.0000	9.031E+00
Pa-231	3.8511E-09	647.797	1,295.593	0.00E+00	2.49E-06	4.99E-06		
Pb-210	7.3880E-15	647.797	1,295.593	0.00E+00	4.79E-12	9.57E-12		
Pm-147	2.1023E+00	647.797	1,295.593	0.00E+00	1.36E+03	2.72E+03		
Pu-238	1.0383E-03	647.797	1,295.593	0.00E+00	6.73E-01	1.35E+00		
Pu-239	5.5293E-03	647.797	1,295.593	0.00E+00	3.58E+00	7.16E+00		
Pu-240	2.1278E-03	647.797	1,295.593	0.00E+00	1.38E+00	2.76E+00		
Pu-241	1.0195E-01	647.797	1,295.593	0.00E+00	6.60E+01	1.32E+02		
Pu-242	2.3128E-07	647.797	1,295.593	0.00E+00	1.50E-04	3.00E-04		
Ra-226	5.2782E-14	647.797	1,295.593	0.00E+00	3.42E-11	6.84E-11		
Ra-228	1.9338E-10	647.797	1,295.593	0.00E+00	1.25E-07	2.51E-07		
Ru-106	9.1684E-02	647.797	1,295.593	0.00E+00	5.94E+01	1.19E+02		
Se-79	1.3018E-05	647.797	1,295.593	0.00E+00	8.43E-03	1.69E-02		
Sn-126	1.2167E-05	647.797	1,295.593	0.00E+00	7.88E-03	1.58E-02		
Sr-90	2.6045E+00	647.797	1,295.593	0.00E+00	1.69E+03	3.37E+03		
Tc-99	4.4241E-04	647.797	1,295.593	0.00E+00	2.87E-01	5.73E-01		
Th-229	1.3713E-10	647.797	1,295.593	0.00E+00	8.88E-08	1.78E-07		
Th-230	1.8090E-11	647.797	1,295.593	0.00E+00	1.17E-08	2.34E-08		
Th-232	2.5278E-10	647.797	1,295.593	0.00E+00	1.64E-07	3.28E-07		
Tl-208	1.6947E-08	647.797	1,295.593	0.00E+00	1.10E-05	2.20E-05		
U-232	4.8737E-08	647.797	1,295.593	0.00E+00	3.16E-05	6.31E-05		
U-233	1.2203E-07	647.797	1,295.593	0.00E+00	7.91E-05	1.58E-04		
U-234	1.5925E-07	647.797	1,295.593	0.00E+00	1.03E-04	2.06E-04		
U-235	2.6194E-06	647.797	0.000	1.47E-02	1.30E-02	1.47E-02		
U-236	1.2693E-05	647.797	1,295.593	0.00E+00	8.22E-03	1.64E-02		
U-238	-3.6331E-08	647.797	0.000	9.12E-03	9.10E-03	9.12E-03		
Y-90	2.6060E+00	647.797	1,295.593	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			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20.00000041	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	330.682	647.797	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		1,295.593	

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

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 (INDONESIA) ¹Fuel decay start date: 2010
 SNF ID #: 476 Estimates as of: 2010
 Fuel Units & Descr: 71 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=13.85kg ; EOL=13.57kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL 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	
							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	264.331	528.662	0.00E+00	2.25E-07	4.50E-07	0.0150	8.545E+13
Am-241	1.8331E-03	264.331	528.662	0.00E+00	4.85E-01	9.69E-01	0.0250	1.880E+13
Am-242m	1.4129E-06	264.331	528.662	0.00E+00	3.73E-04	7.47E-04	0.0375	1.601E+13
Am-243	1.4774E-07	264.331	528.662	0.00E+00	3.91E-05	7.81E-05	0.0575	1.643E+13
C-14	1.2871E-04	264.331	528.662	0.00E+00	3.40E-02	6.80E-02	0.0850	1.018E+13
Ci-36	2.8120E-06	264.331	528.662	0.00E+00	7.43E-04	1.49E-03	0.1250	7.393E+12
Cm-243	1.7940E-07	264.331	528.662	0.00E+00	4.74E-05	9.48E-05	0.2250	8.637E+12
Cm-244	1.6962E-06	264.331	528.662	0.00E+00	4.48E-04	8.97E-04	0.3750	4.383E+12
Co-60	1.2839E+00	264.331	528.662	0.00E+00	3.39E+02	6.79E+02	0.5750	5.827E+13
Cs-134	9.0541E-02	264.331	528.662	0.00E+00	2.39E+01	4.79E+01	0.8500	2.501E+12
Cs-135	3.2195E-05	264.331	528.662	0.00E+00	8.51E-03	1.70E-02	1.2500	5.079E+13
Cs-137	2.7564E+00	264.331	528.662	0.00E+00	7.29E+02	1.46E+03	1.7500	3.386E+10
Eu-154	1.5368E-02	264.331	528.662	0.00E+00	4.06E+00	8.12E+00	2.2500	5.457E+10
Eu-155	2.9293E-02	264.331	528.662	0.00E+00	7.74E+00	1.55E+01	2.7500	4.330E+08
Fe-55	7.7158E-01	264.331	528.662	0.00E+00	2.04E+02	4.08E+02	3.5000	5.041E+07
H-3	1.1111E-02	264.331	528.662	0.00E+00	2.94E+00	5.87E+00	5.0000	2.856E+02
I-129	7.3684E-07	264.331	528.662	0.00E+00	1.95E-04	3.90E-04	7.0000	3.234E+01
Kr-85	2.5263E-01	264.331	528.662	0.00E+00	6.68E+01	1.34E+02	11.0000	3.685E+00
Np-237	1.2427E-06	264.331	528.662	0.00E+00	3.28E-04	6.57E-04		
Pa-231	3.8511E-09	264.331	528.662	0.00E+00	1.02E-06	2.04E-06		
Pb-210	7.3880E-15	264.331	528.662	0.00E+00	1.95E-12	3.91E-12		
Pm-147	2.1023E+00	264.331	528.662	0.00E+00	5.56E+02	1.11E+03		
Pu-238	1.0383E-03	264.331	528.662	0.00E+00	2.74E-01	5.49E-01		
Pu-239	5.5293E-03	264.331	528.662	0.00E+00	1.46E+00	2.92E+00		
Pu-240	2.1278E-03	264.331	528.662	0.00E+00	5.62E-01	1.12E+00		
Pu-241	1.0195E-01	264.331	528.662	0.00E+00	2.69E+01	5.39E+01		
Pu-242	2.3128E-07	264.331	528.662	0.00E+00	6.11E-05	1.22E-04		
Ra-226	5.2782E-14	264.331	528.662	0.00E+00	1.40E-11	2.79E-11		
Ra-228	1.9338E-10	264.331	528.662	0.00E+00	5.11E-08	1.02E-07		
Ru-106	9.1684E-02	264.331	528.662	0.00E+00	2.42E+01	4.85E+01		
Se-79	1.3018E-05	264.331	528.662	0.00E+00	3.44E-03	6.88E-03		
Sn-126	1.2167E-05	264.331	528.662	0.00E+00	3.22E-03	6.43E-03		
Sr-90	2.6045E+00	264.331	528.662	0.00E+00	6.88E+02	1.38E+03		
Tc-99	4.4241E-04	264.331	528.662	0.00E+00	1.17E-01	2.34E-01		
Th-229	1.3713E-10	264.331	528.662	0.00E+00	3.62E-08	7.25E-08		
Th-230	1.8090E-11	264.331	528.662	0.00E+00	4.78E-09	9.56E-09		
Th-232	2.5278E-10	264.331	528.662	0.00E+00	6.68E-08	1.34E-07		
Tl-208	1.6947E-08	264.331	528.662	0.00E+00	4.48E-06	8.96E-06		
U-232	4.8737E-08	264.331	528.662	0.00E+00	1.29E-05	2.58E-05		
U-233	1.2203E-07	264.331	528.662	0.00E+00	3.23E-05	6.45E-05		
U-234	1.5925E-07	264.331	528.662	0.00E+00	4.21E-05	8.42E-05		
U-235	-2.6194E-06	264.331	0.000	5.98E-03	5.29E-03	5.98E-03		
U-236	1.2693E-05	264.331	528.662	0.00E+00	3.36E-03	6.71E-03		
U-238	-3.6331E-08	264.331	0.000	3.72E-03	3.71E-03	3.72E-03		
Y-90	2.6060E+00	264.331	528.662	0.00E+00	6.89E+02	1.38E+03		
Other Radionuclides					9.53E+02	1.91E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.54E+01	3.08E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20.0000041	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	134.933	264.331	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		528.662	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	1.00
Bounding:	1.12		

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: TRIGA STD (ITALY)
 SNF ID #: 467
 Fuel Units & Descr: 64 - ELEMENT
 Heavy Metal Mass: BOL=11.93kg ; EOL=11.90kg
 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

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.2892E-09	58.133	116.266	0.00E+00	7.49E-08	1.50E-07	Avg. MeV	
Am-241	2.9429E-03	58.133	116.266	0.00E+00	1.71E-01	3.42E-01	0.0150	1.563E+13
Am-242m	1.9489E-06	58.133	116.266	0.00E+00	1.13E-04	2.27E-04	0.0250	3.269E+12
Am-243	2.3308E-07	58.133	116.266	0.00E+00	1.35E-05	2.71E-05	0.0375	3.860E+12
C-14	4.3278E-05	58.133	116.266	0.00E+00	2.52E-03	5.03E-03	0.0575	3.192E+12
Cl-36	4.3023E-08	58.133	116.266	0.00E+00	2.50E-06	5.00E-06	0.0850	2.075E+12
Cm-243	2.4286E-07	58.133	116.266	0.00E+00	1.41E-05	2.82E-05	0.1250	2.872E+12
Cm-244	2.6015E-06	58.133	116.266	0.00E+00	1.51E-04	3.02E-04	0.2250	1.822E+12
Co-60	1.6075E-02	58.133	116.266	0.00E+00	9.34E-01	1.87E+00	0.3750	7.496E+11
Cs-134	1.9323E-02	58.133	116.266	0.00E+00	1.12E+00	2.25E+00	0.5750	1.117E+13
Cs-135	3.1549E-05	58.133	116.266	0.00E+00	1.83E-03	3.67E-03	0.8500	2.034E+12
Cs-137	2.4556E+00	58.133	116.266	0.00E+00	1.43E+02	2.86E+02	1.2500	2.237E+12
Eu-154	9.0180E-01	58.133	116.266	0.00E+00	5.24E+01	1.05E+02	1.7500	6.414E+10
Eu-155	2.1820E-01	58.133	116.266	0.00E+00	1.27E+01	2.54E+01	2.2500	1.526E+08
Fe-55	2.2902E-03	58.133	116.266	0.00E+00	1.33E-01	2.66E-01	2.7500	2.992E+06
H-3	8.1609E-03	58.133	116.266	0.00E+00	4.74E-01	9.49E-01	3.5000	3.651E+05
I-129	7.3805E-07	58.133	116.266	0.00E+00	4.29E-05	8.58E-05	5.0000	7.330E+01
Kr-85	1.8256E-01	58.133	116.266	0.00E+00	1.06E+01	2.12E+01	7.0000	8.301E+00
Np-237	1.4505E-06	58.133	116.266	0.00E+00	8.43E-05	1.69E-04	11.0000	9.458E-01
Pa-231	4.5564E-09	58.133	116.266	0.00E+00	2.65E-07	5.30E-07		
Pb-210	1.8842E-14	58.133	116.266	0.00E+00	1.10E-12	2.19E-12		
Pm-147	5.5459E-01	58.133	116.266	0.00E+00	3.22E+01	6.45E+01		
Pu-238	1.2992E-03	58.133	116.266	0.00E+00	7.55E-02	1.51E-01		
Pu-239	5.6932E-03	58.133	116.266	0.00E+00	3.31E-01	6.62E-01		
Pu-240	2.2632E-03	58.133	116.266	0.00E+00	1.32E-01	2.63E-01		
Pu-241	9.8857E-02	58.133	116.266	0.00E+00	5.75E+00	1.15E+01		
Pu-242	3.0602E-07	58.133	116.266	0.00E+00	1.78E-05	3.56E-05		
Ra-226	1.0823E-13	58.133	116.266	0.00E+00	6.29E-12	1.26E-11		
Ra-228	2.0406E-10	58.133	116.266	0.00E+00	1.19E-08	2.37E-08		
Ru-106	3.0180E-03	58.133	116.266	0.00E+00	1.75E-01	3.51E-01		
Se-79	1.2937E-05	58.133	116.266	0.00E+00	7.52E-04	1.50E-03		
Sn-126	1.2238E-05	58.133	116.266	0.00E+00	7.11E-04	1.42E-03		
Sr-90	2.3098E+00	58.133	116.266	0.00E+00	1.34E+02	2.69E+02		
Tc-99	4.4120E-04	58.133	116.266	0.00E+00	2.56E-02	5.13E-02		
Th-229	2.0932E-10	58.133	116.266	0.00E+00	1.22E-08	2.43E-08		
Th-230	2.7744E-11	58.133	116.266	0.00E+00	1.61E-09	3.23E-09		
Th-232	2.3744E-10	58.133	116.266	0.00E+00	1.38E-08	2.76E-08		
Tl-208	1.9459E-08	58.133	116.266	0.00E+00	1.13E-06	2.26E-06		
U-232	5.3850E-08	58.133	116.266	0.00E+00	3.13E-06	6.26E-06		
U-233	1.3135E-07	58.133	116.266	0.00E+00	7.64E-06	1.53E-05		
U-234	1.9143E-07	58.133	116.266	0.00E+00	1.11E-05	2.23E-05		
U-235	-2.6159E-06	58.133	0.000	5.10E-03	4.94E-03	5.10E-03		
U-236	1.2719E-05	58.133	116.266	0.00E+00	7.39E-04	1.48E-03		
U-238	-3.8857E-08	58.133	0.000	3.22E-03	3.21E-03	3.22E-03		
Y-90	2.3098E+00	58.133	116.266	0.00E+00	1.34E+02	2.69E+02		
Other Radionuclides					1.53E+02	3.07E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.16E+00	4.31E+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:	ALUM (1100)	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.76448407	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	58.133	24.436	
Bounding:		116.266	

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:	0.13	0.42		1.00
Bounding:	0.26			

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 (ITALY) 1 Fuel decay start date: 2010
 SNF ID #: 466 Estimates as of: 2010
 Fuel Units & Descr: 60 - ELEMENT Template: TRIGA-AI (LW/U-Zr, Alum., 10 to 20%, U)
 Heavy Metal Mass: BOL=10.80kg ; EOL=10.74kg 2 Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.54

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)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	57.271	114.542	0.00E+00	4.62E-08	9.24E-08	Avg. MeV	
Am-241	2.2586E-03	57.271	114.542	0.00E+00	1.29E-01	2.59E-01	0.0150	1.938E+13
Am-242m	1.9925E-06	57.271	114.542	0.00E+00	1.14E-04	2.28E-04	0.0250	4.208E+12
Am-243	2.3323E-07	57.271	114.542	0.00E+00	1.34E-05	2.67E-05	0.0375	5.241E+12
C-14	4.3308E-05	57.271	114.542	0.00E+00	2.48E-03	4.96E-03	0.0575	4.018E+12
Cl-36	4.3023E-08	57.271	114.542	0.00E+00	2.46E-06	4.93E-06	0.0850	2.812E+12
Co-243	2.7429E-07	57.271	114.542	0.00E+00	1.57E-05	3.14E-05	0.1250	4.207E+12
Co-244	3.1504E-06	57.271	114.542	0.00E+00	1.80E-04	3.61E-04	0.2250	2.348E+12
Co-60	3.1008E-02	57.271	114.542	0.00E+00	1.78E+00	3.55E+00	0.3750	1.045E+13
Cs-134	1.0367E-01	57.271	114.542	0.00E+00	5.94E+00	1.19E+01	0.5750	1.325E+13
Cs-135	3.1549E-05	57.271	114.542	0.00E+00	1.81E-03	3.61E-03	0.8500	3.261E+12
Cs-137	2.7564E+00	57.271	114.542	0.00E+00	1.58E+02	3.16E+02	1.2500	3.381E+12
Eu-154	1.3490E+00	57.271	114.542	0.00E+00	7.73E+01	1.55E+02	1.7500	9.675E+10
Eu-155	4.3880E-01	57.271	114.542	0.00E+00	2.51E+01	5.03E+01	2.2500	1.176E+10
Fe-55	8.6782E-03	57.271	114.542	0.00E+00	4.97E-01	9.94E-01	2.7500	9.551E+07
H-3	1.0805E-02	57.271	114.542	0.00E+00	6.19E-01	1.24E+00	3.5000	1.117E+07
I-129	7.3805E-07	57.271	114.542	0.00E+00	4.23E-05	8.45E-05	5.0000	7.204E+01
Kr-85	2.5218E-01	57.271	114.542	0.00E+00	1.44E+01	2.89E+01	7.0000	8.166E+00
Np-237	1.4463E-06	57.271	114.542	0.00E+00	8.28E-05	1.66E-04	11.0000	9.309E-01
Pa-231	3.5970E-09	57.271	114.542	0.00E+00	2.06E-07	4.12E-07		
Pb-210	8.2511E-15	57.271	114.542	0.00E+00	4.73E-13	9.45E-13		
Pm-147	2.0767E+00	57.271	114.542	0.00E+00	1.19E+02	2.38E+02		
Pu-238	1.3514E-03	57.271	114.542	0.00E+00	7.74E-02	1.55E-01		
Pu-239	5.6947E-03	57.271	114.542	0.00E+00	3.26E-01	6.52E-01		
Pu-240	2.2647E-03	57.271	114.542	0.00E+00	1.30E-01	2.59E-01		
Pu-241	1.2574E-01	57.271	114.542	0.00E+00	7.20E+00	1.44E+01		
Pu-242	3.0602E-07	57.271	114.542	0.00E+00	1.75E-05	3.51E-05		
Ra-226	5.7353E-14	57.271	114.542	0.00E+00	3.28E-12	6.57E-12		
Ra-228	1.8150E-10	57.271	114.542	0.00E+00	1.04E-08	2.08E-08		
Ru-106	9.3744E-02	57.271	114.542	0.00E+00	5.37E+00	1.07E+01		
Se-79	1.2938E-05	57.271	114.542	0.00E+00	7.41E-04	1.48E-03		
Sn-126	1.2239E-05	57.271	114.542	0.00E+00	7.01E-04	1.40E-03		
Sr-90	2.6000E+00	57.271	114.542	0.00E+00	1.49E+02	2.98E+02		
Tc-99	4.4120E-04	57.271	114.542	0.00E+00	2.53E-02	5.05E-02		
Th-229	1.4749E-10	57.271	114.542	0.00E+00	8.45E-09	1.69E-08		
Th-230	1.9549E-11	57.271	114.542	0.00E+00	1.12E-09	2.24E-09		
Th-232	2.3744E-10	57.271	114.542	0.00E+00	1.36E-08	2.72E-08		
Th-208	1.9459E-08	57.271	114.542	0.00E+00	1.11E-06	2.23E-06		
U-232	5.6015E-08	57.271	114.542	0.00E+00	3.21E-06	6.42E-06		
U-233	1.3132E-07	57.271	114.542	0.00E+00	7.52E-06	1.50E-05		
U-234	1.7323E-07	57.271	114.542	0.00E+00	9.92E-06	1.98E-05		
U-235	-2.6159E-06	57.271	0.000	4.67E-03	4.52E-03	4.67E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.2717E-05	57.271	114.542	0.00E+00	7.28E-04	1.46E-03	2.88E+00	5.76E+00
U-238	-3.8857E-08	57.271	0.000	2.90E+03	2.90E-03	2.90E-03	Total	Total
Y-90	2.6015E+00	57.271	114.542	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			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	ALUM (1100)	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	52.628	57.271	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		114.542	

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

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 (ITALY) ¹Fuel decay start date: 2010
 SNF ID #: 477 Estimates as of: 2010
 Fuel Units & Descr: 48 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=9.36kg ; EOL=9.17kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.43

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	178.703	357.405	0.00E+00	1.52E-07	3.04E-07	Avg. MeV	
Am-241	1.8331E-03	178.703	357.405	0.00E+00	3.28E-01	6.55E-01	0.0150	5.777E+13
Am-242m	1.4129E-06	178.703	357.405	0.00E+00	2.52E-04	5.05E-04	0.0250	1.271E+13
Am-243	1.4774E-07	178.703	357.405	0.00E+00	2.64E-05	5.28E-05	0.0375	1.082E+13
C-14	1.2871E-04	178.703	357.405	0.00E+00	2.30E-02	4.60E-02	0.0575	1.111E+13
Cl-36	2.8120E-06	178.703	357.405	0.00E+00	5.03E-04	1.01E-03	0.0850	6.883E+12
Cm-243	1.7940E-07	178.703	357.405	0.00E+00	3.21E-05	6.41E-05	0.1250	4.998E+12
Cm-244	1.6962E-06	178.703	357.405	0.00E+00	3.03E-04	6.06E-04	0.2250	5.839E+12
Co-60	1.2839E+00	178.703	357.405	0.00E+00	2.29E+02	4.59E+02	0.3750	2.963E+12
Cs-134	9.0541E-02	178.703	357.405	0.00E+00	1.62E+01	3.24E+01	0.5750	3.939E+13
Cs-135	3.2195E-05	178.703	357.405	0.00E+00	5.75E-03	1.15E-02	0.8500	1.691E+12
Cs-137	2.7564E+00	178.703	357.405	0.00E+00	4.93E+02	9.85E+02	1.2500	3.433E+13
Eu-154	1.5368E-02	178.703	357.405	0.00E+00	2.75E+00	5.49E+00	1.7500	2.289E+10
Eu-155	2.9293E-02	178.703	357.405	0.00E+00	5.23E+00	1.05E+01	2.2500	3.689E+10
Fe-55	7.7158E-01	178.703	357.405	0.00E+00	1.38E+02	2.76E+02	2.7500	2.927E+08
H-3	1.1111E-02	178.703	357.405	0.00E+00	1.99E+00	3.97E+00	3.5000	3.408E+07
I-129	7.3684E-07	178.703	357.405	0.00E+00	1.32E-04	2.63E-04	5.0000	1.931E+02
Kr-85	2.5263E-01	178.703	357.405	0.00E+00	4.51E+01	9.03E+01	7.0000	2.186E+01
Np-237	1.2427E-06	178.703	357.405	0.00E+00	2.22E-04	4.44E-04	11.0000	2.491E+00
Pa-231	3.8511E-09	178.703	357.405	0.00E+00	6.88E-07	1.38E-06		
Pb-210	7.3880E-15	178.703	357.405	0.00E+00	1.32E-12	2.64E-12		
Pm-147	2.1023E+00	178.703	357.405	0.00E+00	3.76E+02	7.51E+02		
Pu-238	1.0383E-03	178.703	357.405	0.00E+00	1.86E-01	3.71E-01		
Pu-239	5.5293E-03	178.703	357.405	0.00E+00	9.88E-01	1.98E+00		
Pu-240	2.1278E-03	178.703	357.405	0.00E+00	3.80E-01	7.60E-01		
Pu-241	1.0195E-01	178.703	357.405	0.00E+00	1.82E+01	3.64E+01		
Pu-242	2.3128E-07	178.703	357.405	0.00E+00	4.13E-05	8.27E-05		
Ra-226	5.2782E-14	178.703	357.405	0.00E+00	9.43E-12	1.89E-11		
Ra-228	1.9338E-10	178.703	357.405	0.00E+00	3.46E-08	6.91E-08		
Ru-106	9.1684E-02	178.703	357.405	0.00E+00	1.64E+01	3.28E+01		
Se-79	1.3018E-05	178.703	357.405	0.00E+00	2.33E-03	4.65E-03		
Sn-126	1.2167E-05	178.703	357.405	0.00E+00	2.17E-03	4.35E-03		
Sr-90	2.6045E+00	178.703	357.405	0.00E+00	4.65E+02	9.31E+02		
Tc-99	4.4241E-04	178.703	357.405	0.00E+00	7.91E-02	1.58E-01		
Th-229	1.3713E-10	178.703	357.405	0.00E+00	2.45E-08	4.90E-08		
Th-230	1.8090E-11	178.703	357.405	0.00E+00	3.23E-09	6.47E-09		
Th-232	2.5278E-10	178.703	357.405	0.00E+00	4.52E-08	9.03E-08		
Tl-208	1.6947E-08	178.703	357.405	0.00E+00	3.03E-06	6.06E-06		
U-232	4.8737E-08	178.703	357.405	0.00E+00	8.71E-06	1.74E-05		
U-233	1.2203E-07	178.703	357.405	0.00E+00	2.18E-05	4.36E-05		
U-234	1.5925E-07	178.703	357.405	0.00E+00	2.85E-05	5.69E-05		
U-235	-2.6194E-06	178.703	0.000	4.05E-03	3.58E-03	4.05E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.2693E-05	178.703	357.405	0.00E+00	2.27E-03	4.54E-03	1.04E+01	2.08E+01
U-238	-3.6331E-08	178.703	0.000	2.52E-03	2.51E-03	2.52E-03	Total	Total
Y-90	2.6060E+00	178.703	357.405	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			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST (304)	SST	
BOL HM Constituents:	U-Zr/HX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	91.223	178.703	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		357.405	

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

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: TRIGA STD (ITALY) 1 Fuel decay start date: 2006
 SNF ID #: 1080 Estimates as of: 2010
 Fuel Units & Descr: 140 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=26.89kg ; EOL=25.31kg 2 Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
1.26

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)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	1,510.189	3,020.377	0.00E+00	1.29E-06	2.57E-06	Avg. MeV	
Am-241	1.8331E-03	1,510.189	3,020.377	0.00E+00	2.77E+00	5.54E+00	0.0150	4.882E+14
Am-242m	1.4129E-06	1,510.189	3,020.377	0.00E+00	2.13E-03	4.27E-03	0.0250	1.074E+14
Am-243	1.4774E-07	1,510.189	3,020.377	0.00E+00	2.23E-04	4.46E-04	0.0375	9.148E+13
C-14	1.2871E-04	1,510.189	3,020.377	0.00E+00	1.94E-01	3.89E-01	0.0575	9.389E+13
Cl-36	2.8120E-06	1,510.189	3,020.377	0.00E+00	4.25E-03	8.49E-03	0.0850	5.817E+13
Cm-243	1.7940E-07	1,510.189	3,020.377	0.00E+00	2.71E-04	5.42E-04	0.1250	4.224E+13
Cm-244	1.6962E-06	1,510.189	3,020.377	0.00E+00	2.56E-03	5.12E-03	0.2250	4.934E+13
Co-60	1.2839E+00	1,510.189	3,020.377	0.00E+00	1.94E+03	3.88E+03	0.3750	2.504E+13
Cs-134	9.0541E-02	1,510.189	3,020.377	0.00E+00	1.37E+02	2.73E+02	0.5750	3.329E+14
Cs-135	3.2195E-05	1,510.189	3,020.377	0.00E+00	4.86E-02	9.72E-02	0.8500	1.429E+13
Cs-137	2.7564E+00	1,510.189	3,020.377	0.00E+00	4.16E+03	8.33E+03	1.2500	2.902E+14
Eu-154	1.5368E-02	1,510.189	3,020.377	0.00E+00	2.32E+01	4.64E+01	1.7500	1.934E+11
Eu-155	2.9293E-02	1,510.189	3,020.377	0.00E+00	4.42E+01	8.85E+01	2.2500	3.118E+11
Fe-55	7.7158E-01	1,510.189	3,020.377	0.00E+00	1.17E+03	2.33E+03	2.7500	2.474E+09
H-3	1.1111E-02	1,510.189	3,020.377	0.00E+00	1.68E+01	3.36E+01	3.5000	2.880E+08
I-129	7.3684E-07	1,510.189	3,020.377	0.00E+00	1.11E-03	2.23E-03	5.0000	1.599E+03
Kr-85	2.5263E-01	1,510.189	3,020.377	0.00E+00	3.82E+02	7.63E+02	7.0000	1.810E+02
Np-237	1.2427E-06	1,510.189	3,020.377	0.00E+00	1.88E-03	3.75E-03	11.0000	2.062E+01
Pa-231	3.8511E-09	1,510.189	3,020.377	0.00E+00	5.82E-06	1.16E-05		
Pb-210	7.3880E-15	1,510.189	3,020.377	0.00E+00	1.12E-11	2.23E-11		
Pm-147	2.1023E+00	1,510.189	3,020.377	0.00E+00	3.17E+03	6.35E+03		
Pu-238	1.0383E-03	1,510.189	3,020.377	0.00E+00	1.57E+00	3.14E+00		
Pu-239	5.5293E-03	1,510.189	3,020.377	0.00E+00	8.35E+00	1.67E+01		
Pu-240	2.1278E-03	1,510.189	3,020.377	0.00E+00	3.21E+00	6.43E+00		
Pu-241	1.0195E-01	1,510.189	3,020.377	0.00E+00	1.54E+02	3.08E+02		
Pu-242	2.3128E-07	1,510.189	3,020.377	0.00E+00	3.49E-04	6.99E-04		
Ra-226	5.2782E-14	1,510.189	3,020.377	0.00E+00	7.97E-11	1.59E-10		
Ra-228	1.9338E-10	1,510.189	3,020.377	0.00E+00	2.92E-07	5.84E-07		
Ru-106	9.1684E-02	1,510.189	3,020.377	0.00E+00	1.38E+02	2.77E+02		
Se-79	1.3018E-05	1,510.189	3,020.377	0.00E+00	1.97E-02	3.93E-02		
Sn-126	1.2167E-05	1,510.189	3,020.377	0.00E+00	1.84E-02	3.67E-02		
Sr-90	2.6045E+00	1,510.189	3,020.377	0.00E+00	3.93E+03	7.87E+03		
Tc-99	4.4241E-04	1,510.189	3,020.377	0.00E+00	6.68E-01	1.34E+00		
Th-229	1.3713E-10	1,510.189	3,020.377	0.00E+00	2.07E-07	4.14E-07		
Th-230	1.8090E-11	1,510.189	3,020.377	0.00E+00	2.73E-08	5.46E-08		
Th-232	2.5278E-10	1,510.189	3,020.377	0.00E+00	3.82E-07	7.63E-07		
Th-208	1.6947E-08	1,510.189	3,020.377	0.00E+00	2.56E-05	5.12E-05		
U-232	4.8737E-08	1,510.189	3,020.377	0.00E+00	7.36E-05	1.47E-04		
U-233	1.2203E-07	1,510.189	3,020.377	0.00E+00	1.84E-04	3.69E-04		
U-234	1.5925E-07	1,510.189	3,020.377	0.00E+00	2.40E-04	4.81E-04		
U-235	-2.6194E-06	1,510.189	0.000	1.16E-02	7.68E-03	1.16E-02		
U-236	1.2693E-05	1,510.189	3,020.377	0.00E+00	1.92E-02	3.83E-02		
U-238	-3.6331E-08	1,510.189	0.000	7.23E-03	7.17E-03	7.23E-03		
Y-90	2.6060E+00	1,510.189	3,020.377	0.00E+00	3.94E+03	7.87E+03		
Other Radionuclides					5.44E+03	1.09E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.79E+01	1.76E+02
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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20.02640698	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	917.381	1,510.189	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		3,020.377	

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

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 (ITALY) 1Fuel decay start date: 1999
 SNF ID #: 478 Estimate as of: 2010
 Fuel Units & Descr: 71 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=13.64kg ; EOL=12.84kg 2Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 10 years

Estimated
Canister usage:
18"x10"
0.64

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	1.3731E-09	765.881	1,531.763	0.00E+00	1.05E-06	2.10E-06	Avg. MeV	
Am-241	2.3865E-03	765.881	1,531.763	0.00E+00	1.83E+00	3.66E+00	0.0150	1.979E+14
Am-242m	1.3812E-06	765.881	1,531.763	0.00E+00	1.06E-03	2.12E-03	0.0250	4.192E+13
Am-243	1.4767E-07	765.881	1,531.763	0.00E+00	1.13E-04	2.26E-04	0.0375	3.581E+13
C-14	1.2863E-04	765.881	1,531.763	0.00E+00	9.85E-02	1.97E-01	0.0575	3.816E+13
Cl-36	2.8120E-06	765.881	1,531.763	0.00E+00	2.15E-03	4.31E-03	0.0850	2.315E+13
Cm-243	1.5895E-07	765.881	1,531.763	0.00E+00	1.22E-04	2.43E-04	0.1250	1.522E+13
Cm-244	1.4008E-06	765.881	1,531.763	0.00E+00	1.07E-03	2.15E-03	0.2250	1.975E+13
Co-60	6.6541E-01	765.881	1,531.763	0.00E+00	5.10E+02	1.02E+03	0.3750	9.070E+12
Cs-134	1.6887E-02	765.881	1,531.763	0.00E+00	1.29E+01	2.59E+01	0.5750	1.421E+14
Cs-135	3.2195E-05	765.881	1,531.763	0.00E+00	2.47E-02	4.93E-02	0.8500	2.537E+12
Cs-137	2.4556E+00	765.881	1,531.763	0.00E+00	1.88E+03	3.76E+03	1.2500	7.628E+13
Eu-154	1.0268E-02	765.881	1,531.763	0.00E+00	7.86E+00	1.57E+01	1.7500	4.591E+10
Eu-155	1.4570E-02	765.881	1,531.763	0.00E+00	1.12E+01	2.23E+01	2.2500	2.398E+09
Fe-55	2.0361E-01	765.881	1,531.763	0.00E+00	1.56E+02	3.12E+02	2.7500	3.969E+07
H-3	8.3940E-03	765.881	1,531.763	0.00E+00	6.43E+00	1.29E+01	3.5000	4.704E+06
I-129	7.3684E-07	765.881	1,531.763	0.00E+00	5.64E-04	1.13E-03	5.0000	8.077E+02
Kr-85	1.8286E-01	765.881	1,531.763	0.00E+00	1.40E+02	2.80E+02	7.0000	9.134E+01
Np-237	1.2462E-06	765.881	1,531.763	0.00E+00	9.54E-04	1.91E-03	11.0000	1.040E+01
Pa-231	4.9143E-09	765.881	1,531.763	0.00E+00	3.76E-06	7.53E-06		
Pb-210	1.7173E-14	765.881	1,531.763	0.00E+00	1.32E-11	2.63E-11		
Pm-147	5.6185E-01	765.881	1,531.763	0.00E+00	4.30E+02	8.60E+02		
Pu-238	9.9820E-04	765.881	1,531.763	0.00E+00	7.64E-01	1.53E+00		
Pu-239	5.5293E-03	765.881	1,531.763	0.00E+00	4.23E+00	8.47E+00		
Pu-240	2.1263E-03	765.881	1,531.763	0.00E+00	1.63E+00	3.26E+00		
Pu-241	8.0165E-02	765.881	1,531.763	0.00E+00	6.14E+01	1.23E+02		
Pu-242	2.3128E-07	765.881	1,531.763	0.00E+00	1.77E-04	3.54E-04		
Ra-226	9.9774E-14	765.881	1,531.763	0.00E+00	7.64E-11	1.53E-10		
Ra-228	2.1729E-10	765.881	1,531.763	0.00E+00	1.66E-07	3.33E-07		
Ru-106	2.9519E-03	765.881	1,531.763	0.00E+00	2.26E+00	4.52E+00		
Se-79	1.3017E-05	765.881	1,531.763	0.00E+00	9.97E-03	1.99E-02		
Sn-126	1.2167E-05	765.881	1,531.763	0.00E+00	9.32E-03	1.86E-02		
Sr-90	2.3128E+00	765.881	1,531.763	0.00E+00	1.77E+03	3.54E+03		
Tc-99	4.4241E-04	765.881	1,531.763	0.00E+00	3.39E-01	6.78E-01		
Th-229	1.9459E-10	765.881	1,531.763	0.00E+00	1.49E-07	2.98E-07		
Th-230	2.5564E-11	765.881	1,531.763	0.00E+00	1.96E-08	3.92E-08		
Th-232	2.5278E-10	765.881	1,531.763	0.00E+00	1.94E-07	3.87E-07		
Ti-208	1.6947E-08	765.881	1,531.763	0.00E+00	1.30E-05	2.60E-05		
U-232	4.6812E-08	765.881	1,531.763	0.00E+00	3.59E-05	7.17E-05		
U-233	1.2206E-07	765.881	1,531.763	0.00E+00	9.35E-05	1.87E-04		
U-234	1.7323E-07	765.881	1,531.763	0.00E+00	1.33E-04	2.65E-04		
U-235	-2.6194E-06	765.881	0.000	5.90E-03	3.90E-03	5.90E-03		
U-236	1.2693E-05	765.881	1,531.763	0.00E+00	9.72E-03	1.94E-02		
U-238	-3.6331E-08	765.881	0.000	3.67E-03	3.64E-03	3.67E-03		
Y-90	2.3128E+00	765.881	1,531.763	0.00E+00	1.77E+03	3.54E+03		
Other Radionuclides					1.88E+03	3.76E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.00E+01	6.00E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20.02640698	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	465.243	765.881	
Bounding:		1,531.763	

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 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 (JAPAN) 1Fuel decay start date: 2010
 SNF ID #: 481 Estimates as of: 2010
 Fuel Units & Descr: 71 - ELEMENT Template: TRIGA-AI (LW/U-Zrx, Alum., 10 to 20%, U)
 Heavy Metal Mass: BOL=13.85kg ; EOL=13.77kg 2Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.64

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	134.933	269.867	0.00E+00	1.09E-07	2.18E-07	Avg. MeV	
Am-241	2.2586E-03	134.933	269.867	0.00E+00	3.05E-01	6.10E-01	0.0150	4.566E+13
Am-242m	1.9925E-06	134.933	269.867	0.00E+00	2.69E-04	5.38E-04	0.0250	9.913E+12
Am-243	2.3323E-07	134.933	269.867	0.00E+00	3.15E-05	6.29E-05	0.0375	1.235E+13
C-14	4.3308E-05	134.933	269.867	0.00E+00	5.84E-03	1.17E-02	0.0575	9.467E+12
Cl-36	4.3023E-08	134.933	269.867	0.00E+00	5.81E-06	1.16E-05	0.0850	6.626E+12
Cm-243	2.7429E-07	134.933	269.867	0.00E+00	3.70E-05	7.40E-05	0.1250	9.911E+12
Cm-244	3.1504E-06	134.933	269.867	0.00E+00	4.25E-04	8.50E-04	0.2250	5.532E+12
Co-60	3.1008E-02	134.933	269.867	0.00E+00	4.18E+00	8.37E+00	0.3750	2.462E+12
Cs-134	1.0367E-01	134.933	269.867	0.00E+00	1.40E+01	2.80E+01	0.5750	3.121E+13
Cs-135	3.1549E-05	134.933	269.867	0.00E+00	4.26E-03	8.51E-03	0.8500	7.683E+12
Cs-137	2.7564E+00	134.933	269.867	0.00E+00	3.72E+02	7.44E+02	1.2500	7.965E+12
Eu-154	1.3490E+00	134.933	269.867	0.00E+00	1.82E+02	3.64E+02	1.7500	2.279E+11
Eu-155	4.3880E-01	134.933	269.867	0.00E+00	5.92E+01	1.18E+02	2.2500	2.771E+10
Fe-55	8.6782E-03	134.933	269.867	0.00E+00	1.17E+00	2.34E+00	2.7500	2.250E+08
H-3	1.0805E-02	134.933	269.867	0.00E+00	1.46E+00	2.92E+00	3.5000	2.631E+07
I-129	7.3805E-07	134.933	269.867	0.00E+00	9.96E-05	1.99E-04	5.0000	1.625E+02
Kr-85	2.5218E-01	134.933	269.867	0.00E+00	3.40E+01	6.81E+01	7.0000	1.841E+01
Np-237	1.4463E-06	134.933	269.867	0.00E+00	1.95E-04	3.90E-04	11.0000	2.098E+00
Pa-231	3.5970E-09	134.933	269.867	0.00E+00	4.85E-07	9.71E-07		
Pb-210	8.2511E-15	134.933	269.867	0.00E+00	1.11E-12	2.23E-12		
Pm-147	2.0767E+00	134.933	269.867	0.00E+00	2.80E+02	5.60E+02		
Pu-238	1.3514E-03	134.933	269.867	0.00E+00	1.82E-01	3.65E-01		
Pu-239	5.6947E-03	134.933	269.867	0.00E+00	7.68E-01	1.54E+00		
Pu-240	2.2647E-03	134.933	269.867	0.00E+00	3.06E-01	6.11E-01		
Pu-241	1.2574E-01	134.933	269.867	0.00E+00	1.70E+01	3.39E+01		
Pu-242	3.0602E-07	134.933	269.867	0.00E+00	4.13E-05	8.26E-05		
Ra-226	5.7353E-14	134.933	269.867	0.00E+00	7.74E-12	1.55E-11		
Ra-228	1.8150E-10	134.933	269.867	0.00E+00	2.45E-08	4.90E-08		
Ru-106	9.3744E-02	134.933	269.867	0.00E+00	1.26E+01	2.53E+01		
Se-79	1.2938E-05	134.933	269.867	0.00E+00	1.75E-03	3.49E-03		
Sn-126	1.2239E-05	134.933	269.867	0.00E+00	1.65E-03	3.30E-03		
Sr-90	2.6000E+00	134.933	269.867	0.00E+00	3.51E+02	7.02E+02		
Tc-99	4.4120E-04	134.933	269.867	0.00E+00	5.95E-02	1.19E-01		
Th-229	1.4749E-10	134.933	269.867	0.00E+00	1.99E-08	3.98E-08		
Th-230	1.9549E-11	134.933	269.867	0.00E+00	2.64E-09	5.28E-09		
Th-232	2.3744E-10	134.933	269.867	0.00E+00	3.20E-08	6.41E-08		
Tl-208	1.9459E-08	134.933	269.867	0.00E+00	2.63E-06	5.25E-06		
U-232	5.6015E-08	134.933	269.867	0.00E+00	7.56E-06	1.51E-05		
U-233	1.3132E-07	134.933	269.867	0.00E+00	1.77E-05	3.54E-05		
U-234	1.7323E-07	134.933	269.867	0.00E+00	2.34E-05	4.67E-05		
U-235	-2.6159E-06	134.933	0.000	5.98E-03	5.63E-03	5.98E-03		
U-236	1.2717E-05	134.933	269.867	0.00E+00	1.72E-03	3.43E-03		
U-238	-3.8857E-08	134.933	0.000	3.72E-03	3.72E-03	3.72E-03	6.78E+00	1.36E+01
Y-90	2.6015E+00	134.933	269.867	0.00E+00	3.51E+02	7.02E+02	Total	Total
Other Radionuclides					5.13E+02	1.03E+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:	ALUM	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20.00000073	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	134.933	67.771	
Bounding:		269.867	

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:	0.26	0.50	
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 (JAPAN) 1Fuel decay start date: 2010
 SNF ID #: 479 Estimates as of: 2010
 Fuel Units & Descr: 73 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=14.24kg ; EOL=14.09kg 2Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.66

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	8.5173E-10	139.373	278.745	0.00E+00	1.19E-07	2.37E-07	0.0150	4.505E+13
Am-241	1.8331E-03	139.373	278.745	0.00E+00	2.55E-01	5.11E-01	0.0250	9.913E+12
Am-242m	1.4129E-06	139.373	278.745	0.00E+00	1.97E-04	3.94E-04	0.0375	8.442E+12
Am-243	1.4774E-07	139.373	278.745	0.00E+00	2.06E-05	4.12E-05	0.0575	8.665E+12
C-14	1.2871E-04	139.373	278.745	0.00E+00	1.79E-02	3.59E-02	0.0850	5.368E+12
Cl-36	2.8120E-06	139.373	278.745	0.00E+00	3.92E-04	7.84E-04	0.1250	3.898E+12
Cm-243	1.7940E-07	139.373	278.745	0.00E+00	2.50E-05	5.00E-05	0.2250	4.554E+12
Cm-244	1.6962E-06	139.373	278.745	0.00E+00	2.36E-04	4.73E-04	0.3750	2.311E+12
Co-60	1.2839E+00	139.373	278.745	0.00E+00	1.79E+02	3.58E+02	0.5750	3.072E+13
Cs-134	9.0541E-02	139.373	278.745	0.00E+00	1.26E+01	2.52E+01	0.8500	1.318E+12
Cs-135	3.2195E-05	139.373	278.745	0.00E+00	4.49E-03	8.97E-03	1.2500	2.678E+13
Cs-137	2.7564E+00	139.373	278.745	0.00E+00	3.84E+02	7.68E+02	1.7500	1.785E+10
Eu-154	1.5368E-02	139.373	278.745	0.00E+00	2.14E+00	4.28E+00	2.2500	2.877E+10
Eu-155	2.9293E-02	139.373	278.745	0.00E+00	4.08E+00	8.17E+00	2.7500	2.283E+08
Fe-55	7.7158E-01	139.373	278.745	0.00E+00	1.08E+02	2.15E+02	3.5000	2.658E+07
H-3	1.1111E-02	139.373	278.745	0.00E+00	1.55E+00	3.10E+00	5.0000	1.549E+02
I-129	7.3684E-07	139.373	278.745	0.00E+00	1.03E-04	2.05E-04	7.0000	1.755E+01
Kr-85	2.5263E-01	139.373	278.745	0.00E+00	3.52E+01	7.04E+01	11.0000	2.000E+00
Np-237	1.2427E-06	139.373	278.745	0.00E+00	1.73E-04	3.46E-04		
Pa-231	3.8511E-09	139.373	278.745	0.00E+00	5.37E-07	1.07E-06		
Pb-210	7.3880E-15	139.373	278.745	0.00E+00	1.03E-12	2.06E-12		
Pm-147	2.1023E+00	139.373	278.745	0.00E+00	2.93E+02	5.86E+02		
Pu-238	1.0383E-03	139.373	278.745	0.00E+00	1.45E-01	2.89E-01		
Pu-239	5.5293E-03	139.373	278.745	0.00E+00	7.71E-01	1.54E+00		
Pu-240	2.1278E-03	139.373	278.745	0.00E+00	2.97E-01	5.93E-01		
Pu-241	1.0195E-01	139.373	278.745	0.00E+00	1.42E+01	2.84E+01		
Pu-242	2.3128E-07	139.373	278.745	0.00E+00	3.22E-05	6.45E-05		
Ra-226	5.2782E-14	139.373	278.745	0.00E+00	7.36E-12	1.47E-11		
Ra-228	1.9338E-10	139.373	278.745	0.00E+00	2.70E-08	5.39E-08		
Ru-106	9.1684E-02	139.373	278.745	0.00E+00	1.28E+01	2.56E+01		
Se-79	1.3018E-05	139.373	278.745	0.00E+00	1.81E-03	3.63E-03		
Sn-126	1.2167E-05	139.373	278.745	0.00E+00	1.70E-03	3.39E-03		
Sr-90	2.6045E+00	139.373	278.745	0.00E+00	3.63E+02	7.26E+02		
Tc-99	4.4241E-04	139.373	278.745	0.00E+00	6.17E-02	1.23E-01		
Th-229	1.3713E-10	139.373	278.745	0.00E+00	1.91E-08	3.82E-08		
Th-230	1.8090E-11	139.373	278.745	0.00E+00	2.52E-09	5.04E-09		
Th-232	2.5278E-10	139.373	278.745	0.00E+00	3.52E-08	7.05E-08		
Tl-208	1.6947E-08	139.373	278.745	0.00E+00	2.36E-06	4.72E-06		
U-232	4.8737E-08	139.373	278.745	0.00E+00	6.79E-06	1.36E-05		
U-233	1.2203E-07	139.373	278.745	0.00E+00	1.70E-05	3.40E-05		
U-234	1.5925E-07	139.373	278.745	0.00E+00	2.22E-05	4.44E-05		
U-235	-2.6194E-06	139.373	0.000	6.15E-03	5.79E-03	6.15E-03		
U-236	1.2693E-05	139.373	278.745	0.00E+00	1.77E-03	3.54E-03		
U-238	-3.6331E-08	139.373	0.000	3.83E-03	3.82E-03	3.83E-03		
Y-90	2.6060E+00	139.373	278.745	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)
8.11E+00	1.62E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	138.734	139.373	
Bounding:		278.745	

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

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 (KSU)
 SNF ID #: 804
 Fuel Units & Desc: 3 - ELEMENT
 Heavy Metal Mass: BOL=54kg ; EOL=51kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 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"
 0.03

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	8.0632E-10	25.772	51.544	0.00E+00	2.08E-08	4.16E-08	Avg. MeV	
Am-241	2.2586E-03	25.772	51.544	0.00E+00	5.82E-02	1.16E-01	0.0150	8.721E+12
Am-242m	1.9925E-06	25.772	51.544	0.00E+00	5.14E-05	1.03E-04	0.0250	1.893E+12
Am-243	2.3323E-07	25.772	51.544	0.00E+00	6.01E-06	1.20E-05	0.0375	2.359E+12
C-14	4.3308E-05	25.772	51.544	0.00E+00	1.12E-03	2.23E-03	0.0575	1.808E+12
Cl-36	4.3023E-08	25.772	51.544	0.00E+00	1.11E-06	2.22E-06	0.0850	1.266E+12
Co-243	2.7429E-07	25.772	51.544	0.00E+00	7.07E-06	1.41E-05	0.1250	1.893E+12
Co-244	3.1504E-06	25.772	51.544	0.00E+00	8.12E-05	1.62E-04	0.2250	1.057E+12
Co-60	3.1008E-02	25.772	51.544	0.00E+00	7.99E-01	1.60E+00	0.3750	4.702E+11
Cs-134	1.0367E-01	25.772	51.544	0.00E+00	2.67E+00	5.34E+00	0.5750	5.962E+12
Cs-135	3.1549E-05	25.772	51.544	0.00E+00	8.13E-04	1.63E-03	0.8500	1.467E+12
Cs-137	2.7564E+00	25.772	51.544	0.00E+00	7.10E+01	1.42E+02	1.2500	1.521E+12
Eu-154	1.3490E+00	25.772	51.544	0.00E+00	3.48E+01	6.95E+01	1.7500	4.354E+10
Eu-155	4.3890E-01	25.772	51.544	0.00E+00	1.13E+01	2.26E+01	2.2500	5.292E+09
Fe-55	8.6782E-03	25.772	51.544	0.00E+00	2.24E-01	4.47E-01	2.7500	4.298E+07
H-3	1.0805E-02	25.772	51.544	0.00E+00	2.78E-01	5.57E-01	3.5000	5.025E+06
I-129	7.3805E-07	25.772	51.544	0.00E+00	1.90E-05	3.80E-05	5.0000	2.973E+10
Kr-85	2.5218E-01	25.772	51.544	0.00E+00	6.50E+00	1.30E+01	7.0000	3.365E+00
Np-237	1.4463E-06	25.772	51.544	0.00E+00	3.73E-05	7.45E-05	11.0000	3.834E-01
Pa-231	3.5970E-09	25.772	51.544	0.00E+00	9.27E-08	1.85E-07		
Pb-210	8.2511E-15	25.772	51.544	0.00E+00	2.13E-13	4.25E-13		
Pm-147	2.0767E+00	25.772	51.544	0.00E+00	5.35E+01	1.07E+02		
Pu-238	1.3514E-03	25.772	51.544	0.00E+00	3.48E-02	6.97E-02		
Pu-239	5.6947E-03	25.772	51.544	0.00E+00	1.47E-01	2.94E-01		
Pu-240	2.2647E-03	25.772	51.544	0.00E+00	5.84E-02	1.17E-01		
Pu-241	1.2574E-01	25.772	51.544	0.00E+00	3.24E+00	6.48E+00		
Pu-242	3.0602E-07	25.772	51.544	0.00E+00	7.89E-06	1.58E-05		
Ra-226	5.7353E-14	25.772	51.544	0.00E+00	1.48E-12	2.96E-12		
Ra-228	1.8150E-10	25.772	51.544	0.00E+00	4.68E-09	9.36E-09		
Ru-106	9.3744E-02	25.772	51.544	0.00E+00	2.42E+00	4.83E+00		
Se-79	1.2938E-05	25.772	51.544	0.00E+00	3.33E-04	6.67E-04		
Sn-126	1.2239E-05	25.772	51.544	0.00E+00	3.15E-04	6.31E-04		
Sr-90	2.6000E+00	25.772	51.544	0.00E+00	6.70E+01	1.34E+02		
Tc-99	4.4120E-04	25.772	51.544	0.00E+00	1.14E-02	2.27E-02		
Th-229	1.4749E-10	25.772	51.544	0.00E+00	3.80E-09	7.60E-09		
Th-230	1.9549E-11	25.772	51.544	0.00E+00	5.04E-10	1.01E-09		
Th-232	2.3744E-10	25.772	51.544	0.00E+00	6.12E-09	1.22E-08		
Ti-208	1.9459E-08	25.772	51.544	0.00E+00	5.01E-07	1.00E-06		
U-232	5.6015E-08	25.772	51.544	0.00E+00	1.44E-06	2.89E-06		
U-233	1.3132E-07	25.772	51.544	0.00E+00	3.38E-06	6.77E-06		
U-234	1.7323E-07	25.772	51.544	0.00E+00	4.46E-06	8.93E-06		
U-235	-2.6159E-06	25.772	0.000	2.33E-04	1.66E-04	2.33E-04		
U-236	1.2717E-05	25.772	51.544	0.00E+00	3.28E-04	6.55E-04		
U-238	-3.8857E-08	25.772	0.000	1.45E-04	1.44E-04	1.45E-04		
Y-90	2.6015E+00	25.772	51.544	0.00E+00	6.70E+01	1.34E+02		
Other Radionuclides					9.80E+01	1.96E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.29E+00	2.59E+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:	ALUM	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.9999834	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		25.772	
Bounding:		51.544	

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:	1.29		
Bounding:	2.58		

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: TRIGA STD (KSU)
 SNF ID #: 871
 Fuel Units & Descr: 61 - ELEMENT
 Heavy Metal Mass: BOL=11.29kg ; EOL=11.21kg
 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"
 0.55

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	109.984	219.967	0.00E+00	6.76E-07	1.35E-06		
Am-241	4.8165E-03	109.984	219.967	0.00E+00	5.30E-01	1.06E+00	0.0150	1.551E+13
Am-242m	1.7383E-06	109.984	219.967	0.00E+00	1.91E-04	3.82E-04	0.0250	3.211E+12
Am-243	2.3263E-07	109.984	219.967	0.00E+00	2.56E-05	5.12E-05	0.0375	3.030E+12
C-14	4.3158E-05	109.984	219.967	0.00E+00	4.75E-03	9.49E-03	0.0575	3.053E+12
Cl-36	4.3023E-08	109.984	219.967	0.00E+00	4.73E-06	9.46E-06	0.0850	1.822E+12
Cm-243	1.3229E-07	109.984	219.967	0.00E+00	1.45E-05	2.91E-05	0.1250	1.574E+12
Cm-244	1.0000E-06	109.984	219.967	0.00E+00	1.10E-04	2.20E-04	0.2250	1.628E+12
Co-60	6.0120E-04	109.984	219.967	0.00E+00	6.61E-02	1.32E-01	0.3750	6.908E+11
Cs-134	4.3534E-06	109.984	219.967	0.00E+00	4.79E-04	9.58E-04	0.5750	1.138E+13
Cs-135	3.1549E-05	109.984	219.967	0.00E+00	3.47E-03	6.94E-03	0.8500	5.807E+11
Cs-137	1.3788E+00	109.984	219.967	0.00E+00	1.52E+02	3.03E+02	1.2500	5.698E+11
Eu-154	1.2041E-01	109.984	219.967	0.00E+00	1.32E+01	2.65E+01	1.7500	1.833E+10
Eu-155	6.6451E-03	109.984	219.967	0.00E+00	7.31E-01	1.46E+00	2.2500	3.617E+05
Fe-55	2.9338E-06	109.984	219.967	0.00E+00	3.23E-04	6.45E-04	2.7500	1.223E+05
H-3	2.0075E-03	109.984	219.967	0.00E+00	2.21E-01	4.42E-01	3.5000	3.075E+02
I-129	7.3805E-07	109.984	219.967	0.00E+00	8.12E-05	1.62E-04	5.0000	1.295E+02
Kr-85	3.6301E-02	109.984	219.967	0.00E+00	3.99E+00	7.98E+00	7.0000	1.461E+01
Np-237	1.4977E-06	109.984	219.967	0.00E+00	1.65E-04	3.29E-04	11.0000	1.661E+00
Pa-231	1.1275E-08	109.984	219.967	0.00E+00	1.24E-06	2.48E-06		
Pb-210	3.8932E-13	109.984	219.967	0.00E+00	4.28E-11	8.56E-11		
Pm-147	7.5383E-04	109.984	219.967	0.00E+00	8.29E-02	1.66E-01		
Pu-238	1.0668E-03	109.984	219.967	0.00E+00	1.17E-01	2.35E-01		
Pu-239	5.6902E-03	109.984	219.967	0.00E+00	6.26E-01	1.25E+00		
Pu-240	2.2571E-03	109.984	219.967	0.00E+00	2.48E-01	4.96E-01		
Pu-241	2.9699E-02	109.984	219.967	0.00E+00	3.27E+00	6.53E+00		
Pu-242	3.0602E-07	109.984	219.967	0.00E+00	3.37E-05	6.73E-05		
Ra-226	1.0704E-12	109.984	219.967	0.00E+00	1.18E-10	2.35E-10		
Ra-228	2.3654E-10	109.984	219.967	0.00E+00	2.60E-08	5.20E-08		
Ru-106	1.0444E-10	109.984	219.967	0.00E+00	1.15E-08	2.30E-08		
Se-79	1.2934E-05	109.984	219.967	0.00E+00	1.42E-03	2.85E-03		
Sn-126	1.2236E-05	109.984	219.967	0.00E+00	1.35E-03	2.69E-03		
Sr-90	1.2740E+00	109.984	219.967	0.00E+00	1.40E+02	2.80E+02		
Tc-99	4.4120E-04	109.984	219.967	0.00E+00	4.85E-02	9.71E-02		
Th-229	6.4226E-10	109.984	219.967	0.00E+00	7.06E-08	1.41E-07		
Th-230	1.0594E-10	109.984	219.967	0.00E+00	1.17E-08	2.33E-08		
Th-232	2.3744E-10	109.984	219.967	0.00E+00	2.61E-08	5.22E-08		
Tl-208	1.5774E-08	109.984	219.967	0.00E+00	1.73E-06	3.47E-06		
U-232	4.2511E-08	109.984	219.967	0.00E+00	4.68E-06	9.35E-06		
U-233	1.3155E-07	109.984	219.967	0.00E+00	1.45E-05	2.89E-05		
U-234	3.0030E-07	109.984	219.967	0.00E+00	3.30E-05	6.61E-05		
U-235	-2.6144E-06	109.984	0.000	4.88E-03	4.59E-03	4.88E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.2720E-05	109.984	219.967	0.00E+00	1.40E-03	2.80E-03	1.85E+00	3.70E+00
U-238	-3.8857E-08	109.984	0.000	3.03E-03	3.03E-03	3.03E-03	Total	Total
Y-90	1.2744E+00	109.984	219.967	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 (1100)	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	109.984	75.693	
Bounding:		219.967	

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	0.69
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 (MEXICO)
 SNF ID #: 482
 Fuel Units & Descr: 151 - ELEMENT
 Heavy Metal Mass: BOL=29.45kg ; EOL=28.40kg
 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 _n	x _b	b	y _n	y _b	Gamma Sources	
							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	994.605	1,989.209	0.00E+00	8.47E-07	1.69E-06		
Am-241	1.8331E-03	994.605	1,989.209	0.00E+00	1.82E+00	3.65E+00	0.0150	3.215E+14
Am-242m	1.4129E-06	994.605	1,989.209	0.00E+00	1.41E-03	2.81E-03	0.0250	7.074E+13
Am-243	1.4774E-07	994.605	1,989.209	0.00E+00	1.47E-04	2.94E-04	0.0375	6.025E+13
C-14	1.2871E-04	994.605	1,989.209	0.00E+00	1.28E-01	2.56E-01	0.0575	6.184E+13
Cl-36	2.8120E-06	994.605	1,989.209	0.00E+00	2.80E-03	5.59E-03	0.0850	3.831E+13
Cm-243	1.7940E-07	994.605	1,989.209	0.00E+00	1.78E-04	3.57E-04	0.1250	2.782E+13
Cm-244	1.6962E-06	994.605	1,989.209	0.00E+00	1.69E-03	3.37E-03	0.2250	3.250E+13
Co-60	1.2839E+00	994.605	1,989.209	0.00E+00	1.28E+03	2.55E+03	0.3750	1.649E+13
Cs-134	9.0541E-02	994.605	1,989.209	0.00E+00	9.01E+01	1.80E+02	0.5750	2.192E+14
Cs-135	3.2195E-05	994.605	1,989.209	0.00E+00	3.20E-02	6.40E-02	0.8500	9.409E+12
Cs-137	2.7564E+00	994.605	1,989.209	0.00E+00	2.74E+03	5.48E+03	1.2500	1.911E+14
Eu-154	1.5368E-02	994.605	1,989.209	0.00E+00	1.53E+01	3.06E+01	1.7500	1.274E+11
Eu-155	2.9293E-02	994.605	1,989.209	0.00E+00	2.91E+01	5.83E+01	2.2500	2.053E+11
Fe-55	7.7158E-01	994.605	1,989.209	0.00E+00	7.67E+02	1.53E+03	2.7500	1.629E+09
H-3	1.1111E-02	994.605	1,989.209	0.00E+00	1.11E+01	2.21E+01	3.5000	1.897E+08
I-129	7.3684E-07	994.605	1,989.209	0.00E+00	7.33E-04	1.47E-03	5.0000	1.061E+03
Kr-85	2.5263E-01	994.605	1,989.209	0.00E+00	2.51E+02	5.03E+02	7.0000	1.201E+02
Np-237	1.2427E-06	994.605	1,989.209	0.00E+00	1.24E-03	2.47E-03	11.0000	1.368E+01
Pa-231	3.8511E-09	994.605	1,989.209	0.00E+00	3.83E-06	7.66E-06		
Pb-210	7.3880E-15	994.605	1,989.209	0.00E+00	7.35E-12	1.47E-11		
Pm-147	2.1023E+00	994.605	1,989.209	0.00E+00	2.09E+03	4.18E+03		
Pu-238	1.0383E-03	994.605	1,989.209	0.00E+00	1.03E+00	2.07E+00		
Pu-239	5.5293E-03	994.605	1,989.209	0.00E+00	5.50E+00	1.10E+01		
Pu-240	2.1278E-03	994.605	1,989.209	0.00E+00	2.12E+00	4.23E+00		
Pu-241	1.0195E-01	994.605	1,989.209	0.00E+00	1.01E+02	2.03E+02		
Pu-242	2.3128E-07	994.605	1,989.209	0.00E+00	2.30E-04	4.60E-04		
Ra-226	5.2782E-14	994.605	1,989.209	0.00E+00	5.25E-11	1.05E-10		
Ra-228	1.9338E-10	994.605	1,989.209	0.00E+00	1.92E-07	3.85E-07		
Ru-106	9.1684E-02	994.605	1,989.209	0.00E+00	9.12E+01	1.82E+02		
Se-79	1.3018E-05	994.605	1,989.209	0.00E+00	1.29E-02	2.59E-02		
Sn-126	1.2167E-05	994.605	1,989.209	0.00E+00	1.21E-02	2.42E-02		
Sr-90	2.6045E+00	994.605	1,989.209	0.00E+00	2.59E+03	5.18E+03		
Tc-99	4.4241E-04	994.605	1,989.209	0.00E+00	4.40E-01	8.80E-01		
Th-229	1.3713E-10	994.605	1,989.209	0.00E+00	1.36E-07	2.73E-07		
Th-230	1.8090E-11	994.605	1,989.209	0.00E+00	1.80E-08	3.60E-08		
Th-232	2.5278E-10	994.605	1,989.209	0.00E+00	2.51E-07	5.03E-07		
Tl-208	1.6947E-08	994.605	1,989.209	0.00E+00	1.69E-05	3.37E-05		
U-232	4.8737E-08	994.605	1,989.209	0.00E+00	4.85E-05	9.69E-05		
U-233	1.2203E-07	994.605	1,989.209	0.00E+00	1.21E-04	2.43E-04		
U-234	1.5925E-07	994.605	1,989.209	0.00E+00	1.58E-04	3.17E-04		
U-235	-2.6194E-06	994.605	0.000	1.27E-02	1.01E-02	1.27E-02		
U-236	1.2693E-05	994.605	1,989.209	0.00E+00	1.26E-02	2.52E-02		
U-238	-3.6331E-08	994.605	0.000	7.92E-03	7.88E-03	7.92E-03		
Y-90	2.6060E+00	994.605	1,989.209	0.00E+00	2.59E+03	5.18E+03		
Other Radionuclides					3.59E+03	7.17E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.79E+01	1.16E+02
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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20.0000041	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		994.605	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,989.209	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		

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 (MNRC)	¹ Fuel decay start date: 2035
SNF ID #: 704	Estimates as of: 2010
Fuel Units & Descr: 6 - ELEMENT	Template: TRIGA-SS (LW/U-ZrX, SST, 10 to 20%, U)
Heavy Metal Mass: BOL=4.97kg ; EOL=4.97kg	² Template Burnup(MWd): 6.65
ROD Storage Site: INEEL	Template BOL Heavy Metal Mass (MT): 0.000195
	Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.05

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	8.5173E-10	94.964	470.665	0.00E+00	8.09E-08	4.01E-07		
Am-241	1.8331E-03	94.964	470.665	0.00E+00	1.74E-01	8.63E-01	0.0150	7.607E+13
Am-242m	1.4129E-06	94.964	470.665	0.00E+00	1.34E-04	6.65E-04	0.0250	1.674E+13
Am-243	1.4774E-07	94.964	470.665	0.00E+00	1.40E-05	6.95E-05	0.0375	1.425E+13
C-14	1.2871E-04	94.964	470.665	0.00E+00	1.22E-02	6.06E-02	0.0575	1.463E+13
Cf-252	2.8120E-06	94.964	470.665	0.00E+00	2.67E-04	1.32E-03	0.0850	9.064E+12
Cm-243	1.7940E-07	94.964	470.665	0.00E+00	1.70E-05	8.44E-05	0.1250	6.582E+12
Cm-244	1.6962E-06	94.964	470.665	0.00E+00	1.61E-04	7.98E-04	0.2250	7.689E+12
Co-60	1.2839E+00	94.964	470.665	0.00E+00	1.22E+02	6.04E+02	0.3750	3.902E+12
Cs-134	9.0541E-02	94.964	470.665	0.00E+00	8.60E+00	4.26E+01	0.5750	5.188E+13
Cs-135	3.2195E-05	94.964	470.665	0.00E+00	3.06E-03	1.52E-02	0.8500	2.226E+12
Cs-137	2.7564E+00	94.964	470.665	0.00E+00	2.62E+02	1.30E+03	1.2500	4.521E+13
Eu-154	1.5368E-02	94.964	470.665	0.00E+00	1.46E+00	7.23E+00	1.7500	3.014E+10
Eu-155	2.9293E-02	94.964	470.665	0.00E+00	2.78E+00	1.38E+01	2.2500	4.859E+10
Fe-55	7.7158E-01	94.964	470.665	0.00E+00	7.33E+01	3.63E+02	2.7500	3.855E+08
H-3	1.1111E-02	94.964	470.665	0.00E+00	1.06E+00	5.23E+00	3.5000	4.488E+07
I-129	7.3684E-07	94.964	470.665	0.00E+00	7.00E-05	3.47E-04	5.0000	2.497E+02
Kr-85	2.5263E-01	94.964	470.665	0.00E+00	2.40E+01	1.19E+02	7.0000	2.827E+01
Np-237	1.2427E-06	94.964	470.665	0.00E+00	1.18E-04	5.85E-04	11.0000	3.220E+00
Pa-231	3.8511E-09	94.964	470.665	0.00E+00	3.66E-07	1.81E-06		
Pb-210	7.3880E-15	94.964	470.665	0.00E+00	7.02E-13	3.48E-12		
Pm-147	2.1023E+00	94.964	470.665	0.00E+00	2.00E+02	9.89E+02		
Pu-238	1.0383E-03	94.964	470.665	0.00E+00	9.86E-02	4.89E-01		
Pu-239	5.5293E-03	94.964	470.665	0.00E+00	5.25E-01	2.60E+00		
Pu-240	2.1278E-03	94.964	470.665	0.00E+00	2.02E-01	1.00E+00		
Pu-241	1.0195E-01	94.964	470.665	0.00E+00	9.68E+00	4.80E+01		
Pu-242	2.3128E-07	94.964	470.665	0.00E+00	2.20E-05	1.09E-04		
Ra-226	5.2782E-14	94.964	470.665	0.00E+00	5.01E-12	2.48E-11		
Ra-228	1.9338E-10	94.964	470.665	0.00E+00	1.84E-08	9.10E-08		
Ru-106	9.1684E-02	94.964	470.665	0.00E+00	8.71E+00	4.32E+01		
Se-79	1.3018E-05	94.964	470.665	0.00E+00	1.24E-03	6.13E-03		
Sn-126	1.2167E-05	94.964	470.665	0.00E+00	1.16E-03	5.73E-03		
Sr-90	2.6045E+00	94.964	470.665	0.00E+00	2.47E+02	1.23E+03		
Tc-99	4.4241E-04	94.964	470.665	0.00E+00	4.20E-02	2.08E-01		
Th-229	1.3713E-10	94.964	470.665	0.00E+00	1.30E-08	6.45E-08		
Th-230	1.8090E-11	94.964	470.665	0.00E+00	1.72E-09	8.51E-09		
Th-232	2.5278E-10	94.964	470.665	0.00E+00	2.40E-08	1.19E-07		
Tl-208	1.6947E-08	94.964	470.665	0.00E+00	1.61E-06	7.98E-06		
U-232	4.8737E-08	94.964	470.665	0.00E+00	4.63E-06	2.29E-05		
U-233	1.2203E-07	94.964	470.665	0.00E+00	1.16E-05	5.74E-05		
U-234	1.5925E-07	94.964	470.665	0.00E+00	1.51E-05	7.50E-05		
U-235	-2.6194E-06	94.964	0.000	2.13E-03	1.88E-03	2.13E-03		
U-236	1.2693E-05	94.964	470.665	0.00E+00	1.21E-03	5.97E-03		
U-238	-3.6331E-08	94.964	0.000	1.34E-03	1.34E-03	1.34E-03		
Y-90	2.6060E+00	94.964	470.665	0.00E+00	2.47E+02	1.23E+03		
Other Radionuclides					3.42E+02	1.70E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.53E+00	2.74E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.82495894	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		94.964	
Bounding:	470.665	189.929	

Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup taken directly from SFD (converted to MWd).

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.56		
Bounding:	2.77	0.40	

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 (MNRG)
 SNF ID #: 1053
 Fuel Units & Descr: 8 - ELEMENT
 Heavy Metal Mass: BOL=3.96kg ; EOL=3.96kg
 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

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							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	8.5173E-10	75.651	373.524	0.00E+00	6.44E-08	3.18E-07		
Am-241	1.8331E-03	75.651	373.524	0.00E+00	1.39E-01	6.85E-01	0.0150	6.037E+13
Am-242m	1.4129E-06	75.651	373.524	0.00E+00	1.07E-04	5.28E-04	0.0250	1.328E+13
Am-243	1.4774E-07	75.651	373.524	0.00E+00	1.12E-05	5.52E-05	0.0375	1.131E+13
C-14	1.2871E-04	75.651	373.524	0.00E+00	9.74E-03	4.81E-02	0.0575	1.161E+13
Cl-36	2.8120E-06	75.651	373.524	0.00E+00	2.13E-04	1.05E-03	0.0850	7.194E+12
Co-243	1.7940E-07	75.651	373.524	0.00E+00	1.36E-05	6.70E-05	0.1250	5.224E+12
Co-244	1.6962E-06	75.651	373.524	0.00E+00	1.28E-04	6.34E-04	0.2250	6.102E+12
Co-60	1.2839E+00	75.651	373.524	0.00E+00	9.71E+01	4.80E+02	0.3750	3.097E+12
Cs-134	9.0541E-02	75.651	373.524	0.00E+00	6.85E+00	3.38E+01	0.5750	4.117E+12
Cs-135	3.2195E-05	75.651	373.524	0.00E+00	2.44E-03	1.20E-02	0.8500	1.767E+13
Cs-137	2.7564E+00	75.651	373.524	0.00E+00	2.09E+02	1.03E+03	1.2500	3.588E+13
Eu-154	1.5368E-02	75.651	373.524	0.00E+00	1.16E+00	5.74E+00	1.7500	2.392E+10
Eu-155	2.9293E-02	75.651	373.524	0.00E+00	2.22E+00	1.09E+01	2.2500	3.856E+10
Fe-55	7.7158E-01	75.651	373.524	0.00E+00	5.84E+01	2.88E+02	2.7500	3.059E+08
H-3	1.1111E-02	75.651	373.524	0.00E+00	8.41E-01	4.15E+00	3.5000	3.562E+07
I-129	7.3684E-07	75.651	373.524	0.00E+00	5.57E-05	2.75E-04	5.0000	1.982E+02
Kr-85	2.5263E-01	75.651	373.524	0.00E+00	1.91E+01	9.44E+01	7.0000	2.244E+01
Np-237	1.2427E-06	75.651	373.524	0.00E+00	9.40E-05	4.64E-04	11.0000	2.556E+00
Pa-231	3.8511E-09	75.651	373.524	0.00E+00	2.91E-07	1.44E-06		
Pb-210	7.3880E-15	75.651	373.524	0.00E+00	5.59E-13	2.76E-12		
Pm-147	2.1023E+00	75.651	373.524	0.00E+00	1.59E+02	7.85E+02		
Pu-238	1.0383E-03	75.651	373.524	0.00E+00	7.86E-02	3.88E-01		
Pu-239	5.5293E-03	75.651	373.524	0.00E+00	4.18E-01	2.07E+00		
Pu-240	2.1278E-03	75.651	373.524	0.00E+00	1.61E-01	7.95E-01		
Pu-241	1.0195E-01	75.651	373.524	0.00E+00	7.71E+00	3.81E+01		
Pu-242	2.3128E-07	75.651	373.524	0.00E+00	1.75E-05	8.64E-05		
Ra-226	5.2782E-14	75.651	373.524	0.00E+00	3.99E-12	1.97E-11		
Ra-228	1.9338E-10	75.651	373.524	0.00E+00	1.46E-08	7.22E-08		
Ru-106	9.1684E-02	75.651	373.524	0.00E+00	6.94E+00	3.42E+01		
Se-79	1.3018E-05	75.651	373.524	0.00E+00	9.85E-04	4.86E-03		
Sn-126	1.2167E-05	75.651	373.524	0.00E+00	9.20E-04	4.54E-03		
Sr-90	2.6045E+00	75.651	373.524	0.00E+00	1.97E+02	9.73E+02		
Tc-99	4.4241E-04	75.651	373.524	0.00E+00	3.35E-02	1.65E-01		
Th-229	1.3713E-10	75.651	373.524	0.00E+00	1.04E-08	5.12E-08		
Th-230	1.8090E-11	75.651	373.524	0.00E+00	1.37E-09	6.76E-09		
Th-232	2.5278E-10	75.651	373.524	0.00E+00	1.91E-08	9.44E-08		
Ti-208	1.6947E-08	75.651	373.524	0.00E+00	1.28E-06	6.33E-06		
U-232	4.8737E-08	75.651	373.524	0.00E+00	3.69E-06	1.82E-05		
U-233	1.2203E-07	75.651	373.524	0.00E+00	9.23E-06	4.56E-05		
U-234	1.5925E-07	75.651	373.524	0.00E+00	1.20E-05	5.95E-05		
U-235	2.6194E-06	75.651	0.000	1.69E-03	1.49E-03	1.69E-03		
U-236	1.2693E-05	75.651	373.524	0.00E+00	9.60E-04	4.74E-03		
U-238	3.6331E-08	75.651	0.000	1.07E-03	1.07E-03	1.07E-03		
Y-90	2.6060E+00	75.651	373.524	0.00E+00	1.97E+02	9.73E+02		
Other Radionuclides					2.73E+02	1.35E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.40E+00	2.17E+01
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 (304)	SST	
BOL Enrichment %:	U-ZrHx	U	
	19.74990819	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:	373.524	75.651	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup taken directly from SFD (converted to MWd).
		151.301	

Checks		
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup
Bounding:	0.56	0.41
	2.76	
		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 (MNRC) 1Fuel decay start date: 2035
 SNF ID #: 1054 Estimates as of: 2010
 Fuel Units & Descr: 84 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=41.61kg ; EOL=40.56kg 2Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.76

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	8.5173E-10	1,002.338	2,004.675	0.00E+00	8.54E-07	1.71E-06	0.0150	3.240E+14
Am-241	1.8331E-03	1,002.338	2,004.675	0.00E+00	1.84E+00	3.67E+00	0.0250	7.129E+13
Am-242m	1.4129E-06	1,002.338	2,004.675	0.00E+00	1.42E-03	2.83E-03	0.0375	6.071E+13
Am-243	1.4774E-07	1,002.338	2,004.675	0.00E+00	1.48E-04	2.96E-04	0.0575	6.232E+13
C-14	1.2871E-04	1,002.338	2,004.675	0.00E+00	1.29E-01	2.58E-01	0.0850	3.861E+13
Cl-36	2.8120E-06	1,002.338	2,004.675	0.00E+00	2.82E-03	5.64E-03	0.1250	2.803E+13
Cm-243	1.7940E-07	1,002.338	2,004.675	0.00E+00	1.80E-04	3.60E-04	0.2250	3.275E+13
Cm-244	1.6962E-06	1,002.338	2,004.675	0.00E+00	1.70E-03	3.40E-03	0.3750	1.662E+13
Co-60	1.2839E+00	1,002.338	2,004.675	0.00E+00	1.29E+03	2.57E+03	0.5750	2.210E+14
Cs-134	9.0541E-02	1,002.338	2,004.675	0.00E+00	9.08E+01	1.82E+02	0.8500	9.482E+12
Cs-135	3.2195E-05	1,002.338	2,004.675	0.00E+00	3.23E-02	6.45E-02	1.2500	1.926E+14
Cs-137	2.7564E+00	1,002.338	2,004.675	0.00E+00	2.76E+03	5.53E+03	1.7500	1.284E+11
Eu-154	1.5368E-02	1,002.338	2,004.675	0.00E+00	1.54E+01	3.08E+01	2.2500	2.069E+11
Eu-155	2.9293E-02	1,002.338	2,004.675	0.00E+00	2.94E+01	5.87E+01	2.7500	1.642E+09
Fe-55	7.7158E-01	1,002.338	2,004.675	0.00E+00	7.73E+02	1.55E+03	3.5000	1.912E+08
H-3	1.1111E-02	1,002.338	2,004.675	0.00E+00	1.11E+01	2.23E+01	5.0000	1.076E+03
I-129	7.3684E-07	1,002.338	2,004.675	0.00E+00	7.39E-04	1.48E-03	7.0000	1.219E+02
Kr-85	2.5263E-01	1,002.338	2,004.675	0.00E+00	2.53E+02	5.06E+02	11.0000	1.389E+01
Np-237	1.2427E-06	1,002.338	2,004.675	0.00E+00	1.25E-03	2.49E-03		
Pa-231	3.8511E-09	1,002.338	2,004.675	0.00E+00	3.86E-06	7.72E-06		
Pb-210	7.3880E-15	1,002.338	2,004.675	0.00E+00	7.41E-12	1.48E-11		
Pm-147	2.1023E+00	1,002.338	2,004.675	0.00E+00	2.11E+03	4.21E+03		
Pu-238	1.0383E-03	1,002.338	2,004.675	0.00E+00	1.04E+00	2.08E+00		
Pu-239	5.5293E-03	1,002.338	2,004.675	0.00E+00	5.54E+00	1.11E+01		
Pu-240	2.1278E-03	1,002.338	2,004.675	0.00E+00	2.13E+00	4.27E+00		
Pu-241	1.0195E-01	1,002.338	2,004.675	0.00E+00	1.02E+02	2.04E+02		
Pu-242	2.3128E-07	1,002.338	2,004.675	0.00E+00	2.32E-04	4.64E-04		
Ra-226	5.2782E-14	1,002.338	2,004.675	0.00E+00	5.29E-11	1.06E-10		
Ra-228	1.9338E-10	1,002.338	2,004.675	0.00E+00	1.94E-07	3.88E-07		
Ru-106	9.1684E-02	1,002.338	2,004.675	0.00E+00	9.19E+01	1.84E+02		
Se-79	1.3018E-05	1,002.338	2,004.675	0.00E+00	1.30E-02	2.61E-02		
Sn-126	1.2167E-05	1,002.338	2,004.675	0.00E+00	1.22E-02	2.44E-02		
Sr-90	2.6045E+00	1,002.338	2,004.675	0.00E+00	2.61E+03	5.22E+03		
Tc-99	4.4241E-04	1,002.338	2,004.675	0.00E+00	4.43E-01	8.87E-01		
Th-229	1.3713E-10	1,002.338	2,004.675	0.00E+00	1.37E-07	2.75E-07		
Th-230	1.8090E-11	1,002.338	2,004.675	0.00E+00	1.81E-08	3.63E-08		
Th-232	2.5278E-10	1,002.338	2,004.675	0.00E+00	2.53E-07	5.07E-07		
Th-230	1.6947E-08	1,002.338	2,004.675	0.00E+00	1.70E-05	3.40E-05		
U-232	4.8737E-08	1,002.338	2,004.675	0.00E+00	4.89E-05	9.77E-05		
U-233	1.2203E-07	1,002.338	2,004.675	0.00E+00	1.22E-04	2.45E-04		
U-234	1.5925E-07	1,002.338	2,004.675	0.00E+00	1.60E-04	3.19E-04		
U-235	-2.6194E-06	1,002.338	0.000	1.78E-02	1.51E-02	1.78E-02		
U-236	1.2693E-05	1,002.338	2,004.675	0.00E+00	1.27E-02	2.54E-02		
U-238	-3.6331E-08	1,002.338	0.000	1.12E-02	1.12E-02	1.12E-02		
Y-90	2.6060E+00	1,002.338	2,004.675	0.00E+00	2.61E+03	5.22E+03		
Other Radionuclides					3.61E+03	7.23E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.83E+01	1.17E+02
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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.74990819	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	784.424	1,002.338	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		2,004.675	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.71	1.28	1.00
Bounding:	1.41		

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 (MSU) ¹Fuel decay start date: 1973
 SNF ID #: 878 Estimates as of: 2010
 Fuel Units & Descr: 58 - ELEMENT Template: TRIGA-AI (LW/U-Zrx. Alum., 10 to 20%, U)
 Heavy Metal Mass: BOL=10.73kg ; EOL=10.65kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL 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	
							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	6.1504E-09	71.971	143.941	0.00E+00	4.43E-07	8.85E-07	0.0150	1.015E+13
Am-241	4.8165E-03	71.971	143.941	0.00E+00	3.47E-01	6.93E-01	0.0250	2.101E+12
Am-242m	1.7383E-06	71.971	143.941	0.00E+00	1.25E-04	2.50E-04	0.0375	1.983E+12
Am-243	2.3263E-07	71.971	143.941	0.00E+00	1.67E-05	3.35E-05	0.0575	1.988E+12
C-14	4.3158E-05	71.971	143.941	0.00E+00	3.11E-03	6.21E-03	0.0850	1.192E+12
Cl-36	4.3023E-08	71.971	143.941	0.00E+00	3.10E-06	6.19E-06	0.1250	1.030E+12
Cm-243	1.3229E-07	71.971	143.941	0.00E+00	9.52E-06	1.90E-05	0.2250	1.065E+12
Cm-244	1.0000E-06	71.971	143.941	0.00E+00	7.20E-05	1.44E-04	0.3750	4.521E+11
Co-60	6.0120E-04	71.971	143.941	0.00E+00	4.33E-02	8.65E-02	0.5750	7.448E+12
Cs-134	4.3534E-06	71.971	143.941	0.00E+00	3.13E-04	6.27E-04	0.8500	3.800E+11
Cs-135	3.1549E-05	71.971	143.941	0.00E+00	2.27E-03	4.54E-03	1.2500	3.729E+11
Cs-137	1.3788E+00	71.971	143.941	0.00E+00	9.92E+01	1.98E+02	1.7500	1.200E+10
Eu-154	1.2041E-01	71.971	143.941	0.00E+00	8.67E+00	1.73E+01	2.2500	2.367E+05
Eu-155	6.6451E-03	71.971	143.941	0.00E+00	4.78E-01	9.57E-01	2.7500	8.006E+04
Fe-55	2.9338E-06	71.971	143.941	0.00E+00	2.11E-04	4.22E-04	3.5000	2.061E+02
H-3	2.0075E-03	71.971	143.941	0.00E+00	1.44E-01	2.89E-01	5.0000	8.680E+01
I-129	7.3805E-07	71.971	143.941	0.00E+00	5.31E-05	1.06E-04	7.0000	9.800E+00
Kr-85	3.6301E-02	71.971	143.941	0.00E+00	2.61E+00	5.23E+00	11.0000	1.115E+00
Np-237	1.4977E-06	71.971	143.941	0.00E+00	1.08E-04	2.16E-04		
Pa-231	1.1275E-08	71.971	143.941	0.00E+00	8.11E-07	1.62E-06		
Pb-210	3.8932E-13	71.971	143.941	0.00E+00	2.80E-11	5.60E-11		
Pm-147	7.5383E-04	71.971	143.941	0.00E+00	5.43E-02	1.09E-01		
Pu-238	1.0668E-03	71.971	143.941	0.00E+00	7.68E-02	1.54E-01		
Pu-239	5.6902E-03	71.971	143.941	0.00E+00	4.10E-01	8.19E-01		
Pu-240	2.2571E-03	71.971	143.941	0.00E+00	1.62E-01	3.25E-01		
Pu-241	2.9699E-02	71.971	143.941	0.00E+00	2.14E+00	4.27E+00		
Pu-242	3.0602E-07	71.971	143.941	0.00E+00	2.20E-05	4.40E-05		
Ra-226	1.0704E-12	71.971	143.941	0.00E+00	7.70E-11	1.54E-10		
Ra-228	2.3654E-10	71.971	143.941	0.00E+00	1.70E-08	3.40E-08		
Ru-106	1.0444E-10	71.971	143.941	0.00E+00	7.52E-09	1.50E-08		
Se-79	1.2934E-05	71.971	143.941	0.00E+00	9.31E-04	1.86E-03		
Sn-126	1.2236E-05	71.971	143.941	0.00E+00	8.81E-04	1.76E-03		
Sr-90	1.2740E+00	71.971	143.941	0.00E+00	9.17E+01	1.83E+02		
Tc-99	4.4120E-04	71.971	143.941	0.00E+00	3.18E-02	6.35E-02		
Th-229	6.4226E-10	71.971	143.941	0.00E+00	4.62E-08	9.24E-08		
Th-230	1.0594E-10	71.971	143.941	0.00E+00	7.62E-09	1.52E-08		
Th-232	2.3744E-10	71.971	143.941	0.00E+00	1.71E-08	3.42E-08		
Th-208	1.5774E-08	71.971	143.941	0.00E+00	1.14E-06	2.27E-06		
U-232	4.2511E-08	71.971	143.941	0.00E+00	3.06E-06	6.12E-06		
U-233	1.3155E-07	71.971	143.941	0.00E+00	9.47E-06	1.89E-05		
U-234	3.0030E-07	71.971	143.941	0.00E+00	2.16E-05	4.32E-05		
U-235	-2.6144E-06	71.971	0.000	4.64E-03	4.45E-03	4.64E-03		
U-236	1.2720E-05	71.971	143.941	0.00E+00	9.15E-04	1.83E-03		
U-238	-3.8857E-08	71.971	0.000	2.89E-03	2.88E-03	2.89E-03		
Y-90	1.2744E+00	71.971	143.941	0.00E+00	9.17E+01	1.83E+02		
Other Radionuclides					1.10E+02	2.19E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.21E+00	2.42E+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:	ALUM (1100)	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	52.287	71.971	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		143.941	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	1.00
Bounding:	0.36		

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 (MSU)
 SNF ID #: 873
 Fuel Units & Descr: 48 - ELEMENT
 Heavy Metal Mass: BOL=9.36kg ; EOL=8.29kg
 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"
 0.43

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	1,021.812	2,043.623	0.00E+00	4.24E-06	8.47E-06	0.0150	1.814E+14
Am-241	3.5850E-03	1,021.812	2,043.623	0.00E+00	3.66E+00	7.33E+00	0.0250	3.771E+13
Am-242m	1.2899E-06	1,021.812	2,043.623	0.00E+00	1.32E-03	2.64E-03	0.0375	3.272E+13
Am-243	1.4747E-07	1,021.812	2,043.623	0.00E+00	1.51E-04	3.01E-04	0.0575	3.523E+13
C-14	1.2839E-04	1,021.812	2,043.623	0.00E+00	1.31E-01	2.62E-01	0.0850	2.124E+13
Cl-36	2.8120E-06	1,021.812	2,043.623	0.00E+00	2.87E-03	5.75E-03	0.1250	1.386E+13
Cm-243	1.1038E-07	1,021.812	2,043.623	0.00E+00	1.13E-04	2.26E-04	0.2250	1.827E+13
Cm-244	7.8917E-07	1,021.812	2,043.623	0.00E+00	8.06E-04	1.61E-03	0.3750	7.976E+12
Co-60	9.2647E-02	1,021.812	2,043.623	0.00E+00	9.47E+01	1.89E+02	0.5750	1.322E+14
Cs-134	1.0940E-04	1,021.812	2,043.623	0.00E+00	1.12E-01	2.24E-01	0.8500	1.420E+12
Cs-135	3.2195E-05	1,021.812	2,043.623	0.00E+00	3.29E-02	6.58E-02	1.2500	1.458E+13
Cs-137	1.7368E+00	1,021.812	2,043.623	0.00E+00	1.77E+03	3.55E+03	1.7500	3.696E+10
Eu-154	3.0677E-03	1,021.812	2,043.623	0.00E+00	3.13E+00	6.27E+00	2.2500	7.793E+07
Eu-155	1.7925E-03	1,021.812	2,043.623	0.00E+00	1.83E+00	3.66E+00	2.7500	1.318E+06
Fe-55	3.7444E-03	1,021.812	2,043.623	0.00E+00	3.83E+00	7.65E+00	3.5000	2.740E+03
H-3	3.6180E-03	1,021.812	2,043.623	0.00E+00	3.70E+00	7.39E+00	5.0000	1.066E+03
I-129	7.3684E-07	1,021.812	2,043.623	0.00E+00	7.53E-04	1.51E-03	7.0000	1.203E+02
Kr-85	6.9368E-02	1,021.812	2,043.623	0.00E+00	7.09E+01	1.42E+02	11.0000	1.368E+01
Np-237	1.2662E-06	1,021.812	2,043.623	0.00E+00	1.29E-03	2.59E-03		
Pa-231	9.1654E-09	1,021.812	2,043.623	0.00E+00	9.37E-06	1.87E-05		
Pb-210	1.3728E-13	1,021.812	2,043.623	0.00E+00	1.40E-10	2.81E-10		
Pm-147	1.0702E-02	1,021.812	2,043.623	0.00E+00	1.09E+01	2.19E+01		
Pu-238	8.8692E-04	1,021.812	2,043.623	0.00E+00	9.06E-01	1.81E+00		
Pu-239	5.5263E-03	1,021.812	2,043.623	0.00E+00	5.65E+00	1.13E+01		
Pu-240	2.1233E-03	1,021.812	2,043.623	0.00E+00	2.17E+00	4.34E+00		
Pu-241	3.8962E-02	1,021.812	2,043.623	0.00E+00	3.98E+01	7.96E+01		
Pu-242	2.3128E-07	1,021.812	2,043.623	0.00E+00	2.36E-04	4.73E-04		
Ra-226	4.6752E-13	1,021.812	2,043.623	0.00E+00	4.78E-10	9.55E-10		
Ra-228	2.4827E-10	1,021.812	2,043.623	0.00E+00	2.54E-07	5.07E-07		
Ru-106	9.8526E-08	1,021.812	2,043.623	0.00E+00	1.01E-04	2.01E-04		
Se-79	1.3015E-05	1,021.812	2,043.623	0.00E+00	1.33E-02	2.66E-02		
Sn-126	1.2165E-05	1,021.812	2,043.623	0.00E+00	1.24E-02	2.49E-02		
Sr-90	1.6195E+00	1,021.812	2,043.623	0.00E+00	1.65E+03	3.31E+03		
Tc-99	4.4241E-04	1,021.812	2,043.623	0.00E+00	4.52E-01	9.04E-01		
Th-229	4.2451E-10	1,021.812	2,043.623	0.00E+00	4.34E-07	8.68E-07		
Th-230	6.1398E-11	1,021.812	2,043.623	0.00E+00	6.27E-08	1.25E-07		
Th-232	2.5278E-10	1,021.812	2,043.623	0.00E+00	2.58E-07	5.17E-07		
Ti-208	1.5098E-08	1,021.812	2,043.623	0.00E+00	1.54E-05	3.09E-05		
U-232	4.0662E-08	1,021.812	2,043.623	0.00E+00	4.15E-05	8.31E-05		
U-233	1.2217E-07	1,021.812	2,043.623	0.00E+00	1.25E-04	2.50E-04		
U-234	2.2391E-07	1,021.812	2,043.623	0.00E+00	2.29E-04	4.58E-04		
U-235	-2.6194E-06	1,021.812	0.000	4.05E-03	1.37E-03	4.05E-03		
U-236	1.2695E-05	1,021.812	2,043.623	0.00E+00	1.30E-02	2.59E-02		
U-238	-3.6331E-08	1,021.812	0.000	2.52E-03	2.48E-03	2.52E-03		
Y-90	1.6195E+00	1,021.812	2,043.623	0.00E+00	1.65E+03	3.31E+03		
Other Radionuclides					1.76E+03	3.52E+03		

Thermal Power
 Nominal Heat Output (Watts): 2.17E+01
 Bounding Heat Output (Watts): 4.34E+01
 Total

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:	SST (304)	SST
BOL HM Constituents:	U-ZrHX	U
BOL Enrichment %:	20	10 to 20

Burnup Summary (MWd) ²		Basis for burnup used in estimate:
Nominal:	1,021.812	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	2,043.623	Bounding burnup assumed to be twice nominal burnup.

Checks		Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier: 3.20	1.00
Bounding:	Burnup Multiplier: 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 (REED COLLEGE)
 SNF ID #: 775
 Fuel Units & Desc: 9 - ELEMENT
 Heavy Metal Mass: BOL=1.72kg ; EOL=1.71kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2026
 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"
 0.12

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	12.887	25.774	0.00E+00	1.10E-08	2.20E-08	Avg. MeV	
Am-241	1.8331E-03	12.887	25.774	0.00E+00	2.36E-02	4.72E-02	0.0150	4.166E+12
Am-242m	1.4129E-06	12.887	25.774	0.00E+00	1.82E-05	3.64E-05	0.0250	9.166E+11
Am-243	1.4774E-07	12.887	25.774	0.00E+00	1.90E-06	3.81E-06	0.0375	7.806E+11
C-14	1.2871E-04	12.887	25.774	0.00E+00	1.66E-03	3.32E-03	0.0575	8.012E+11
Ci-36	2.8120E-06	12.887	25.774	0.00E+00	3.62E-05	7.25E-05	0.0850	4.964E+11
Cm-243	1.7940E-07	12.887	25.774	0.00E+00	2.31E-06	4.62E-06	0.1250	3.604E+11
Cm-244	1.6962E-06	12.887	25.774	0.00E+00	2.19E-05	4.37E-05	0.2250	4.211E+11
Co-60	1.2839E+00	12.887	25.774	0.00E+00	1.65E+01	3.31E+01	0.3750	2.137E+11
Cs-134	9.0541E-02	12.887	25.774	0.00E+00	1.17E+00	2.33E+00	0.5750	2.841E+12
Cs-135	3.2195E-05	12.887	25.774	0.00E+00	4.15E-04	8.30E-04	0.8500	1.219E+11
Cs-137	2.7564E+00	12.887	25.774	0.00E+00	3.55E+01	7.10E+01	1.2500	2.476E+12
Eu-154	1.5368E-02	12.887	25.774	0.00E+00	1.98E-01	3.96E-01	1.7500	1.651E+09
Eu-155	2.9293E-02	12.887	25.774	0.00E+00	3.78E-01	7.55E-01	2.2500	2.661E+09
Fe-55	7.7158E-01	12.887	25.774	0.00E+00	9.94E+00	1.99E+01	2.7500	2.111E+07
H-3	1.1111E-02	12.887	25.774	0.00E+00	1.43E-01	2.86E-01	3.5000	2.458E+06
I-129	7.3684E-07	12.887	25.774	0.00E+00	9.50E-06	1.90E-05	5.0000	1.457E+01
Kr-85	2.5263E-01	12.887	25.774	0.00E+00	3.26E+00	6.51E+00	7.0000	1.651E+00
Np-237	1.2427E-06	12.887	25.774	0.00E+00	1.60E-05	3.20E-05	11.0000	1.882E-01
Pa-231	3.8511E-09	12.887	25.774	0.00E+00	4.96E-08	9.93E-08		
Pb-210	7.3880E-15	12.887	25.774	0.00E+00	9.52E-14	1.90E-13		
Pm-147	2.1023E+00	12.887	25.774	0.00E+00	2.71E+01	5.42E+01		
Pu-238	1.0383E-03	12.887	25.774	0.00E+00	1.34E-02	2.68E-02		
Pu-239	5.5293E-03	12.887	25.774	0.00E+00	7.13E-02	1.43E-01		
Pu-240	2.1278E-03	12.887	25.774	0.00E+00	2.74E-02	5.48E-02		
Pu-241	1.0195E-01	12.887	25.774	0.00E+00	1.31E+00	2.63E+00		
Pu-242	2.3128E-07	12.887	25.774	0.00E+00	2.98E-06	5.96E-06		
Ra-226	5.2782E-14	12.887	25.774	0.00E+00	6.80E-13	1.36E-12		
Ra-228	1.9338E-10	12.887	25.774	0.00E+00	2.49E-09	4.98E-09		
Ru-106	9.1684E-02	12.887	25.774	0.00E+00	1.18E+00	2.36E+00		
Se-79	1.3018E-05	12.887	25.774	0.00E+00	1.68E-04	3.36E-04		
Sn-126	1.2167E-05	12.887	25.774	0.00E+00	1.57E-04	3.14E-04		
Sr-90	2.6045E+00	12.887	25.774	0.00E+00	3.36E+01	6.71E+01		
Tc-99	4.4241E-04	12.887	25.774	0.00E+00	5.70E-03	1.14E-02		
Th-229	1.3713E-10	12.887	25.774	0.00E+00	1.77E-09	3.53E-09		
Th-230	1.8090E-11	12.887	25.774	0.00E+00	2.33E-10	4.66E-10		
Th-232	2.5278E-10	12.887	25.774	0.00E+00	3.26E-09	6.52E-09		
Ti-208	1.6947E-08	12.887	25.774	0.00E+00	2.18E-07	4.37E-07		
U-232	4.8737E-08	12.887	25.774	0.00E+00	6.28E-07	1.26E-06		
U-233	1.2203E-07	12.887	25.774	0.00E+00	1.57E-06	3.15E-06		
U-234	1.5925E-07	12.887	25.774	0.00E+00	2.05E-06	4.10E-06		
U-235	-2.6194E-06	12.887	0.000	7.49E-04	7.15E-04	7.49E-04		
U-236	1.2693E-05	12.887	25.774	0.00E+00	1.64E-04	3.27E-04		
U-238	-3.6331E-08	12.887	0.000	4.61E-04	4.61E-04	4.61E-04		
Y-90	2.6060E+00	12.887	25.774	0.00E+00	3.38E+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			Basis for Parameter Differences:
	From SFD	Used	
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 enrichment (very close to 20%)
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U-ZrHx	U	
BOL Enrichment %:	20.15706806	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		12.887	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup. ²
Bounding:		25.774	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.22		
Bounding:	0.44		

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 (ROMANIA) 1Fuel decay start date: 2010
 SNF ID #: 1078 Estimates as of: 2010
 Fuel Units & Descr: 498 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=124.50kg ; EOL=121.46kg 2Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 4.49

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	2,899.906	5,799.812	0.00E+00	2.47E-06	4.94E-06	0.0150	9.374E+14
Am-241	1.8331E-03	2,899.906	5,799.812	0.00E+00	5.32E+00	1.06E+01	0.0250	2.063E+14
Am-242m	1.4129E-06	2,899.906	5,799.812	0.00E+00	4.10E-03	8.19E-03	0.0375	1.757E+14
Am-243	1.4774E-07	2,899.906	5,799.812	0.00E+00	4.28E-04	8.57E-04	0.0575	1.803E+14
C-14	1.2871E-04	2,899.906	5,799.812	0.00E+00	3.73E-01	7.46E-01	0.0850	1.117E+14
Cl-36	2.8120E-06	2,899.906	5,799.812	0.00E+00	8.15E-03	1.63E-02	0.1250	8.111E+13
Cm-243	1.7940E-07	2,899.906	5,799.812	0.00E+00	5.20E-04	1.04E-03	0.2250	9.475E+13
Cm-244	1.6962E-06	2,899.906	5,799.812	0.00E+00	4.92E-03	9.84E-03	0.3750	4.808E+13
Co-60	1.2839E+00	2,899.906	5,799.812	0.00E+00	3.72E+03	7.45E+03	0.5750	6.393E+14
Cs-134	9.0541E-02	2,899.906	5,799.812	0.00E+00	2.63E+02	5.25E+02	0.8500	2.743E+13
Cs-135	3.2195E-05	2,899.906	5,799.812	0.00E+00	9.34E-02	1.87E-01	1.2500	5.572E+14
Cs-137	2.7564E+00	2,899.906	5,799.812	0.00E+00	7.99E+03	1.60E+04	7.0000	3.529E+02
Eu-154	1.5368E-02	2,899.906	5,799.812	0.00E+00	4.46E+01	8.91E+01	11.0000	4.020E+01
Eu-155	2.9293E-02	2,899.906	5,799.812	0.00E+00	8.49E+01	1.70E+02		
Fe-55	7.7158E-01	2,899.906	5,799.812	0.00E+00	2.24E+03	4.48E+03		
H-3	1.1111E-02	2,899.906	5,799.812	0.00E+00	3.22E+01	6.44E+01		
I-129	7.3684E-07	2,899.906	5,799.812	0.00E+00	2.14E-03	4.27E-03		
Kr-85	2.5263E-01	2,899.906	5,799.812	0.00E+00	7.33E+02	1.47E+03		
Np-237	1.2427E-06	2,899.906	5,799.812	0.00E+00	3.60E-03	7.21E-03		
Pa-231	3.8511E-09	2,899.906	5,799.812	0.00E+00	1.12E-05	2.23E-05		
Pb-210	7.3880E-15	2,899.906	5,799.812	0.00E+00	2.14E-11	4.28E-11		
Pm-147	2.1023E+00	2,899.906	5,799.812	0.00E+00	6.10E+03	1.22E+04		
Pu-238	1.0383E-03	2,899.906	5,799.812	0.00E+00	3.01E+00	6.02E+00		
Pu-239	5.5293E-03	2,899.906	5,799.812	0.00E+00	1.60E+01	3.21E+01		
Pu-240	2.1278E-03	2,899.906	5,799.812	0.00E+00	6.17E+00	1.23E+01		
Pu-241	1.0195E-01	2,899.906	5,799.812	0.00E+00	2.96E+02	5.91E+02		
Pu-242	2.3128E-07	2,899.906	5,799.812	0.00E+00	6.71E-04	1.34E-03		
Ra-226	5.2782E-14	2,899.906	5,799.812	0.00E+00	1.53E-10	3.06E-10		
Ra-228	1.9338E-10	2,899.906	5,799.812	0.00E+00	5.61E-07	1.12E-06		
Ru-106	9.1684E-02	2,899.906	5,799.812	0.00E+00	2.66E+02	5.32E+02		
Se-79	1.3018E-05	2,899.906	5,799.812	0.00E+00	3.78E-02	7.55E-02		
Sn-126	1.2167E-05	2,899.906	5,799.812	0.00E+00	3.53E-02	7.06E-02		
Sr-90	2.6045E+00	2,899.906	5,799.812	0.00E+00	7.55E+03	1.51E+04		
Tc-99	4.4241E-04	2,899.906	5,799.812	0.00E+00	1.28E+00	2.57E+00		
Th-229	1.3713E-10	2,899.906	5,799.812	0.00E+00	3.98E-07	7.95E-07		
Th-230	1.8090E-11	2,899.906	5,799.812	0.00E+00	5.25E-08	1.05E-07		
Th-232	2.5278E-10	2,899.906	5,799.812	0.00E+00	7.33E-07	1.47E-06		
Th-208	1.6947E-08	2,899.906	5,799.812	0.00E+00	4.91E-05	9.83E-05		
U-232	4.8737E-08	2,899.906	5,799.812	0.00E+00	1.41E-04	2.83E-04		
U-233	1.2203E-07	2,899.906	5,799.812	0.00E+00	3.54E-04	7.08E-04		
U-234	1.5925E-07	2,899.906	5,799.812	0.00E+00	4.62E-04	9.24E-04		
U-235	-2.6194E-06	2,899.906	0.000	5.35E-02	4.59E-02	5.35E-02		
U-236	1.2693E-05	2,899.906	5,799.812	0.00E+00	3.68E-02	7.36E-02		
U-238	-3.6331E-08	2,899.906	0.000	3.35E-02	3.34E-02	3.35E-02		
Y-90	2.6060E+00	2,899.906	5,799.812	0.00E+00	7.56E+03	1.51E+04		
Other Radionuclides					1.05E+04	2.09E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.69E+02	3.38E+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 / SST (304)	
BOL HM Constituents:	U-ZrHX / U	
BOL Enrichment %:	19.9 / 10 to 20	

Burnup Summary (MWd) ²		Basis for burnup used in estimate:
Nominal:	From SFD / Estimated	
Bounding:	1,213.377 / 2,899.906	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
	5,799.812	

Checks		Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier / Estimated Burnup/ Given Burnup	
Bounding:	0.68 / 2.39	1.00
	1.37	

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: TRIGA STD (SLOVENIA)
 SNF ID #: 1079
 Fuel Units & Descr: 149 - ELEMENT
 Heavy Metal Mass: BOL=28.58kg ; EOL=27.45kg
 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"
 1.34

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	1,080.997	2,161.995	0.00E+00	9.21E-07	1.84E-06	0.0150	3.494E+14
Am-241	1.8331E-03	1,080.997	2,161.995	0.00E+00	1.98E+00	3.96E+00	0.0250	7.689E+13
Am-242m	1.4129E-06	1,080.997	2,161.995	0.00E+00	1.53E-03	3.05E-03	0.0375	6.548E+13
Am-243	1.4774E-07	1,080.997	2,161.995	0.00E+00	1.60E-04	3.19E-04	0.0575	6.721E+13
C-14	1.2871E-04	1,080.997	2,161.995	0.00E+00	1.39E-01	2.78E-01	0.0850	4.164E+13
Ci-36	2.8120E-06	1,080.997	2,161.995	0.00E+00	3.04E-03	6.08E-03	0.1250	3.023E+13
Cm-243	1.7940E-07	1,080.997	2,161.995	0.00E+00	1.94E-04	3.88E-04	0.2250	3.532E+13
Cm-244	1.6962E-06	1,080.997	2,161.995	0.00E+00	1.83E-03	3.67E-03	0.3750	1.792E+13
Co-60	1.2839E+00	1,080.997	2,161.995	0.00E+00	1.39E+03	2.78E+03	0.5750	2.383E+14
Cs-134	9.0541E-02	1,080.997	2,161.995	0.00E+00	9.79E+01	1.96E+02	0.8500	1.023E+13
Cs-135	3.2195E-05	1,080.997	2,161.995	0.00E+00	3.48E-02	6.96E-02	1.2500	2.077E+14
Cs-137	2.7564E+00	1,080.997	2,161.995	0.00E+00	2.98E+03	5.96E+03	1.7500	1.385E+11
Eu-154	1.5368E-02	1,080.997	2,161.995	0.00E+00	1.66E+01	3.32E+01	2.2500	2.232E+11
Eu-155	2.9293E-02	1,080.997	2,161.995	0.00E+00	3.17E+01	6.33E+01	2.7500	1.771E+09
Fe-55	7.7158E-01	1,080.997	2,161.995	0.00E+00	8.34E+02	1.67E+03	3.5000	2.062E+08
H-3	1.1111E-02	1,080.997	2,161.995	0.00E+00	1.20E+01	2.40E+01	5.0000	1.151E+03
I-129	7.3684E-07	1,080.997	2,161.995	0.00E+00	7.97E-04	1.59E-03	7.0000	1.303E+02
Kr-85	2.5263E-01	1,080.997	2,161.995	0.00E+00	2.73E+02	5.46E+02	11.0000	1.484E+01
Np-237	1.2427E-06	1,080.997	2,161.995	0.00E+00	1.34E-03	2.69E-03		
Pa-231	3.8511E-09	1,080.997	2,161.995	0.00E+00	4.16E-06	8.33E-06		
Pb-210	7.3880E-15	1,080.997	2,161.995	0.00E+00	7.99E-12	1.60E-11		
Pm-147	2.1023E+00	1,080.997	2,161.995	0.00E+00	2.27E+03	4.55E+03		
Pu-238	1.0383E-03	1,080.997	2,161.995	0.00E+00	1.12E+00	2.24E+00		
Pu-239	5.5293E-03	1,080.997	2,161.995	0.00E+00	5.98E+00	1.20E+01		
Pu-240	2.1278E-03	1,080.997	2,161.995	0.00E+00	2.30E+00	4.60E+00		
Pu-241	1.0195E-01	1,080.997	2,161.995	0.00E+00	1.10E+02	2.20E+02		
Pu-242	2.3128E-07	1,080.997	2,161.995	0.00E+00	2.50E-04	5.00E-04		
Ra-226	5.2782E-14	1,080.997	2,161.995	0.00E+00	5.71E-11	1.14E-10		
Ra-228	1.9338E-10	1,080.997	2,161.995	0.00E+00	2.09E-07	4.18E-07		
Ru-106	9.1684E-02	1,080.997	2,161.995	0.00E+00	9.91E+01	1.98E+02		
Se-79	1.3018E-05	1,080.997	2,161.995	0.00E+00	1.41E-02	2.81E-02		
Sn-126	1.2167E-05	1,080.997	2,161.995	0.00E+00	1.32E-02	2.63E-02		
Sr-90	2.6045E+00	1,080.997	2,161.995	0.00E+00	2.82E+03	5.63E+03		
Tc-99	4.4241E-04	1,080.997	2,161.995	0.00E+00	4.78E-01	9.56E-01		
Th-229	1.3713E-10	1,080.997	2,161.995	0.00E+00	1.48E-07	2.96E-07		
Th-230	1.8090E-11	1,080.997	2,161.995	0.00E+00	1.96E-08	3.91E-08		
Th-232	2.5278E-10	1,080.997	2,161.995	0.00E+00	2.73E-07	5.47E-07		
Tl-208	1.6947E-08	1,080.997	2,161.995	0.00E+00	1.83E-05	3.66E-05		
U-232	4.8737E-08	1,080.997	2,161.995	0.00E+00	5.27E-05	1.05E-04		
U-233	1.2203E-07	1,080.997	2,161.995	0.00E+00	1.32E-04	2.64E-04		
U-234	1.5925E-07	1,080.997	2,161.995	0.00E+00	1.72E-04	3.44E-04		
U-235	-2.6194E-06	1,080.997	0.000	1.23E-02	9.45E-03	1.23E-02		
U-236	1.2693E-05	1,080.997	2,161.995	0.00E+00	1.37E-02	2.74E-02		
U-238	-3.6331E-08	1,080.997	0.000	7.70E-03	7.66E-03	7.70E-03		
Y-90	2.6060E+00	1,080.997	2,161.995	0.00E+00	2.82E+03	5.63E+03		
Other Radionuclides					3.90E+03	7.79E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.29E+01	1.26E+02
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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.8857762	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		1,080.997	
Bounding:		2,161.995	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.11		
Bounding:	2.22		

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: TRIGA STD (SLOVENIA)
 SNF ID #: 488
 Fuel Units & Descr: 122 - ELEMENT
 Heavy Metal Mass: BOL=23.40kg ; EOL=22.59kg
 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 _n	x _b	b	y _n	y _b	Gamma Sources	
							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	768.650	1,537.300	0.00E+00	6.55E-07	1.31E-06	0.0150	2.485E+14
Am-241	1.8331E-03	768.650	1,537.300	0.00E+00	1.41E+00	2.82E+00	0.0250	5.467E+13
Am-242m	1.4129E-06	768.650	1,537.300	0.00E+00	1.09E-03	2.17E-03	0.0375	4.656E+13
Am-243	1.4774E-07	768.650	1,537.300	0.00E+00	1.14E-04	2.27E-04	0.0575	4.779E+13
C-14	1.2871E-04	768.650	1,537.300	0.00E+00	9.89E-02	1.98E-01	0.0850	2.961E+13
Cl-36	2.8120E-06	768.650	1,537.300	0.00E+00	2.16E-03	4.32E-03	0.1250	2.150E+13
Cm-243	1.7940E-07	768.650	1,537.300	0.00E+00	1.38E-04	2.76E-04	0.2250	2.512E+13
Cm-244	1.6962E-06	768.650	1,537.300	0.00E+00	1.30E-03	2.61E-03	0.3750	1.274E+13
Co-60	1.2839E+00	768.650	1,537.300	0.00E+00	9.87E+02	1.97E+03	0.5750	1.694E+14
Cs-134	9.0541E-02	768.650	1,537.300	0.00E+00	6.96E+01	1.39E+02	0.8500	7.271E+12
Cs-135	3.2195E-05	768.650	1,537.300	0.00E+00	2.47E-02	4.95E-02	1.2500	1.477E+14
Cs-137	2.7564E+00	768.650	1,537.300	0.00E+00	2.12E+03	4.24E+03	11.0000	1.058E+01
Eu-154	1.5368E-02	768.650	1,537.300	0.00E+00	1.18E+01	2.36E+01	2.2500	1.587E+11
Eu-155	2.9293E-02	768.650	1,537.300	0.00E+00	2.25E+01	4.50E+01	2.7500	1.259E+09
Fe-55	7.7158E-01	768.650	1,537.300	0.00E+00	5.93E+02	1.19E+03	3.5000	1.466E+08
H-3	1.1111E-02	768.650	1,537.300	0.00E+00	8.54E+00	1.71E+01	5.0000	8.201E+02
I-129	7.3684E-07	768.650	1,537.300	0.00E+00	5.66E-04	1.13E-03	7.0000	9.284E+01
Kr-85	2.5263E-01	768.650	1,537.300	0.00E+00	1.94E+02	3.88E+02		
Np-237	1.2427E-06	768.650	1,537.300	0.00E+00	9.55E-04	1.91E-03		
Pa-231	3.8511E-09	768.650	1,537.300	0.00E+00	2.96E-06	5.92E-06		
Pb-210	7.3880E-15	768.650	1,537.300	0.00E+00	5.68E-12	1.14E-11		
Pm-147	2.1023E+00	768.650	1,537.300	0.00E+00	1.62E+03	3.23E+03		
Pu-238	1.0383E-03	768.650	1,537.300	0.00E+00	7.98E-01	1.60E+00		
Pu-239	5.5293E-03	768.650	1,537.300	0.00E+00	4.25E+00	8.50E+00		
Pu-240	2.1278E-03	768.650	1,537.300	0.00E+00	1.64E+00	3.27E+00		
Pu-241	1.0195E-01	768.650	1,537.300	0.00E+00	7.84E+01	1.57E+02		
Pu-242	2.3128E-07	768.650	1,537.300	0.00E+00	1.78E-04	3.56E-04		
Ra-226	5.2782E-14	768.650	1,537.300	0.00E+00	4.06E-11	8.11E-11		
Ra-228	1.9338E-10	768.650	1,537.300	0.00E+00	1.49E-07	2.97E-07		
Ru-106	9.1684E-02	768.650	1,537.300	0.00E+00	7.05E+01	1.41E+02		
Se-79	1.3018E-05	768.650	1,537.300	0.00E+00	1.00E-02	2.00E-02		
Sn-126	1.2167E-05	768.650	1,537.300	0.00E+00	9.35E-03	1.87E-02		
Sr-90	2.6045E+00	768.650	1,537.300	0.00E+00	2.00E+03	4.00E+03		
Tc-99	4.4241E-04	768.650	1,537.300	0.00E+00	3.40E-01	6.80E-01		
Th-229	1.3713E-10	768.650	1,537.300	0.00E+00	1.05E-07	2.11E-07		
Th-230	1.8090E-11	768.650	1,537.300	0.00E+00	1.39E-08	2.78E-08		
Th-232	2.5278E-10	768.650	1,537.300	0.00E+00	1.94E-07	3.89E-07		
Tl-208	1.6947E-08	768.650	1,537.300	0.00E+00	1.30E-05	2.61E-05		
U-232	4.8737E-08	768.650	1,537.300	0.00E+00	3.75E-05	7.49E-05		
U-233	1.2203E-07	768.650	1,537.300	0.00E+00	9.38E-05	1.88E-04		
U-234	1.5925E-07	768.650	1,537.300	0.00E+00	1.22E-04	2.45E-04		
U-235	-2.6194E-06	768.650	0.000	1.01E-02	8.04E-03	1.01E-02		
U-236	1.2693E-05	768.650	1,537.300	0.00E+00	9.76E-03	1.95E-02		
U-238	-3.6331E-08	768.650	0.000	6.30E-03	6.27E-03	6.30E-03		
Y-90	2.6060E+00	768.650	1,537.300	0.00E+00	2.00E+03	4.01E+03		
Other Radionuclides					2.77E+03	5.54E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.47E+01	8.95E+01
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 (304)	SST	
BOL Enrichment %:	U-ZrHX	U	
	19.8857762	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		768.650	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,537.300	Bounding burnup assumed to be twice nominal burnup.

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

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 (SLOVENIA)
 SNF ID #: 468
 Fuel Units & Descr: 67 - ELEMENT
 Heavy Metal Mass: BOL=11.88kg ; EOL=11.53kg
 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	
							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	1.2892E-09	405.208	810.416	0.00E+00	5.22E-07	1.04E-06	0.0150	1.090E+14
Am-241	2.9429E-03	405.208	810.416	0.00E+00	1.19E+00	2.38E+00	0.0250	2.279E+13
Am-242m	1.9489E-06	405.208	810.416	0.00E+00	7.90E-04	1.58E-03	0.0375	2.691E+13
Am-243	2.3308E-05	405.208	810.416	0.00E+00	9.44E-05	1.89E-04	0.0575	2.225E+13
C-14	4.3278E-07	405.208	810.416	0.00E+00	1.75E-02	3.51E-02	0.0850	1.446E+13
Cl-36	4.3023E-08	405.208	810.416	0.00E+00	1.74E-05	3.49E-05	0.1250	2.002E+13
Cm-243	2.4286E-07	405.208	810.416	0.00E+00	9.84E-05	1.97E-04	0.2250	1.270E+13
Cm-244	2.6015E-06	405.208	810.416	0.00E+00	1.05E-03	2.11E-03	0.3750	5.225E+12
Co-60	1.6075E-02	405.208	810.416	0.00E+00	6.51E+00	1.30E+01	0.5750	7.784E+13
Cs-134	1.9323E-02	405.208	810.416	0.00E+00	7.83E+00	1.57E+01	0.8500	1.418E+13
Cs-135	3.1549E-05	405.208	810.416	0.00E+00	1.28E-02	2.56E-02	1.2500	1.559E+13
Cs-137	2.4556E+00	405.208	810.416	0.00E+00	9.95E+02	1.99E+03	1.7500	4.471E+11
Eu-154	9.0180E-01	405.208	810.416	0.00E+00	3.65E+02	7.31E+02	2.2500	1.064E+09
Eu-155	2.1820E-01	405.208	810.416	0.00E+00	8.84E+01	1.77E+02	2.7500	2.086E+07
Fe-55	2.2902E-03	405.208	810.416	0.00E+00	9.28E-01	1.86E+00	3.5000	2.545E+06
H-3	8.1609E-03	405.208	810.416	0.00E+00	3.31E+00	6.61E+00	5.0000	4.665E+02
I-129	7.3805E-07	405.208	810.416	0.00E+00	2.99E-04	5.98E-04	7.0000	5.274E+01
Kr-85	1.8256E-01	405.208	810.416	0.00E+00	7.40E+01	1.48E+02	11.0000	6.004E+00
Np-237	1.4505E-06	405.208	810.416	0.00E+00	5.88E-04	1.18E-03		
Pa-231	4.5564E-09	405.208	810.416	0.00E+00	1.85E-06	3.69E-06		
Pb-210	1.8842E-14	405.208	810.416	0.00E+00	7.63E-12	1.53E-11		
Pm-147	5.5459E-01	405.208	810.416	0.00E+00	2.25E+02	4.49E+02		
Pu-238	1.2992E-03	405.208	810.416	0.00E+00	5.26E-01	1.05E+00		
Pu-239	5.6932E-03	405.208	810.416	0.00E+00	2.31E+00	4.61E+00		
Pu-240	2.2632E-03	405.208	810.416	0.00E+00	9.17E-01	1.83E+00		
Pu-241	9.8857E-02	405.208	810.416	0.00E+00	4.01E+01	8.01E+01		
Pu-242	3.0602E-07	405.208	810.416	0.00E+00	1.24E-04	2.48E-04		
Ra-226	1.0823E-13	405.208	810.416	0.00E+00	4.39E-11	8.77E-11		
Ra-228	2.0406E-10	405.208	810.416	0.00E+00	8.27E-08	1.65E-07		
Ru-106	3.0180E-03	405.208	810.416	0.00E+00	1.22E+00	2.45E+00		
Se-79	1.2937E-05	405.208	810.416	0.00E+00	5.24E-03	1.05E-02		
Sn-126	1.2238E-05	405.208	810.416	0.00E+00	4.96E-03	9.92E-03		
Sr-90	2.3098E+00	405.208	810.416	0.00E+00	9.36E+02	1.87E+03		
Tc-99	4.4120E-04	405.208	810.416	0.00E+00	1.79E-01	3.58E-01		
Th-229	2.0932E-10	405.208	810.416	0.00E+00	8.48E-08	1.70E-07		
Th-230	2.7744E-11	405.208	810.416	0.00E+00	1.12E-08	2.25E-08		
Th-232	2.3744E-10	405.208	810.416	0.00E+00	9.62E-08	1.92E-07		
Tl-208	1.9459E-08	405.208	810.416	0.00E+00	7.88E-06	1.58E-05		
U-232	5.3850E-08	405.208	810.416	0.00E+00	2.18E-05	4.36E-05		
U-233	1.3135E-07	405.208	810.416	0.00E+00	5.32E-05	1.06E-04		
U-234	1.9143E-07	405.208	810.416	0.00E+00	7.76E-05	1.55E-04		
U-235	2.6159E-06	405.208	0.000	5.14E-03	4.08E-03	5.14E-03		
U-236	1.2719E-05	405.208	810.416	0.00E+00	5.15E-03	1.03E-02		
U-238	3.8857E-08	405.208	0.000	3.19E-03	3.18E-03	3.19E-03		
Y-90	2.3098E+00	405.208	810.416	0.00E+00	9.36E+02	1.87E+03		
Other Radionuclides					1.07E+03	2.14E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.50E+01	3.01E+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:	ALUM (1100)	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20.00337313	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	405.208	332.554	
Bounding:		810.416	

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:	0.92	0.82		0.99
Bounding:	1.85			

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 (SO, KOREA) ¹Fuel decay start date: 1972
 SNF ID #: 483 Estimates as of: 2010
 Fuel Units & Descr: 69 - ELEMENT Template: TRIGA-AI (LW/U-Zrx, Alum., 10 to 20%, U)
 Heavy Metal Mass: BOL=13.11kg : EOL=12.96kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL 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	383.310	766.620	0.00E+00	2.36E-06	4.72E-06	0.0150	5.407E+13
Am-241	4.8165E-03	383.310	766.620	0.00E+00	1.85E+00	3.69E+00	0.0250	1.119E+13
Am-242m	1.7383E-07	383.310	766.620	0.00E+00	6.66E-04	1.33E-03	0.0375	1.058E+13
Am-243	2.3263E-06	383.310	766.620	0.00E+00	8.92E-05	1.78E-04	0.0575	1.064E+13
C-14	4.3158E-05	383.310	766.620	0.00E+00	1.65E-02	3.31E-02	0.0850	6.350E+12
Ci-36	4.3023E-08	383.310	766.620	0.00E+00	1.65E-05	3.30E-05	0.1250	5.485E+12
Cm-243	1.3229E-07	383.310	766.620	0.00E+00	5.07E-05	1.01E-04	0.2250	5.673E+12
Cm-244	1.0000E-06	383.310	766.620	0.00E+00	3.83E-04	7.67E-04	0.3750	2.408E+12
Co-60	6.0120E-04	383.310	766.620	0.00E+00	2.30E-01	4.61E-01	0.5750	3.966E+13
Cs-134	4.3534E-06	383.310	766.620	0.00E+00	1.67E-03	3.34E-03	0.8500	2.024E+12
Cs-135	3.1549E-05	383.310	766.620	0.00E+00	1.21E-02	2.42E-02	1.2500	1.986E+12
Cs-137	1.3788E+00	383.310	766.620	0.00E+00	5.29E+02	1.06E+03	1.7500	6.389E+10
Eu-154	1.2041E-01	383.310	766.620	0.00E+00	4.62E+01	9.23E+01	2.2500	1.260E+06
Eu-155	6.6451E-03	383.310	766.620	0.00E+00	2.55E+00	5.09E+00	2.7500	4.263E+05
Fe-55	2.9338E-06	383.310	766.620	0.00E+00	1.12E-03	2.25E-03	3.5000	1.034E+03
H-3	2.0075E-03	383.310	766.620	0.00E+00	7.70E-01	1.54E+00	5.0000	4.349E+02
I-129	7.3805E-07	383.310	766.620	0.00E+00	2.83E-04	5.66E-04	7.0000	4.904E+01
Kr-85	3.6301E-02	383.310	766.620	0.00E+00	1.39E+01	2.78E+01	11.0000	5.574E+00
Np-237	1.4977E-06	383.310	766.620	0.00E+00	5.74E-04	1.15E-03		
Pa-231	1.1275E-08	383.310	766.620	0.00E+00	4.32E-06	8.64E-06		
Pb-210	3.8932E-13	383.310	766.620	0.00E+00	1.49E-10	2.98E-10		
Pm-147	7.5383E-04	383.310	766.620	0.00E+00	2.89E-01	5.78E-01		
Pu-238	1.0688E-03	383.310	766.620	0.00E+00	4.09E-01	8.18E-01		
Pu-239	5.6902E-03	383.310	766.620	0.00E+00	2.18E+00	4.36E+00		
Pu-240	2.2571E-03	383.310	766.620	0.00E+00	8.65E-01	1.73E+00		
Pu-241	2.9699E-02	383.310	766.620	0.00E+00	1.14E+01	2.28E+01		
Pu-242	3.0602E-07	383.310	766.620	0.00E+00	1.17E-04	2.35E-04		
Ra-226	1.0704E-12	383.310	766.620	0.00E+00	4.10E-10	8.21E-10		
Ra-228	2.3654E-10	383.310	766.620	0.00E+00	9.07E-08	1.81E-07		
Ru-106	1.0444E-10	383.310	766.620	0.00E+00	4.00E-08	8.01E-08		
Se-79	1.2934E-05	383.310	766.620	0.00E+00	4.96E-03	9.92E-03		
Sn-126	1.2236E-05	383.310	766.620	0.00E+00	4.69E-03	9.38E-03		
Sr-90	1.2740E+00	383.310	766.620	0.00E+00	4.88E+02	9.77E+02		
Tc-99	4.4120E-04	383.310	766.620	0.00E+00	1.69E-01	3.38E-01		
Th-229	6.4226E-10	383.310	766.620	0.00E+00	2.46E-07	4.92E-07		
Th-230	1.0594E-10	383.310	766.620	0.00E+00	4.06E-08	8.12E-08		
Th-232	2.3744E-10	383.310	766.620	0.00E+00	9.10E-08	1.82E-07		
Ti-208	1.5774E-08	383.310	766.620	0.00E+00	6.05E-06	1.21E-05		
U-232	4.2511E-08	383.310	766.620	0.00E+00	1.63E-05	3.26E-05		
U-233	1.3155E-07	383.310	766.620	0.00E+00	5.04E-05	1.01E-04		
U-234	3.0030E-07	383.310	766.620	0.00E+00	1.15E-04	2.30E-04		
U-235	-2.6144E-06	383.310	0.000	5.67E-03	4.66E-03	5.67E-03		
U-236	1.2720E-05	383.310	766.620	0.00E+00	4.88E-03	9.75E-03		
U-238	-3.8857E-08	383.310	0.000	3.53E-03	3.51E-03	3.53E-03		
Y-90	1.2744E+00	383.310	766.620	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

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 (1100)	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	383.310	144.896	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.
Bounding:		766.620	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.79	0.38	0.98
Bounding:	1.58		

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 (SO, KOREA)	¹ Fuel decay start date: 1996
SNF ID #: 494	Estimates as of: 2010
Fuel Units & Descr: 104 - ELEMENT	Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
Heavy Metal Mass: BOL=19.76kg ; EOL=19.26kg	² Template Burnup(MWd): 6.65
ROD Storage Site: INEEL	Template BOL Heavy Metal Mass (MT): 0.000195
	Template Decay Time: 10 years

Estimated
Canister usage:
18"x10"
0.94

Radionuclide	m		x _n		x _b		b		y _n		y _b		Gamma Sources	
	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	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	1.3731E-09	476.540	476.540	953.080	0.00E+00	6.54E-07	1.31E-06			0.0150	1.231E+14			
Am-241	2.3865E-03	476.540	476.540	953.080	0.00E+00	1.14E+00	2.27E+00			0.0250	2.608E+13			
Am-242m	1.3812E-06	476.540	476.540	953.080	0.00E+00	6.58E-04	1.32E-03			0.0375	2.228E+13			
Am-243	1.4767E-07	476.540	476.540	953.080	0.00E+00	7.04E-05	1.41E-04			0.0575	2.375E+13			
C-14	1.2863E-04	476.540	476.540	953.080	0.00E+00	6.13E-02	1.23E-01			0.0850	1.441E+13			
Cl-36	2.8120E-06	476.540	476.540	953.080	0.00E+00	1.34E-03	2.68E-03			0.1250	9.470E+12			
Cm-243	1.5895E-07	476.540	476.540	953.080	0.00E+00	7.57E-05	1.51E-04			0.2250	1.229E+13			
Cm-244	1.4008E-06	476.540	476.540	953.080	0.00E+00	6.68E-04	1.34E-03			0.3750	5.643E+12			
Co-60	6.6541E-01	476.540	476.540	953.080	0.00E+00	3.17E+02	6.34E+02			0.5750	8.842E+13			
Cs-134	1.6887E-02	476.540	476.540	953.080	0.00E+00	8.05E+00	1.61E+01			0.8500	1.578E+12			
Cs-135	3.2195E-05	476.540	476.540	953.080	0.00E+00	1.53E-02	3.07E-02			1.2500	4.746E+13			
Cs-137	2.4556E+00	476.540	476.540	953.080	0.00E+00	1.17E+03	2.34E+03			1.7500	2.857E+10			
Eu-154	1.0268E-02	476.540	476.540	953.080	0.00E+00	4.89E+00	9.79E+00			2.2500	1.492E+09			
Eu-155	1.4570E-02	476.540	476.540	953.080	0.00E+00	6.94E+00	1.39E+01			2.7500	2.469E+07			
Fe-55	2.0361E-01	476.540	476.540	953.080	0.00E+00	9.70E+01	1.94E+02			3.5000	2.927E+06			
H-3	8.3940E-03	476.540	476.540	953.080	0.00E+00	4.00E+00	8.00E+00			5.0000	5.096E+02			
I-129	7.3684E-07	476.540	476.540	953.080	0.00E+00	3.51E-04	7.02E-04			7.0000	5.764E+01			
Kr-85	1.8286E-01	476.540	476.540	953.080	0.00E+00	8.71E+01	1.74E+02			11.0000	6.564E+00			
Np-237	1.2462E-06	476.540	476.540	953.080	0.00E+00	5.94E-04	1.19E-03							
Pa-231	4.9143E-09	476.540	476.540	953.080	0.00E+00	2.34E-06	4.68E-06							
Pb-210	1.7173E-14	476.540	476.540	953.080	0.00E+00	8.18E-12	1.64E-11							
Pm-147	5.6165E-01	476.540	476.540	953.080	0.00E+00	2.68E+02	5.35E+02							
Pu-238	9.9820E-04	476.540	476.540	953.080	0.00E+00	4.76E-01	9.51E-01							
Pu-239	5.5293E-03	476.540	476.540	953.080	0.00E+00	2.63E+00	5.27E+00							
Pu-240	2.1263E-03	476.540	476.540	953.080	0.00E+00	1.01E+00	2.03E+00							
Pu-241	8.0165E-02	476.540	476.540	953.080	0.00E+00	3.82E+01	7.64E+01							
Pu-242	2.3128E-07	476.540	476.540	953.080	0.00E+00	1.10E-04	2.20E-04							
Ra-226	9.9774E-14	476.540	476.540	953.080	0.00E+00	4.75E-11	9.51E-11							
Ra-228	2.1729E-10	476.540	476.540	953.080	0.00E+00	1.04E-07	2.07E-07							
Ru-106	2.9519E-03	476.540	476.540	953.080	0.00E+00	1.41E+00	2.81E+00							
Se-79	1.3017E-05	476.540	476.540	953.080	0.00E+00	6.20E-03	1.24E-02							
Sn-126	1.2167E-05	476.540	476.540	953.080	0.00E+00	5.80E-03	1.16E-02							
Sr-90	2.3128E+00	476.540	476.540	953.080	0.00E+00	1.10E+03	2.20E+03							
Tc-99	4.4241E-04	476.540	476.540	953.080	0.00E+00	2.11E-01	4.22E-01							
Th-229	1.9459E-10	476.540	476.540	953.080	0.00E+00	9.27E-08	1.85E-07							
Th-230	2.5564E-11	476.540	476.540	953.080	0.00E+00	1.22E-08	2.44E-08							
Th-232	2.5278E-10	476.540	476.540	953.080	0.00E+00	1.20E-07	2.41E-07							
Ti-208	1.6947E-08	476.540	476.540	953.080	0.00E+00	8.08E-06	1.62E-05							
U-232	4.6812E-08	476.540	476.540	953.080	0.00E+00	2.23E-05	4.46E-05							
U-233	1.2206E-07	476.540	476.540	953.080	0.00E+00	5.82E-05	1.16E-04							
U-234	1.7323E-07	476.540	476.540	953.080	0.00E+00	8.26E-05	1.65E-04							
U-235	2.6194E-06	476.540	0.000	8.54E-03	7.29E-03	8.54E-03								
U-236	1.2693E-05	476.540	953.080	0.00E+00	6.05E-03	1.21E-02								
U-238	-3.6331E-08	476.540	0.000	5.31E-03	5.30E-03	5.31E-03								
Y-90	2.3128E+00	476.540	476.540	953.080	0.00E+00	1.10E+03	2.20E+03							
Other Radionuclides						1.17E+03	2.34E+03							

Thermal Power		
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
1.87E+01	3.73E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		476.540	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		953.080	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.71		1.00
Bounding:	1.41		

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 (SOLVENIA)
 SNF ID #: 731
 Fuel Units & Descr: 10 - ELEMENT
 Heavy Metal Mass: BOL=4.95kg ; EOL=4.75kg
 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"
 0.09

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	186.617	373.234	0.00E+00	1.59E-07	3.18E-07	Avg. MeV	
Am-241	1.8331E-03	186.617	373.234	0.00E+00	3.42E-01	6.84E-01	0.0150	6.032E+13
Am-242m	1.4129E-07	186.617	373.234	0.00E+00	2.64E-04	5.27E-04	0.0250	1.327E+13
Am-243	1.4774E-07	186.617	373.234	0.00E+00	2.76E-05	5.51E-05	0.0375	1.130E+13
C-14	1.2871E-04	186.617	373.234	0.00E+00	2.40E-02	4.80E-02	0.0575	1.160E+13
Cl-36	2.8120E-06	186.617	373.234	0.00E+00	5.25E-04	1.05E-03	0.0850	7.188E+12
Co-243	1.7940E-07	186.617	373.234	0.00E+00	3.35E-05	6.70E-05	0.1250	5.220E+12
Co-244	1.6962E-06	186.617	373.234	0.00E+00	3.17E-04	6.33E-04	0.2250	6.098E+12
Co-60	1.2839E+00	186.617	373.234	0.00E+00	2.40E+02	4.79E+02	0.3750	3.094E+12
Cs-134	9.0541E-02	186.617	373.234	0.00E+00	1.69E+01	3.38E+01	0.5750	4.114E+13
Cs-135	3.2195E-05	186.617	373.234	0.00E+00	6.01E-03	1.20E-02	0.8500	1.765E+12
Cs-137	2.7564E+00	186.617	373.234	0.00E+00	5.14E+02	1.03E+03	1.2500	3.586E+13
Eu-154	1.5368E-02	186.617	373.234	0.00E+00	2.87E+00	5.74E+00	1.7500	2.390E+10
Eu-155	2.9293E-02	186.617	373.234	0.00E+00	5.47E+00	1.09E+01	2.2500	3.853E+10
Fe-55	7.7158E-01	186.617	373.234	0.00E+00	1.44E+02	2.88E+02	2.7500	3.057E+08
H-3	1.1111E-02	186.617	373.234	0.00E+00	2.07E+00	4.15E+00	3.5000	3.559E+07
I-129	7.3684E-07	186.617	373.234	0.00E+00	1.38E-04	2.75E-04	5.0000	1.987E+02
Kr-85	2.5263E-01	186.617	373.234	0.00E+00	4.71E+01	9.43E+01	7.0000	2.249E+01
Np-237	1.2427E-06	186.617	373.234	0.00E+00	2.32E-04	4.64E-04	11.0000	2.562E+00
Pa-231	3.8511E-09	186.617	373.234	0.00E+00	7.19E-07	1.44E-06		
Pb-210	7.3880E-15	186.617	373.234	0.00E+00	1.38E-12	2.76E-12		
Pm-147	2.1023E+00	186.617	373.234	0.00E+00	3.92E+02	7.85E+02		
Pu-238	1.0383E-03	186.617	373.234	0.00E+00	1.94E-01	3.88E-01		
Pu-239	5.5293E-03	186.617	373.234	0.00E+00	1.03E+00	2.06E+00		
Pu-240	2.1278E-03	186.617	373.234	0.00E+00	3.97E-01	7.94E-01		
Pu-241	1.0195E-01	186.617	373.234	0.00E+00	1.90E+01	3.81E+01		
Pu-242	2.3128E-07	186.617	373.234	0.00E+00	4.32E-05	8.63E-05		
Ra-226	5.2782E-14	186.617	373.234	0.00E+00	9.85E-12	1.97E-11		
Ra-228	1.9338E-10	186.617	373.234	0.00E+00	3.61E-08	7.22E-08		
Ru-106	9.1684E-02	186.617	373.234	0.00E+00	1.71E+01	3.42E+01		
Se-79	1.3018E-05	186.617	373.234	0.00E+00	2.43E-03	4.86E-03		
Sn-126	1.2167E-05	186.617	373.234	0.00E+00	2.27E-03	4.54E-03		
Sr-90	2.6045E+00	186.617	373.234	0.00E+00	4.86E+02	9.72E+02		
Tc-99	4.4241E-04	186.617	373.234	0.00E+00	8.26E-02	1.65E-01		
Th-229	1.3713E-10	186.617	373.234	0.00E+00	2.56E-08	5.12E-08		
Th-230	1.8090E-11	186.617	373.234	0.00E+00	3.38E-09	6.75E-09		
Th-232	2.5278E-10	186.617	373.234	0.00E+00	4.72E-08	9.43E-08		
Ti-208	1.6947E-08	186.617	373.234	0.00E+00	3.16E-06	6.33E-06		
U-232	4.8737E-08	186.617	373.234	0.00E+00	9.10E-06	1.82E-05		
U-233	1.2203E-07	186.617	373.234	0.00E+00	2.28E-05	4.55E-05		
U-234	1.5925E-07	186.617	373.234	0.00E+00	2.97E-05	5.94E-05		
U-235	-2.6194E-06	186.617	0.000	2.11E-03	1.63E-03	2.11E-03		
U-236	1.2693E-05	186.617	373.234	0.00E+00	2.37E-03	4.74E-03		
U-238	-3.6331E-08	186.617	0.000	1.33E-03	1.33E-03	1.33E-03		
Y-90	2.6060E+00	186.617	373.234	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		Basis for Parameter Differences:	
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.76747705	10 to 20	

Burnup Summary (MWd) ²		Basis for burnup used in estimate:	
	From SFD	Estimated	
Nominal:	186.617	186.148	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		373.234	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.11	1.00	1.00
Bounding:	2.21		

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: TRIGA STD (THAILAND)
 SNF ID #: 489
 Fuel Units & Descr: 100 - ELEMENT
 Heavy Metal Mass: BOL=19.50kg ; EOL=19.30kg
 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							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	190.921	381.843	0.00E+00	1.63E-07	3.25E-07	Avg. MeV	
Am-241	1.8331E-03	190.921	381.843	0.00E+00	3.50E-01	7.00E-01	0.0150	6.172E+13
Am-242m	1.4129E-06	190.921	381.843	0.00E+00	2.70E-04	5.40E-04	0.0250	1.358E+13
Am-243	1.4774E-07	190.921	381.843	0.00E+00	2.82E-05	5.64E-05	0.0375	1.156E+13
C-14	1.2871E-04	190.921	381.843	0.00E+00	2.46E-02	4.91E-02	0.0575	1.187E+13
Cl-36	2.8120E-06	190.921	381.843	0.00E+00	5.37E-04	1.07E-03	0.0850	7.354E+12
Cm-243	1.7940E-07	190.921	381.843	0.00E+00	3.43E-05	6.85E-05	0.1250	5.340E+12
Cm-244	1.6962E-06	190.921	381.843	0.00E+00	3.24E-04	6.48E-04	0.2250	6.238E+12
Co-60	1.2839E+00	190.921	381.843	0.00E+00	2.45E+02	4.90E+02	0.3750	3.166E+12
Cs-134	9.0541E-02	190.921	381.843	0.00E+00	1.73E+01	3.46E+01	0.5750	4.209E+13
Cs-135	3.2195E+05	190.921	381.843	0.00E+00	6.15E-03	1.23E-02	0.8500	1.806E+12
Cs-137	2.7564E-00	190.921	381.843	0.00E+00	5.26E+02	1.05E+03	1.2500	3.668E+13
Eu-154	1.5368E-02	190.921	381.843	0.00E+00	2.93E+00	5.87E+00	1.7500	2.446E+10
Eu-155	2.9293E-02	190.921	381.843	0.00E+00	5.59E+00	1.12E+01	2.2500	3.942E+10
Fe-55	7.7158E-01	190.921	381.843	0.00E+00	1.47E+02	2.95E+02	2.7500	3.128E+08
H-3	1.1111E-02	190.921	381.843	0.00E+00	2.12E+00	4.24E+00	3.5000	3.641E+07
I-129	7.3684E-07	190.921	381.843	0.00E+00	1.41E-04	2.81E-04	5.0000	2.122E+02
Kr-85	2.5263E-01	190.921	381.843	0.00E+00	4.82E+01	9.65E+01	7.0000	2.404E+01
Np-237	1.2427E-06	190.921	381.843	0.00E+00	2.37E-04	4.75E-04	11.0000	2.740E+00
Pa-231	3.8511E-09	190.921	381.843	0.00E+00	7.35E-07	1.47E-06		
Pb-210	7.3880E-15	190.921	381.843	0.00E+00	1.41E-12	2.82E-12		
Pm-147	2.1023E+00	190.921	381.843	0.00E+00	4.01E+02	8.03E+02		
Pu-238	1.0383E-03	190.921	381.843	0.00E+00	1.98E-01	3.96E-01		
Pu-239	5.5293E-03	190.921	381.843	0.00E+00	1.06E+00	2.11E+00		
Pu-240	2.1278E-03	190.921	381.843	0.00E+00	4.06E-01	8.12E-01		
Pu-241	1.0195E-01	190.921	381.843	0.00E+00	1.95E+01	3.89E+01		
Pu-242	2.3128E-07	190.921	381.843	0.00E+00	4.42E-05	8.83E-05		
Ra-226	5.2782E-14	190.921	381.843	0.00E+00	1.01E-11	2.02E-11		
Ra-228	1.9338E-10	190.921	381.843	0.00E+00	3.69E-08	7.38E-08		
Ru-106	9.1684E-02	190.921	381.843	0.00E+00	1.75E+01	3.50E+01		
Se-79	1.3018E-05	190.921	381.843	0.00E+00	2.49E-03	4.97E-03		
Sn-126	1.2167E-05	190.921	381.843	0.00E+00	2.32E-03	4.65E-03		
Sr-90	2.6045E+00	190.921	381.843	0.00E+00	4.97E+02	9.95E+02		
Tc-99	4.4241E-04	190.921	381.843	0.00E+00	8.45E-02	1.69E-01		
Th-229	1.3713E-10	190.921	381.843	0.00E+00	2.62E-08	5.24E-08		
Th-230	1.8090E-11	190.921	381.843	0.00E+00	3.45E-09	6.91E-09		
Th-232	2.5278E-10	190.921	381.843	0.00E+00	4.83E-08	9.65E-08		
Ti-208	1.6947E-08	190.921	381.843	0.00E+00	3.24E-06	6.47E-06		
U-232	4.8737E-08	190.921	381.843	0.00E+00	9.30E-06	1.86E-05		
U-233	1.2203E-07	190.921	381.843	0.00E+00	2.33E-05	4.66E-05		
U-234	1.5925E-07	190.921	381.843	0.00E+00	3.04E-05	6.08E-05		
U-235	-2.6194E-06	190.921	0.000	8.43E-03	7.93E-03	8.43E-03		
U-236	1.2693E-05	190.921	381.843	0.00E+00	2.42E-03	4.85E-03		
U-238	-3.6331E-08	190.921	0.000	5.24E-03	5.24E-03	5.24E-03		
Y-90	2.6060E+00	190.921	381.843	0.00E+00	4.98E+02	9.95E+02		
Other Radionuclides					6.88E+02	1.38E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.11E+01	2.22E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		190.921	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		381.843	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		

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 (TURKEY) ¹Fuel decay start date: 2010
 SNF ID #: 490 Estimates as of: 2010
 Fuel Units & Descr: 79 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=15.41kg ; EOL=15.25kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.71

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	150.828	301.656	0.00E+00	1.28E-07	2.57E-07	Avg. MeV	
Am-241	1.8331E-03	150.828	301.656	0.00E+00	2.76E-01	5.53E-01	0.0150	4.876E+13
Am-242m	1.4129E-07	150.828	301.656	0.00E+00	2.13E-04	4.26E-04	0.0250	1.073E+13
Am-243	1.4774E-06	150.828	301.656	0.00E+00	2.23E-05	4.46E-05	0.0375	9.136E+12
C-14	1.2871E-04	150.828	301.656	0.00E+00	1.94E-02	3.88E-02	0.0575	9.377E+12
Cl-36	2.8120E-06	150.828	301.656	0.00E+00	4.24E-04	8.48E-04	0.0850	5.809E+12
Cm-243	1.7940E-07	150.828	301.656	0.00E+00	2.71E-05	5.41E-05	0.1250	4.219E+12
Cm-244	1.6962E-06	150.828	301.656	0.00E+00	2.56E-04	5.12E-04	0.2250	4.928E+12
Co-60	1.2839E+00	150.828	301.656	0.00E+00	1.94E+02	3.87E+02	0.3750	2.501E+12
Cs-134	9.0541E-02	150.828	301.656	0.00E+00	1.37E+01	2.73E+01	0.5750	3.325E+13
Cs-135	3.2195E-05	150.828	301.656	0.00E+00	4.86E-03	9.71E-03	0.8500	1.427E+12
Cs-137	2.7564E+00	150.828	301.656	0.00E+00	4.16E+02	8.31E+02	1.2500	2.898E+13
Eu-154	1.5368E-02	150.828	301.656	0.00E+00	2.32E+00	4.64E+00	1.7500	1.932E+10
Eu-155	2.9293E-02	150.828	301.656	0.00E+00	4.42E+00	8.84E+00	2.2500	3.114E+10
Fe-55	7.7158E-01	150.828	301.656	0.00E+00	1.16E+02	2.33E+02	2.7500	2.471E+08
H-3	1.1111E-02	150.828	301.656	0.00E+00	1.68E+00	3.35E+00	3.5000	2.876E+07
I-129	7.3684E-07	150.828	301.656	0.00E+00	1.11E-04	2.22E-04	5.0000	1.676E+02
Kr-85	2.5263E-01	150.828	301.656	0.00E+00	3.81E+01	7.62E+01	7.0000	1.899E+01
Np-237	1.2427E-06	150.828	301.656	0.00E+00	1.87E-04	3.75E-04	11.0000	2.164E+00
Pa-231	3.8511E-09	150.828	301.656	0.00E+00	5.81E-07	1.16E-06		
Pb-210	7.3880E-15	150.828	301.656	0.00E+00	1.11E-12	2.23E-12		
Pm-147	2.1023E+00	150.828	301.656	0.00E+00	3.17E+02	6.34E+02		
Pu-238	1.0383E-03	150.828	301.656	0.00E+00	1.57E-01	3.13E-01		
Pu-239	5.5293E-03	150.828	301.656	0.00E+00	8.34E-01	1.67E+00		
Pu-240	2.1278E-03	150.828	301.656	0.00E+00	3.21E-01	6.42E-01		
Pu-241	1.0195E-01	150.828	301.656	0.00E+00	1.54E+01	3.08E+01		
Pu-242	2.3128E-07	150.828	301.656	0.00E+00	3.49E-05	6.98E-05		
Ra-226	5.2782E-14	150.828	301.656	0.00E+00	7.96E-12	1.59E-11		
Ra-228	1.9338E-10	150.828	301.656	0.00E+00	2.92E-08	5.83E-08		
Ru-106	9.1684E-02	150.828	301.656	0.00E+00	1.38E+01	2.77E+01		
Se-79	1.3018E-05	150.828	301.656	0.00E+00	1.96E-03	3.93E-03		
Sn-126	1.2167E-05	150.828	301.656	0.00E+00	1.84E-03	3.67E-03		
Sr-90	2.6045E+00	150.828	301.656	0.00E+00	3.93E+02	7.86E+02		
Tc-99	4.4241E-04	150.828	301.656	0.00E+00	6.67E-02	1.33E-01		
Th-229	1.3713E-10	150.828	301.656	0.00E+00	2.07E-08	4.14E-08		
Th-230	1.8090E-11	150.828	301.656	0.00E+00	2.73E-09	5.46E-09		
Th-232	2.5278E-10	150.828	301.656	0.00E+00	3.81E-08	7.63E-08		
Tl-208	1.6947E-08	150.828	301.656	0.00E+00	2.56E-06	5.11E-06		
U-232	4.8737E-08	150.828	301.656	0.00E+00	7.35E-06	1.47E-05		
U-233	1.2203E-07	150.828	301.656	0.00E+00	1.84E-05	3.68E-05		
U-234	1.5925E-07	150.828	301.656	0.00E+00	2.40E-05	4.80E-05		
U-235	-2.6194E-06	150.828	0.000	6.66E-03	6.26E-03	6.66E-03		
U-236	1.2693E-05	150.828	301.656	0.00E+00	1.91E-03	3.83E-03		
U-238	-3.6331E-08	150.828	0.000	4.14E-03	4.14E-03	4.14E-03		
Y-90	2.6060E+00	150.828	301.656	0.00E+00	3.93E+02	7.86E+02		
Other Radionuclides					5.44E+02	1.09E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.78E+00	1.76E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	150.828	150.828	
Bounding:		301.656	

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		
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 (U OF AZ) 1Fuel decay start date: 2035
 SNF ID #: 59 Estimates as of: 2010
 Fuel Units & Descr: 84 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=16.38kg ; EOL=15.75kg 2Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.76

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	8.5173E-10	601.403	1,202.805	0.00E+00	5.12E-07	1.02E-06		
Am-241	1.8331E-03	601.403	1,202.805	0.00E+00	1.10E+00	2.20E+00	0.0150	1.944E+14
Am-242m	1.4129E-06	601.403	1,202.805	0.00E+00	8.50E-04	1.70E-03	0.0250	4.278E+13
Am-243	1.4774E-07	601.403	1,202.805	0.00E+00	8.89E-05	1.78E-04	0.0375	3.643E+13
C-14	1.2871E-04	601.403	1,202.805	0.00E+00	7.74E-02	1.55E-01	0.0575	3.739E+13
Cl-36	2.8120E-06	601.403	1,202.805	0.00E+00	1.69E-03	3.38E-03	0.0850	2.316E+13
Cm-243	1.7940E-07	601.403	1,202.805	0.00E+00	1.08E-04	2.16E-04	0.1250	1.682E+13
Cm-244	1.6962E-06	601.403	1,202.805	0.00E+00	1.02E-03	2.04E-03	0.2250	1.965E+13
Co-60	1.2839E+00	601.403	1,202.805	0.00E+00	7.72E+02	1.54E+03	0.3750	9.972E+12
Cs-134	9.0541E-02	601.403	1,202.805	0.00E+00	5.45E+01	1.09E+02	0.5750	1.326E+14
Cs-135	3.2195E-05	601.403	1,202.805	0.00E+00	1.94E-02	3.87E-02	0.8500	5.689E+12
Cs-137	2.7564E+00	601.403	1,202.805	0.00E+00	1.66E+03	3.32E+03	1.2500	1.155E+14
Eu-154	1.5368E-02	601.403	1,202.805	0.00E+00	9.24E+00	1.85E+01	1.7500	7.703E+10
Eu-155	2.9293E-02	601.403	1,202.805	0.00E+00	1.76E+01	3.52E+01	2.2500	1.242E+11
Fe-55	7.7158E-01	601.403	1,202.805	0.00E+00	4.64E+02	9.28E+02	2.7500	9.852E+08
H-3	1.1111E-02	601.403	1,202.805	0.00E+00	6.68E+00	1.34E+01	3.5000	1.147E+08
I-129	7.3684E-07	601.403	1,202.805	0.00E+00	4.43E-04	8.86E-04	5.0000	6.404E+02
Kr-85	2.5263E-01	601.403	1,202.805	0.00E+00	1.52E+02	3.04E+02	7.0000	7.250E+01
Np-237	1.2427E-06	601.403	1,202.805	0.00E+00	7.47E-04	1.49E-03	11.0000	8.260E+00
Pa-231	3.8511E-09	601.403	1,202.805	0.00E+00	2.32E-06	4.63E-06		
Pb-210	7.3880E-15	601.403	1,202.805	0.00E+00	4.44E-12	8.89E-12		
Pm-147	2.1023E+00	601.403	1,202.805	0.00E+00	1.26E+03	2.53E+03		
Pu-238	1.0383E-03	601.403	1,202.805	0.00E+00	6.24E-01	1.25E+00		
Pu-239	5.5293E-03	601.403	1,202.805	0.00E+00	3.33E+00	6.65E+00		
Pu-240	2.1278E-03	601.403	1,202.805	0.00E+00	1.28E+00	2.56E+00		
Pu-241	1.0195E-01	601.403	1,202.805	0.00E+00	6.13E+01	1.23E+02		
Pu-242	2.3128E-07	601.403	1,202.805	0.00E+00	1.39E-04	2.78E-04		
Ra-226	5.2782E-14	601.403	1,202.805	0.00E+00	3.17E-11	6.35E-11		
Ra-228	1.9338E-10	601.403	1,202.805	0.00E+00	1.16E-07	2.33E-07		
Ru-106	9.1684E-02	601.403	1,202.805	0.00E+00	5.51E+01	1.10E+02		
Se-79	1.3018E-05	601.403	1,202.805	0.00E+00	7.83E-03	1.57E-02		
Sn-126	1.2167E-05	601.403	1,202.805	0.00E+00	7.32E-03	1.46E-02		
Sr-90	2.6045E+00	601.403	1,202.805	0.00E+00	1.57E+03	3.13E+03		
Tc-99	4.4241E-04	601.403	1,202.805	0.00E+00	2.66E-01	5.32E-01		
Th-229	1.3713E-10	601.403	1,202.805	0.00E+00	8.25E-08	1.65E-07		
Th-230	1.8090E-11	601.403	1,202.805	0.00E+00	1.09E-08	2.18E-08		
Th-232	2.5278E-10	601.403	1,202.805	0.00E+00	1.52E-07	3.04E-07		
Tl-208	1.6947E-08	601.403	1,202.805	0.00E+00	1.02E-05	2.04E-05		
U-232	4.8737E-08	601.403	1,202.805	0.00E+00	2.93E-05	5.86E-05		
U-233	1.2203E-07	601.403	1,202.805	0.00E+00	7.34E-05	1.47E-04		
U-234	1.5925E-07	601.403	1,202.805	0.00E+00	9.58E-05	1.92E-04		
U-235	-2.6194E-06	601.403	0.000	7.08E-03	5.50E-03	7.08E-03		
U-236	1.2693E-05	601.403	1,202.805	0.00E+00	7.63E-03	1.53E-02		
U-238	-3.6331E-08	601.403	0.000	4.40E-03	4.38E-03	4.40E-03		
Y-90	2.6060E+00	601.403	1,202.805	0.00E+00	1.57E+03	3.13E+03		
Other Radionuclides					2.17E+03	4.34E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.50E+01	7.00E+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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		601.403	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,202.805	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	1.08		1.00
Bounding:	2.15		

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 (U OF AZ)
SNF ID #: 975

Fuel Units & Descr: 8 - ELEMENT
Heavy Metal Mass: BOL=1.50kg ; EOL=1.50kg
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

Radionuclide	m	x _n	x _b	b	y _n	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	21.915	43.829	0.00E+00	1.87E-08	3.73E-08	Avg. MeV	
Am-241	1.8331E-03	21.915	43.829	0.00E+00	4.02E-02	8.03E-02	0.0150	7.084E+12
Am-242m	1.4129E-06	21.915	43.829	0.00E+00	3.10E-05	6.19E-05	0.0250	1.559E+12
Am-243	1.4774E-07	21.915	43.829	0.00E+00	3.24E-06	6.48E-06	0.0375	1.327E+12
C-14	1.2871E-04	21.915	43.829	0.00E+00	2.82E-03	5.64E-03	0.0575	1.362E+12
Ci-36	2.8120E-06	21.915	43.829	0.00E+00	6.16E-05	1.23E-04	0.0850	8.441E+11
Cm-243	1.7940E-07	21.915	43.829	0.00E+00	3.93E-06	7.86E-06	0.1250	6.129E+11
Cm-244	1.6962E-06	21.915	43.829	0.00E+00	3.72E-05	7.43E-05	0.2250	7.161E+11
Co-60	1.2839E+00	21.915	43.829	0.00E+00	2.81E+01	5.63E+01	0.3750	3.634E+11
Cs-134	9.0541E-02	21.915	43.829	0.00E+00	1.98E+00	3.97E+00	0.5750	4.831E+12
Cs-135	3.2195E-05	21.915	43.829	0.00E+00	7.06E-04	1.41E-03	0.8500	2.073E+11
Cs-137	2.7564E+00	21.915	43.829	0.00E+00	6.04E+01	1.21E+02	1.2500	4.211E+12
Eu-154	1.5368E-02	21.915	43.829	0.00E+00	3.37E-01	6.74E-01	1.7500	2.807E+09
Eu-155	2.9293E-02	21.915	43.829	0.00E+00	6.42E-01	1.28E+00	2.2500	4.524E+09
Fe-55	7.7158E-01	21.915	43.829	0.00E+00	1.69E+01	3.38E+01	2.7500	3.590E+07
H-3	1.1111E-02	21.915	43.829	0.00E+00	2.43E-01	4.87E-01	3.5000	4.179E+06
I-129	7.3684E-07	21.915	43.829	0.00E+00	1.61E-05	3.23E-05	5.0000	2.391E+01
Kr-85	2.5263E-01	21.915	43.829	0.00E+00	5.54E+00	1.11E+01	7.0000	2.708E+00
Np-237	1.2427E-06	21.915	43.829	0.00E+00	2.72E-05	5.45E-05	11.0000	3.086E-01
Pa-231	3.8511E-09	21.915	43.829	0.00E+00	8.44E-08	1.69E-07		
Pb-210	7.3880E-15	21.915	43.829	0.00E+00	1.62E-13	3.24E-13		
Pm-147	2.1023E+00	21.915	43.829	0.00E+00	4.61E+01	9.21E+01		
Pu-238	1.0383E-03	21.915	43.829	0.00E+00	2.28E-02	4.55E-02		
Pu-239	5.5293E-03	21.915	43.829	0.00E+00	1.21E-01	2.42E-01		
Pu-240	2.1278E-03	21.915	43.829	0.00E+00	4.66E-02	9.33E-02		
Pu-241	1.0195E-01	21.915	43.829	0.00E+00	2.23E+00	4.47E+00		
Pu-242	2.3128E-07	21.915	43.829	0.00E+00	5.07E-06	1.01E-05		
Ra-226	5.2782E-14	21.915	43.829	0.00E+00	1.16E-12	2.31E-12		
Ra-228	1.9338E-10	21.915	43.829	0.00E+00	4.24E-09	8.48E-09		
Ru-106	9.1684E-02	21.915	43.829	0.00E+00	2.01E+00	4.02E+00		
Se-79	1.3018E-05	21.915	43.829	0.00E+00	2.85E-04	5.71E-04		
Sn-126	1.2167E-05	21.915	43.829	0.00E+00	2.67E-04	5.33E-04		
Sr-90	2.6045E+00	21.915	43.829	0.00E+00	5.71E+01	1.14E+02		
Tc-99	4.4241E-04	21.915	43.829	0.00E+00	9.70E-03	1.94E-02		
Th-229	1.3713E-10	21.915	43.829	0.00E+00	3.01E-09	6.01E-09		
Th-230	1.8090E-11	21.915	43.829	0.00E+00	3.96E-10	7.93E-10		
Th-232	2.5278E-10	21.915	43.829	0.00E+00	5.54E-09	1.11E-08		
Tl-208	1.6947E-08	21.915	43.829	0.00E+00	3.71E-07	7.43E-07		
U-232	4.8737E-08	21.915	43.829	0.00E+00	1.07E-06	2.14E-06		
U-233	1.2203E-07	21.915	43.829	0.00E+00	2.67E-06	5.35E-06		
U-234	1.5925E-07	21.915	43.829	0.00E+00	3.49E-06	6.98E-06		
U-235	-2.6194E-06	21.915	0.000	5.95E-04	5.38E-04	5.95E-04		
U-236	1.2693E-05	21.915	43.829	0.00E+00	2.78E-04	5.56E-04		
U-238	-3.6331E-08	21.915	0.000	4.11E-04	4.10E-04	4.11E-04		
Y-90	2.6060E+00	21.915	43.829	0.00E+00	5.71E+01	1.14E+02		
Other Radionuclides					7.90E+01	1.58E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.28E+00	2.55E+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 (304)	SST	
BOL HM Constituents:	U-ZHX	U	
BOL Enrichment %:	18.3974873	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	21.915		Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		43.829	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.43	0.00	0.99
Bounding:	0.86		

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 (U OF ILL)
 SNF ID #: 449
 Fuel Units & Descr: 133 - ELEMENT
 Heavy Metal Mass: BOL=25.94kg ; EOL=23.99kg
 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"
 1.20

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	8.5173E-10	1,853.656	3,707.313	0.00E+00	1.58E-06	3.16E-06	0.0150	5.992E+14
Am-241	1.8331E-03	1,853.656	3,707.313	0.00E+00	3.40E+00	6.80E+00	0.0250	1.318E+14
Am-242m	1.4129E-06	1,853.656	3,707.313	0.00E+00	2.62E-03	5.24E-03	0.0375	1.123E+14
Am-243	1.4774E-07	1,853.656	3,707.313	0.00E+00	2.74E-04	5.48E-04	0.0675	1.152E+14
C-14	1.2871E-04	1,853.656	3,707.313	0.00E+00	2.39E-01	4.77E-01	0.0850	7.140E+13
Cl-36	2.8120E-06	1,853.656	3,707.313	0.00E+00	5.21E-03	1.04E-02	0.1250	5.185E+13
Cm-243	1.7940E-07	1,853.656	3,707.313	0.00E+00	3.33E-04	6.65E-04	0.2250	6.057E+13
Cm-244	1.6962E-06	1,853.656	3,707.313	0.00E+00	3.14E-03	6.29E-03	0.3750	3.074E+13
Co-60	1.2839E+00	1,853.656	3,707.313	0.00E+00	2.38E+03	4.76E+03	0.5750	4.086E+14
Cs-134	9.0541E-02	1,853.656	3,707.313	0.00E+00	1.68E+02	3.36E+02	0.8500	1.754E+13
Cs-135	3.2195E-05	1,853.656	3,707.313	0.00E+00	5.97E-02	1.19E-01	1.2500	3.561E+14
Cs-137	2.7564E+00	1,853.656	3,707.313	0.00E+00	5.11E+03	1.02E+04	1.7500	2.374E+11
Eu-154	1.5368E-02	1,853.656	3,707.313	0.00E+00	2.85E+01	5.70E+01	2.2500	3.827E+11
Eu-155	2.9293E-02	1,853.656	3,707.313	0.00E+00	5.43E+01	1.09E+02	2.7500	3.037E+09
Fe-55	7.7158E-01	1,853.656	3,707.313	0.00E+00	1.43E+03	2.86E+03	3.5000	3.535E+08
H-3	1.1111E-02	1,853.656	3,707.313	0.00E+00	2.06E+01	4.12E+01	5.0000	1.959E+03
I-129	7.3684E-07	1,853.656	3,707.313	0.00E+00	1.37E-03	2.73E-03	7.0000	2.217E+02
Kr-85	2.5263E-01	1,853.656	3,707.313	0.00E+00	4.68E+02	9.37E+02	11.0000	2.526E+01
Np-237	1.2427E-06	1,853.656	3,707.313	0.00E+00	2.30E-03	4.61E-03		
Pa-231	3.8511E-09	1,853.656	3,707.313	0.00E+00	7.14E-06	1.43E-05		
Pb-210	7.3880E-15	1,853.656	3,707.313	0.00E+00	1.37E-11	2.74E-11		
Pm-147	2.1023E+00	1,853.656	3,707.313	0.00E+00	3.90E+03	7.79E+03		
Pu-238	1.0383E-03	1,853.656	3,707.313	0.00E+00	1.92E+00	3.85E+00		
Pu-239	5.5293E-03	1,853.656	3,707.313	0.00E+00	1.02E+01	2.05E+01		
Pu-240	2.1278E-03	1,853.656	3,707.313	0.00E+00	3.94E+00	7.89E+00		
Pu-241	1.0195E-01	1,853.656	3,707.313	0.00E+00	1.89E+02	3.78E+02		
Pu-242	2.3128E-07	1,853.656	3,707.313	0.00E+00	4.29E-04	8.57E-04		
Ra-226	5.2782E-14	1,853.656	3,707.313	0.00E+00	9.78E-11	1.96E-10		
Ra-228	1.9338E-10	1,853.656	3,707.313	0.00E+00	3.58E-07	7.17E-07		
Ru-106	9.1684E-02	1,853.656	3,707.313	0.00E+00	1.70E+02	3.40E+02		
Se-79	1.3018E-05	1,853.656	3,707.313	0.00E+00	2.41E-02	4.83E-02		
Sn-126	1.2167E-05	1,853.656	3,707.313	0.00E+00	2.26E-02	4.51E-02		
Sr-90	2.6045E+00	1,853.656	3,707.313	0.00E+00	4.83E+03	9.66E+03		
Tc-99	4.4241E-04	1,853.656	3,707.313	0.00E+00	8.20E-01	1.64E+00		
Th-229	1.3713E-10	1,853.656	3,707.313	0.00E+00	2.54E-07	5.08E-07		
Th-230	1.8090E-11	1,853.656	3,707.313	0.00E+00	3.35E-08	6.71E-08		
Th-232	2.5278E-10	1,853.656	3,707.313	0.00E+00	4.69E-07	9.37E-07		
Ti-208	1.6947E-08	1,853.656	3,707.313	0.00E+00	3.14E-05	6.28E-05		
U-232	4.8737E-08	1,853.656	3,707.313	0.00E+00	9.03E-05	1.81E-04		
U-233	1.2203E-07	1,853.656	3,707.313	0.00E+00	2.26E-04	4.52E-04		
U-234	1.5925E-07	1,853.656	3,707.313	0.00E+00	2.95E-04	5.90E-04		
U-235	-2.6194E-06	1,853.656	0.000	1.12E-02	6.35E-03	1.12E-02		
U-236	1.2693E-05	1,853.656	3,707.313	0.00E+00	2.35E-02	4.71E-02		
U-238	-3.6331E-08	1,853.656	0.000	6.97E-03	6.91E-03	6.97E-03		
Y-90	2.6060E+00	1,853.656	3,707.313	0.00E+00	4.83E+03	9.66E+03		
Other Radionuclides					6.68E+03	1.34E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.08E+02	2.16E+02
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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		1,853.656	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		3,707.313	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	2.10		1.00
Bounding:	4.19		

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 (U OF UTAH) ¹Fuel decay start date: 2035
 SNF ID #: 699 Estimates as of: 2010
 Fuel Units & Descr: 63 - ELEMENT Template: TRIGA-AI (LW/U-Zrx, Alum., 10 to 20%, U)
 Heavy Metal Mass: BOL=11.00kg ; EOL=10.72kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.00018
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.57

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	8.0632E-10	264.593	529.186	0.00E+00	2.13E-07	4.27E-07	Avg. MeV	
Am-241	2.2586E-03	264.593	529.186	0.00E+00	5.98E-01	1.20E+00	0.0150	8.954E+13
Am-242m	1.9925E-07	264.593	529.186	0.00E+00	5.27E-04	1.05E-03	0.0250	1.944E+13
Am-243	2.3323E-06	264.593	529.186	0.00E+00	6.17E-05	1.23E-04	0.0375	2.421E+13
C-14	4.3308E-05	264.593	529.186	0.00E+00	1.15E-02	2.29E-02	0.0575	1.858E+13
Cl-36	4.3023E-08	264.593	529.186	0.00E+00	1.14E-05	2.28E-05	0.0850	1.299E+13
Co-243	2.7429E-07	264.593	529.186	0.00E+00	7.26E-05	1.45E-04	0.1250	1.943E+13
Co-244	3.1504E-06	264.593	529.186	0.00E+00	8.34E-04	1.67E-03	0.2250	1.085E+13
Co-60	3.1008E-02	264.593	529.186	0.00E+00	8.20E+00	1.64E+01	0.3750	4.828E+12
Cs-134	1.0367E-01	264.593	529.186	0.00E+00	2.74E+01	5.49E+01	0.5750	6.121E+13
Cs-135	3.1549E-05	264.593	529.186	0.00E+00	8.35E-03	1.67E-02	0.8500	1.507E+13
Cs-137	2.7564E+00	264.593	529.186	0.00E+00	7.29E+02	1.46E+03	1.2500	1.562E+13
Eu-154	1.3490E+00	264.593	529.186	0.00E+00	3.57E+02	7.14E+02	1.7500	4.470E+11
Eu-155	4.3880E-01	264.593	529.186	0.00E+00	1.16E+02	2.32E+02	2.2500	5.434E+10
Fe-55	8.6782E-03	264.593	529.186	0.00E+00	2.30E+00	4.59E+00	2.7500	4.419E+08
H-3	1.0805E-02	264.593	529.186	0.00E+00	2.86E+00	5.72E+00	3.5000	5.159E+07
I-129	7.3805E-07	264.593	529.186	0.00E+00	1.95E-04	3.91E-04	5.0000	3.087E+02
Kr-85	2.5218E-01	264.593	529.186	0.00E+00	6.67E+01	1.33E+02	7.0000	3.494E+01
Np-237	1.4463E-06	264.593	529.186	0.00E+00	3.83E-04	7.65E-04	11.0000	3.981E+00
Pa-231	3.5970E-09	264.593	529.186	0.00E+00	9.52E-07	1.90E-06		
Pb-210	8.2511E-15	264.593	529.186	0.00E+00	2.18E-12	4.37E-12		
Pm-147	2.0767E+00	264.593	529.186	0.00E+00	5.49E+02	1.10E+03		
Pu-238	1.3514E-03	264.593	529.186	0.00E+00	3.58E-01	7.15E-01		
Pu-239	5.6947E-03	264.593	529.186	0.00E+00	1.51E+00	3.01E+00		
Pu-240	2.2647E-03	264.593	529.186	0.00E+00	5.99E-01	1.20E+00		
Pu-241	1.2574E-01	264.593	529.186	0.00E+00	3.33E+01	6.65E+01		
Pu-242	3.0602E-07	264.593	529.186	0.00E+00	8.10E-05	1.62E-04		
Ra-226	5.7353E-14	264.593	529.186	0.00E+00	1.52E-11	3.04E-11		
Ra-228	1.8150E-10	264.593	529.186	0.00E+00	4.80E-08	9.60E-08		
Ru-106	9.3744E-02	264.593	529.186	0.00E+00	2.48E+01	4.96E+01		
Se-79	1.2938E-05	264.593	529.186	0.00E+00	3.42E-03	6.85E-03		
Sn-126	1.2239E-05	264.593	529.186	0.00E+00	3.24E-03	6.48E-03		
Sr-90	2.6000E+00	264.593	529.186	0.00E+00	6.88E+02	1.38E+03		
Tc-99	4.4120E-04	264.593	529.186	0.00E+00	1.17E-01	2.33E-01		
Th-229	1.4749E-10	264.593	529.186	0.00E+00	3.90E-08	7.80E-08		
Th-230	1.9549E-11	264.593	529.186	0.00E+00	5.17E-09	1.03E-08		
Th-232	2.3744E-10	264.593	529.186	0.00E+00	6.28E-08	1.26E-07		
Tl-208	1.9459E-08	264.593	529.186	0.00E+00	5.15E-06	1.03E-05		
U-232	5.6015E-08	264.593	529.186	0.00E+00	1.48E-05	2.96E-05		
U-233	1.3132E-07	264.593	529.186	0.00E+00	3.47E-05	6.95E-05		
U-234	1.7323E-07	264.593	529.186	0.00E+00	4.58E-05	9.17E-05		
U-235	-2.6159E-06	264.593	0.00	4.73E-03	4.04E-03	4.73E-03		
U-236	1.2717E-05	264.593	529.186	0.00E+00	3.36E-03	6.73E-03		
U-238	-3.8857E-08	264.593	0.00	2.96E-03	2.95E-03	2.96E-03		
Y-90	2.6015E+00	264.593	529.186	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:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	ALUM (6061)	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	19.89699819	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	214.408	264.593	
Bounding:		529.186	

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

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 (UC BERKLEY) ¹Fuel decay start date: 1982
 SNF ID #: 874 Estimates as of: 2010
 Fuel Units & Descr: 111 - ELEMENT Template: TRIGA-SS (LW/U-ZrX, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=21.65kg ; EOL=19.17kg ²Template Burnup(MWd): 6.85
 ROD Storage Sits: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 25 years

Estimated
Canister usage:
18"x10"
1.00

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	4.1459E-09	2,362.939	4,725.879	0.00E+00	9.80E-06	1.96E-05		
Am-241	3.5850E-03	2,362.939	4,725.879	0.00E+00	8.47E+00	1.69E+01	0.0150	4.195E+14
Am-242m	1.2899E-06	2,362.939	4,725.879	0.00E+00	3.05E-03	6.10E-03	0.0250	8.721E+13
Am-243	1.4747E-07	2,362.939	4,725.879	0.00E+00	3.48E-04	6.97E-04	0.0375	7.566E+13
C-14	1.2839E-04	2,362.939	4,725.879	0.00E+00	3.03E-01	6.07E-01	0.0575	8.148E+13
Cf-252	2.8120E-06	2,362.939	4,725.879	0.00E+00	6.64E-03	1.33E-02	0.0850	4.911E+13
Cm-243	1.1038E-07	2,362.939	4,725.879	0.00E+00	2.61E-04	5.22E-04	0.1250	3.204E+13
Cm-244	7.8917E-07	2,362.939	4,725.879	0.00E+00	1.86E-03	3.73E-03	0.2250	4.224E+13
Co-60	9.2647E-02	2,362.939	4,725.879	0.00E+00	2.19E+02	4.38E+02	0.3750	1.845E+13
Cs-134	1.0940E-04	2,362.939	4,725.879	0.00E+00	2.59E-01	5.17E-01	0.5750	3.059E+14
Cs-137	3.2195E-05	2,362.939	4,725.879	0.00E+00	7.61E-02	1.52E-01	0.8500	3.283E+12
Cs-137	1.7368E+00	2,362.939	4,725.879	0.00E+00	4.10E+03	8.21E+03	1.2500	3.371E+13
Eu-154	3.0677E-03	2,362.939	4,725.879	0.00E+00	7.25E+00	1.45E+01	1.7500	8.548E+08
Eu-155	1.7925E-03	2,362.939	4,725.879	0.00E+00	4.24E+00	8.47E+00	2.2500	1.802E+08
Fe-55	3.7444E-03	2,362.939	4,725.879	0.00E+00	8.85E+00	1.77E+01	2.7500	3.047E+06
H-3	3.6180E-03	2,362.939	4,725.879	0.00E+00	8.55E+00	1.71E+01	3.5000	6.336E+03
I-129	7.3684E-07	2,362.939	4,725.879	0.00E+00	1.74E-03	3.48E-03	5.0000	2.464E+03
Kr-85	6.9368E-02	2,362.939	4,725.879	0.00E+00	1.64E+02	3.28E+02	7.0000	2.781E+02
Np-237	1.2662E-06	2,362.939	4,725.879	0.00E+00	2.99E-03	5.98E-03	11.0000	3.163E+01
Pa-231	9.1654E-09	2,362.939	4,725.879	0.00E+00	2.17E-05	4.33E-05		
Pb-210	1.3728E-13	2,362.939	4,725.879	0.00E+00	3.24E-10	6.49E-10		
Pm-147	1.0702E-02	2,362.939	4,725.879	0.00E+00	2.53E+01	5.06E+01		
Pu-238	8.8692E-04	2,362.939	4,725.879	0.00E+00	2.10E+00	4.19E+00		
Pu-239	5.5263E-03	2,362.939	4,725.879	0.00E+00	1.31E+01	2.61E+01		
Pu-240	2.1233E-03	2,362.939	4,725.879	0.00E+00	5.02E+00	1.00E+01		
Pu-241	3.8962E-02	2,362.939	4,725.879	0.00E+00	9.21E+01	1.84E+02		
Pu-242	2.3128E-07	2,362.939	4,725.879	0.00E+00	5.46E-04	1.09E-03		
Ra-226	4.6752E-13	2,362.939	4,725.879	0.00E+00	1.10E-09	2.21E-09		
Ra-228	2.4827E-10	2,362.939	4,725.879	0.00E+00	5.87E-07	1.17E-06		
Ru-106	9.8526E-08	2,362.939	4,725.879	0.00E+00	2.33E-04	4.66E-04		
Se-79	1.3015E-05	2,362.939	4,725.879	0.00E+00	3.08E-02	6.15E-02		
Sn-126	1.2165E-05	2,362.939	4,725.879	0.00E+00	2.87E-02	5.75E-02		
Sr-90	1.6195E+00	2,362.939	4,725.879	0.00E+00	3.83E+03	7.65E+03		
Tc-99	4.4241E-04	2,362.939	4,725.879	0.00E+00	1.05E+00	2.09E+00		
Th-229	4.2451E-10	2,362.939	4,725.879	0.00E+00	1.00E-06	2.01E-06		
Th-230	6.1398E-11	2,362.939	4,725.879	0.00E+00	1.45E-07	2.90E-07		
Th-232	2.5278E-10	2,362.939	4,725.879	0.00E+00	5.97E-07	1.19E-06		
Tl-208	1.5098E-08	2,362.939	4,725.879	0.00E+00	3.57E-05	7.14E-05		
U-232	4.0662E-08	2,362.939	4,725.879	0.00E+00	9.61E-05	1.92E-04		
U-233	1.2217E-07	2,362.939	4,725.879	0.00E+00	2.89E-04	5.77E-04		
U-234	2.2391E-07	2,362.939	4,725.879	0.00E+00	5.29E-04	1.06E-03		
U-235	-2.6194E-06	2,362.939	0.000	9.35E-03	3.17E-03	9.35E-03		
U-236	1.2695E-05	2,362.939	4,725.879	0.00E+00	3.00E-02	6.00E-02		
U-238	-3.6331E-08	2,362.939	0.000	5.82E-03	5.73E-03	5.82E-03		
Y-90	1.6195E+00	2,362.939	4,725.879	0.00E+00	3.83E+03	7.65E+03		
Other Radionuclides					4.07E+03	8.13E+03		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							5.01E+01	1.00E+02
							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 (304)	SST	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		2,362.939	
Bounding:		4,725.879	

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		

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 (UNIV. OF TEXAS)
SNF ID #: 877
Fuel Units & Descr: 69 - ELEMENT
Heavy Metal Mass: BOL=12.77kg ; EOL=12.68kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1973
Estimates as of: 2010
Template: TRIGA-AI (LW/U-Zrx, Alum., 10 to 20%, U)
²**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

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	6.1504E-09	85.620	171.241	0.00E+00	5.27E-07	1.05E-06		
Am-241	4.8165E-03	85.620	171.241	0.00E+00	4.12E-01	8.25E-01	0.0150	1.208E+13
Am-242m	1.7383E-06	85.620	171.241	0.00E+00	1.49E-04	2.98E-04	0.0250	2.500E+12
Am-243	2.3263E-07	85.620	171.241	0.00E+00	1.99E-05	3.98E-05	0.0375	2.359E+12
C-14	4.3158E-05	85.620	171.241	0.00E+00	3.70E-03	7.39E-03	0.0575	2.376E+12
Cl-36	4.3023E-08	85.620	171.241	0.00E+00	3.68E-06	7.37E-06	0.0850	1.418E+12
Co-243	1.3229E-07	85.620	171.241	0.00E+00	1.13E-05	2.27E-05	0.1250	1.225E+12
Co-244	1.0000E-06	85.620	171.241	0.00E+00	8.56E-05	1.71E-04	0.2250	1.267E+12
Co-60	6.0120E-04	85.620	171.241	0.00E+00	5.15E-02	1.03E-01	0.3750	5.378E+11
Cs-134	4.3534E-06	85.620	171.241	0.00E+00	3.73E-04	7.45E-04	0.5750	8.860E+12
Cs-135	3.1549E-05	85.620	171.241	0.00E+00	2.70E-03	5.40E-03	0.8500	4.520E+11
Cs-137	1.3788E+00	85.620	171.241	0.00E+00	1.18E+02	2.36E+02	1.2500	4.436E+11
Eu-154	1.2041E-01	85.620	171.241	0.00E+00	1.03E+01	2.06E+01	1.7500	1.427E+10
Eu-155	6.6451E-03	85.620	171.241	0.00E+00	5.69E-01	1.14E+00	2.2500	2.816E+05
Fe-55	2.9338E-06	85.620	171.241	0.00E+00	2.51E-04	5.02E-04	2.7500	9.524E+04
H-3	2.0075E-03	85.620	171.241	0.00E+00	1.72E-01	3.44E-01	3.5000	2.452E+02
I-129	7.3805E-07	85.620	171.241	0.00E+00	6.32E-05	1.26E-04	5.0000	1.033E+02
Kr-85	3.6301E-02	85.620	171.241	0.00E+00	3.11E+00	6.22E+00	7.0000	1.166E+01
Np-237	1.4977E-06	85.620	171.241	0.00E+00	1.28E-04	2.56E-04	11.0000	1.326E+00
Pa-231	1.1275E-08	85.620	171.241	0.00E+00	9.65E-07	1.93E-06		
Pb-210	3.8932E-13	85.620	171.241	0.00E+00	3.33E-11	6.67E-11		
Pm-147	7.5383E-04	85.620	171.241	0.00E+00	6.45E-02	1.29E-01		
Pu-238	1.0668E-03	85.620	171.241	0.00E+00	9.13E-02	1.83E-01		
Pu-239	5.6902E-03	85.620	171.241	0.00E+00	4.87E-01	9.74E-01		
Pu-240	2.2571E-03	85.620	171.241	0.00E+00	1.93E-01	3.87E-01		
Pu-241	2.9699E-02	85.620	171.241	0.00E+00	2.54E+00	5.09E+00		
Pu-242	3.0602E-07	85.620	171.241	0.00E+00	2.62E-05	5.24E-05		
Ra-226	1.0704E-12	85.620	171.241	0.00E+00	9.16E-11	1.83E-10		
Ra-228	2.3654E-10	85.620	171.241	0.00E+00	2.03E-08	4.05E-08		
Ru-106	1.0444E-10	85.620	171.241	0.00E+00	8.94E-09	1.79E-08		
Se-79	1.2934E-05	85.620	171.241	0.00E+00	1.11E-03	2.21E-03		
Sn-126	1.2236E-05	85.620	171.241	0.00E+00	1.05E-03	2.10E-03		
Sr-90	1.2740E+00	85.620	171.241	0.00E+00	1.09E+02	2.18E+02		
Tc-99	4.4120E-04	85.620	171.241	0.00E+00	3.78E-02	7.56E-02		
Th-229	6.4226E-10	85.620	171.241	0.00E+00	5.50E-08	1.10E-07		
Th-230	1.0594E-10	85.620	171.241	0.00E+00	9.07E-09	1.81E-08		
Th-232	2.3744E-10	85.620	171.241	0.00E+00	2.03E-08	4.07E-08		
Tl-208	1.5774E-08	85.620	171.241	0.00E+00	1.35E-06	2.70E-06		
U-232	4.2511E-08	85.620	171.241	0.00E+00	3.64E-06	7.28E-06		
U-233	1.3155E-07	85.620	171.241	0.00E+00	1.13E-05	2.25E-05		
U-234	3.0030E-07	85.620	171.241	0.00E+00	2.57E-05	5.14E-05		
U-235	-2.6144E-06	85.620	0.000	5.52E-03	5.29E-03	5.52E-03		
U-236	1.2720E-05	85.620	171.241	0.00E+00	1.09E-03	2.18E-03		
U-238	-3.8857E-08	85.620	0.000	3.43E-03	3.43E-03	3.43E-03		
Y-90	1.2744E+00	85.620	171.241	0.00E+00	1.09E+02	2.18E+02		
Other Radionuclides					1.30E+02	2.61E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.44E+00	2.88E+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:	ALUM (1100)	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	62.204	85.620	
Bounding:		171.241	

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		

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 (USGS) ¹Fuel decay start date: 2035
 SNF ID #: 964 Estimates as of: 2010
 Fuel Units & Descr: 1 - ELEMENT Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL= .18kg ; EOL= .18kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.01

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	0.764	1.527	0.00E+00	6.50E-10	1.30E-09	Avg. MeV	
Am-241	1.8331E-03	0.764	1.527	0.00E+00	1.40E-03	2.80E-03	0.0150	2.469E+11
Am-242m	1.4129E-06	0.764	1.527	0.00E+00	1.08E-06	2.16E-06	0.0250	5.432E+10
Am-243	1.4774E-07	0.764	1.527	0.00E+00	1.13E-07	2.26E-07	0.0375	4.626E+10
C-14	1.2871E-04	0.764	1.527	0.00E+00	9.83E-05	1.97E-04	0.0575	4.748E+10
Cl-36	2.8120E-06	0.764	1.527	0.00E+00	2.15E-06	4.30E-06	0.0850	2.942E+10
Cm-243	1.7940E-07	0.764	1.527	0.00E+00	1.37E-07	2.74E-07	0.1250	2.136E+10
Cm-244	1.6962E-06	0.764	1.527	0.00E+00	1.30E-06	2.59E-06	0.2250	2.495E+10
Co-60	1.2839E+00	0.764	1.527	0.00E+00	9.81E-01	1.96E+00	0.3750	1.266E+10
Cs-134	9.0541E-02	0.764	1.527	0.00E+00	6.91E-02	1.38E-01	0.5750	1.683E+11
Cs-135	3.2195E-05	0.764	1.527	0.00E+00	2.46E-05	4.92E-05	0.8500	7.224E+09
Cs-137	2.7564E+00	0.764	1.527	0.00E+00	2.11E+00	4.21E+00	1.2500	1.467E+11
Eu-154	1.5368E-02	0.764	1.527	0.00E+00	1.17E-02	2.35E-02	1.7500	9.782E+07
Eu-155	2.9283E-02	0.764	1.527	0.00E+00	2.24E-02	4.47E-02	2.2500	1.577E+08
Fe-55	7.7158E-01	0.764	1.527	0.00E+00	5.89E-01	1.18E+00	2.7500	1.251E+06
H-3	1.1111E-02	0.764	1.527	0.00E+00	8.49E-03	1.70E-02	3.5000	1.456E+05
I-129	7.3684E-07	0.764	1.527	0.00E+00	5.63E-07	1.13E-06	5.0000	9.152E-01
Kr-85	2.5263E-01	0.764	1.527	0.00E+00	1.93E-01	3.86E-01	7.0000	1.038E-01
Np-237	1.2427E-06	0.764	1.527	0.00E+00	9.49E-07	1.90E-06	11.0000	1.184E-02
Pa-231	3.8511E-09	0.764	1.527	0.00E+00	2.94E-09	5.88E-09		
Pb-210	7.3880E-15	0.764	1.527	0.00E+00	5.64E-15	1.13E-14		
Pm-147	2.1023E+00	0.764	1.527	0.00E+00	1.61E+00	3.21E+00		
Pu-238	1.0383E-03	0.764	1.527	0.00E+00	7.93E-04	1.59E-03		
Pu-239	5.5293E-03	0.764	1.527	0.00E+00	4.22E-03	8.45E-03		
Pu-240	2.1278E-03	0.764	1.527	0.00E+00	1.62E-03	3.25E-03		
Pu-241	1.0195E-01	0.764	1.527	0.00E+00	7.79E-02	1.56E-01		
Pu-242	2.3128E-07	0.764	1.527	0.00E+00	1.77E-07	3.53E-07		
Ra-226	5.2782E-10	0.764	1.527	0.00E+00	4.03E-10	8.06E-10		
Ra-228	1.9338E-14	0.764	1.527	0.00E+00	1.48E-14	2.95E-14		
Ru-106	9.1684E-02	0.764	1.527	0.00E+00	7.00E-02	1.40E-01		
Se-79	1.3018E-05	0.764	1.527	0.00E+00	9.94E-06	1.99E-05		
Sn-126	1.2167E-05	0.764	1.527	0.00E+00	9.29E-06	1.86E-05		
Sr-90	2.6045E+00	0.764	1.527	0.00E+00	1.99E+00	3.98E+00		
Tc-99	4.4241E-04	0.764	1.527	0.00E+00	3.38E-04	6.76E-04		
Th-229	1.3713E-10	0.764	1.527	0.00E+00	1.05E-10	2.09E-10		
Th-230	1.8090E-11	0.764	1.527	0.00E+00	1.38E-11	2.76E-11		
Th-232	2.5278E-10	0.764	1.527	0.00E+00	1.93E-10	3.86E-10		
Ti-208	1.6947E-08	0.764	1.527	0.00E+00	1.29E-08	2.59E-08		
U-232	4.8737E-08	0.764	1.527	0.00E+00	3.72E-08	7.44E-08		
U-233	1.2203E-07	0.764	1.527	0.00E+00	9.32E-08	1.86E-07		
U-234	1.5925E-07	0.764	1.527	0.00E+00	1.22E-07	2.43E-07		
U-235	-2.6194E-06	0.764	0.000	7.80E-05	7.60E-05	7.80E-05		
U-236	1.2693E-05	0.764	1.527	0.00E+00	9.69E-06	1.94E-05		
U-238	-3.6331E-08	0.764	0.000	4.97E-05	4.97E-05	4.97E-05		
Y-90	2.6060E+00	0.764	1.527	0.00E+00	1.99E+00	3.98E+00		
Other Radionuclides					2.75E+00	5.51E+00		

Thermal Power	
Nominal Heat	Bounding
Output (Watts)	Heat Output (Watts)
4.44E-02	8.89E-02
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-ZrHX	U
BOL Enrichment %:	19.6176994	10 to 20

Burnup Summary (MWd) ²		Basis for burnup used in estimate:
From SFD	Estimated	
Nominal:	0.764	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	1.527	Bounding burnup assumed to be twice nominal burnup.

Checks		Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	
	0.12	1.00
Bounding:	0.24	

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 (ZAIRE) ¹Fuel decay start date: 2010
 SNF ID #: 487 Estimates as of: 2010
 Fuel Units & Descr: 56 - ELEMENT Template: TRIGA-AI (LW/U-Zr, Alum., 10 to 20%, U)
 Heavy Metal Mass: BOL=10.08kg ; EOL=10.05kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.00018
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.50

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	8.0632E-10	147.360	294.719	0.00E+00	1.19E-07	2.38E-07		
Am-241	2.2586E-03	147.360	294.719	0.00E+00	3.33E-01	6.66E-01	0.0150	4.987E+13
Am-242m	1.9925E-06	147.360	294.719	0.00E+00	2.94E-04	5.87E-04	0.0250	1.083E+13
Am-243	2.3323E-07	147.360	294.719	0.00E+00	3.44E-05	6.87E-05	0.0375	1.349E+13
C-14	4.3308E-05	147.360	294.719	0.00E+00	6.38E-03	1.28E-02	0.0575	1.034E+13
Ci-36	4.3023E-08	147.360	294.719	0.00E+00	6.34E-06	1.27E-05	0.0850	7.236E+12
Cm-243	2.7429E-07	147.360	294.719	0.00E+00	4.04E-05	8.08E-05	0.1250	1.082E+13
Cm-244	3.1504E-06	147.360	294.719	0.00E+00	4.64E-04	9.28E-04	0.2250	6.041E+12
Co-60	3.1008E-02	147.360	294.719	0.00E+00	4.57E+00	9.14E+00	0.3750	2.689E+12
Cs-134	1.0367E-01	147.360	294.719	0.00E+00	1.53E+01	3.06E+01	0.5750	3.409E+13
Cs-135	3.1549E-05	147.360	294.719	0.00E+00	4.65E-03	9.30E-03	0.8500	8.390E+12
Cs-137	2.7564E+00	147.360	294.719	0.00E+00	4.06E+02	8.12E+02	1.2500	8.698E+12
Eu-154	1.3490E+00	147.360	294.719	0.00E+00	1.99E+02	3.98E+02	1.7500	2.489E+11
Eu-155	4.3880E-01	147.360	294.719	0.00E+00	6.47E+01	1.29E+02	2.2500	3.026E+10
Fe-55	8.6782E-03	147.360	294.719	0.00E+00	1.28E+00	2.56E+00	2.7500	2.458E+08
H-3	1.0805E-02	147.360	294.719	0.00E+00	1.59E+00	3.18E+00	3.5000	2.873E+07
I-129	7.3805E-07	147.360	294.719	0.00E+00	1.09E-04	2.18E-04	5.0000	1.744E+02
Kr-85	2.5218E-01	147.360	294.719	0.00E+00	3.72E+01	7.43E+01	7.0000	1.974E+01
Np-237	1.4463E-06	147.360	294.719	0.00E+00	2.13E-04	4.26E-04	11.0000	2.249E+00
Pa-231	3.5970E-09	147.360	294.719	0.00E+00	5.30E-07	1.06E-06		
Pb-210	8.2511E-15	147.360	294.719	0.00E+00	1.22E-12	2.43E-12		
Pm-147	2.0767E+00	147.360	294.719	0.00E+00	3.06E+02	6.12E+02		
Pu-238	1.3514E-03	147.360	294.719	0.00E+00	1.99E-01	3.98E-01		
Pu-239	5.6947E-03	147.360	294.719	0.00E+00	8.39E-01	1.68E+00		
Pu-240	2.2647E-03	147.360	294.719	0.00E+00	3.34E-01	6.67E-01		
Pu-241	1.2574E-01	147.360	294.719	0.00E+00	1.85E+01	3.71E+01		
Pu-242	3.0602E-07	147.360	294.719	0.00E+00	4.51E-05	9.02E-05		
Ra-226	5.7353E-14	147.360	294.719	0.00E+00	8.45E-12	1.69E-11		
Ra-228	1.8150E-10	147.360	294.719	0.00E+00	2.67E-08	5.35E-08		
Ru-106	9.3744E-02	147.360	294.719	0.00E+00	1.38E+01	2.76E+01		
Se-79	1.2938E-05	147.360	294.719	0.00E+00	1.91E-03	3.81E-03		
Sn-126	1.2239E-05	147.360	294.719	0.00E+00	1.80E-03	3.61E-03		
Sr-90	2.6000E+00	147.360	294.719	0.00E+00	3.83E+02	7.66E+02		
Tc-99	4.4120E-04	147.360	294.719	0.00E+00	6.50E-02	1.30E-01		
Th-229	1.4749E-10	147.360	294.719	0.00E+00	2.17E-08	4.35E-08		
Th-230	1.9549E-11	147.360	294.719	0.00E+00	2.88E-09	5.76E-09		
Th-232	2.3744E-10	147.360	294.719	0.00E+00	3.50E-08	7.00E-08		
Ti-208	1.9459E-08	147.360	294.719	0.00E+00	2.87E-06	5.73E-06		
U-232	5.6015E-08	147.360	294.719	0.00E+00	8.25E-06	1.65E-05		
U-233	1.3132E-07	147.360	294.719	0.00E+00	1.94E-05	3.87E-05		
U-234	1.7323E-07	147.360	294.719	0.00E+00	2.55E-05	5.11E-05		
U-235	-2.6159E-06	147.360	0.000	4.36E-03	3.97E-03	4.36E-03		
U-236	1.2717E-05	147.360	294.719	0.00E+00	1.87E-03	3.75E-03		
U-238	-3.8857E-08	147.360	0.000	2.71E-03	2.70E-03	2.71E-03		
Y-90	2.6015E+00	147.360	294.719	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:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U-ZrHX	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	147.360	26.727	
Bounding:		294.719	

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:	0.40	0.18	
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 (ZAIRE) ¹Fuel decay start date: 2010
 SNF ID #: 486 Estimates as of: 2010
 Fuel Units & Descr: 80 - ELEMENT Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=15.45kg ; EOL=15.29kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.72

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	152.737	305.474	0.00E+00	1.30E-07	2.60E-07	0.0150	4.937E+13
Am-241	1.8331E-03	152.737	305.474	0.00E+00	2.80E-01	5.60E-01	0.0250	1.086E+13
Am-242m	1.4129E-06	152.737	305.474	0.00E+00	2.16E-04	4.32E-04	0.0375	9.252E+12
Am-243	1.4774E-07	152.737	305.474	0.00E+00	2.26E-05	4.51E-05	0.0575	9.496E+12
C-14	1.2871E-04	152.737	305.474	0.00E+00	1.97E-02	3.93E-02	0.0850	5.883E+12
Cl-36	2.8120E-06	152.737	305.474	0.00E+00	4.30E-04	8.59E-04	0.1250	4.272E+12
Cm-243	1.7940E-07	152.737	305.474	0.00E+00	2.74E-05	5.48E-05	0.2250	4.991E+12
Cm-244	1.6962E-06	152.737	305.474	0.00E+00	2.59E-04	5.18E-04	0.3750	2.532E+12
Co-60	1.2839E+00	152.737	305.474	0.00E+00	1.96E+02	3.92E+02	0.5750	3.367E+13
Cs-134	9.0541E-02	152.737	305.474	0.00E+00	1.38E+01	2.77E+01	0.8500	1.445E+12
Cs-135	3.2195E-05	152.737	305.474	0.00E+00	4.92E-03	9.83E-03	1.2500	2.935E+13
Cs-137	2.7564E+00	152.737	305.474	0.00E+00	4.21E+02	8.42E+02	1.7500	1.956E+10
Eu-154	1.5368E-02	152.737	305.474	0.00E+00	2.35E+00	4.69E+00	2.2500	3.153E+10
Eu-155	2.9293E-02	152.737	305.474	0.00E+00	4.47E+00	8.95E+00	2.7500	2.502E+08
Fe-55	7.7158E-01	152.737	305.474	0.00E+00	1.18E+02	2.36E+02	3.5000	2.913E+07
H-3	1.1111E-02	152.737	305.474	0.00E+00	1.70E+00	3.39E+00	5.0000	1.697E+02
I-129	7.3684E-07	152.737	305.474	0.00E+00	1.13E-04	2.25E-04	7.0000	1.922E+01
Kr-85	2.5263E-01	152.737	305.474	0.00E+00	3.86E+01	7.72E+01	11.0000	2.191E+00
Np-237	1.2427E-06	152.737	305.474	0.00E+00	1.90E-04	3.80E-04		
Pa-231	3.8511E-09	152.737	305.474	0.00E+00	5.88E-07	1.18E-06		
Pb-210	7.3880E-15	152.737	305.474	0.00E+00	1.13E-12	2.26E-12		
Pm-147	2.1023E+00	152.737	305.474	0.00E+00	3.21E+02	6.42E+02		
Pu-238	1.0383E-03	152.737	305.474	0.00E+00	1.59E-01	3.17E-01		
Pu-239	5.5293E-03	152.737	305.474	0.00E+00	8.45E-01	1.69E+00		
Pu-240	2.1278E-03	152.737	305.474	0.00E+00	3.25E-01	6.50E-01		
Pu-241	1.0195E-01	152.737	305.474	0.00E+00	1.56E+01	3.11E+01		
Pu-242	2.3128E-07	152.737	305.474	0.00E+00	3.53E-05	7.06E-05		
Ra-226	5.2782E-14	152.737	305.474	0.00E+00	8.06E-12	1.61E-11		
Ra-228	1.9338E-10	152.737	305.474	0.00E+00	2.95E-08	5.91E-08		
Ru-106	9.1684E-02	152.737	305.474	0.00E+00	1.40E+01	2.80E+01		
Se-79	1.3018E-05	152.737	305.474	0.00E+00	1.99E-03	3.98E-03		
Sn-126	1.2167E-05	152.737	305.474	0.00E+00	1.86E-03	3.72E-03		
Sr-90	2.6045E+00	152.737	305.474	0.00E+00	3.98E+02	7.96E+02		
Tc-99	4.4241E-04	152.737	305.474	0.00E+00	6.76E-02	1.35E-01		
Th-229	1.3713E-10	152.737	305.474	0.00E+00	2.09E-08	4.19E-08		
Th-230	1.8090E-11	152.737	305.474	0.00E+00	2.76E-09	5.53E-09		
Th-232	2.5278E-10	152.737	305.474	0.00E+00	3.86E-08	7.72E-08		
Tl-208	1.6947E-08	152.737	305.474	0.00E+00	2.59E-06	5.18E-06		
U-232	4.8737E-08	152.737	305.474	0.00E+00	7.44E-06	1.49E-05		
U-233	1.2203E-07	152.737	305.474	0.00E+00	1.86E-05	3.73E-05		
U-234	1.5925E-07	152.737	305.474	0.00E+00	2.43E-05	4.86E-05		
U-235	-2.6194E-06	152.737	0.000	6.68E-03	6.28E-03	6.68E-03		
U-236	1.2693E-05	152.737	305.474	0.00E+00	1.94E-03	3.88E-03		
U-238	-3.6331E-08	152.737	0.000	4.15E-03	4.15E-03	4.15E-03		
Y-90	2.6060E+00	152.737	305.474	0.00E+00	3.98E+02	7.96E+02		
Other Radionuclides					5.51E+02	1.10E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.89E+00	1.78E+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 (304)	SST	
BOL HM Constituents:	U-ZrHx	U	
BOL Enrichment %:	20.00000041	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		152.737	
Bounding:		305.474	

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		
Bounding:	0.58		

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: TRR-1 (THAILAND) ¹Fuel decay start date: 1998
 SNF ID #: 633 Estimate as of: 2010
 Fuel Units & Descr: 31 - MTR TYPE Template: TRIGA-AI (LW/U-Zr, Alum., 10 to 20%, U)
 Heavy Metal Mass: BOL=5.29kg ; EOL=4.77kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00018
 Template Decay Time: 10 years

Estimated
 Canister usage:
 18"x10"
 1.29

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	1.2892E-09	500.072	1,000.145	0.00E+00	6.45E-07	1.29E-06		
Am-241	2.9429E-03	500.072	1,000.145	0.00E+00	1.47E+00	2.94E+00	0.0150	1.345E+14
Am-242m	1.9489E-06	500.072	1,000.145	0.00E+00	9.75E-04	1.95E-03	0.0250	2.812E+13
Am-243	2.3308E-07	500.072	1,000.145	0.00E+00	1.17E-04	2.33E-04	0.0375	3.321E+13
C-14	4.3278E-05	500.072	1,000.145	0.00E+00	2.16E-02	4.33E-02	0.0575	2.746E+13
Cl-36	4.3023E-08	500.072	1,000.145	0.00E+00	2.15E-05	4.30E-05	0.0850	1.785E+13
Cm-243	2.4286E-07	500.072	1,000.145	0.00E+00	1.21E-04	2.43E-04	0.1250	2.470E+13
Cm-244	2.6015E-06	500.072	1,000.145	0.00E+00	1.30E-03	2.60E-03	0.2250	1.567E+13
Co-60	1.6075E-02	500.072	1,000.145	0.00E+00	8.04E+00	1.61E+01	0.3750	6.448E+12
Cs-134	1.9323E-02	500.072	1,000.145	0.00E+00	9.66E+00	1.93E+01	0.5750	9.606E+13
Cs-135	3.1549E-05	500.072	1,000.145	0.00E+00	1.58E-02	3.16E-02	0.8500	1.750E+13
Cs-137	2.4556E+00	500.072	1,000.145	0.00E+00	1.23E+03	2.46E+03	1.2500	1.924E+13
Eu-154	9.0180E-01	500.072	1,000.145	0.00E+00	4.51E+02	9.02E+02	1.7500	5.517E+11
Eu-155	2.1820E-01	500.072	1,000.145	0.00E+00	1.09E+02	2.18E+02	2.2500	1.318E+09
Fe-55	2.2902E-03	500.072	1,000.145	0.00E+00	1.15E+00	2.29E+00	2.7500	2.574E+07
H-3	8.1609E-03	500.072	1,000.145	0.00E+00	4.08E+00	8.16E+00	3.5000	3.141E+06
I-129	7.3805E-07	500.072	1,000.145	0.00E+00	3.69E-04	7.38E-04	5.0000	5.671E+02
Kr-85	1.8256E-01	500.072	1,000.145	0.00E+00	9.13E+01	1.83E+02	7.0000	6.410E+01
Np-237	1.4505E-06	500.072	1,000.145	0.00E+00	7.25E-04	1.45E-03	11.0000	7.297E+00
Pa-231	4.5564E-09	500.072	1,000.145	0.00E+00	2.28E-06	4.56E-06		
Pb-210	1.8842E-14	500.072	1,000.145	0.00E+00	9.42E-12	1.88E-11		
Pm-147	5.5459E-01	500.072	1,000.145	0.00E+00	2.77E+02	5.55E+02		
Pu-238	1.2992E-03	500.072	1,000.145	0.00E+00	6.50E-01	1.30E+00		
Pu-239	5.6932E-03	500.072	1,000.145	0.00E+00	2.85E+00	5.69E+00		
Pu-240	2.2632E-03	500.072	1,000.145	0.00E+00	1.13E+00	2.26E+00		
Pu-241	9.8857E-02	500.072	1,000.145	0.00E+00	4.94E+01	9.89E+01		
Pu-242	3.0602E-07	500.072	1,000.145	0.00E+00	1.53E-04	3.06E-04		
Ra-226	1.0823E-13	500.072	1,000.145	0.00E+00	5.41E-11	1.08E-10		
Ra-228	2.0406E-10	500.072	1,000.145	0.00E+00	1.02E-07	2.04E-07		
Ru-106	3.0180E-03	500.072	1,000.145	0.00E+00	1.51E+00	3.02E+00		
Se-79	1.2937E-05	500.072	1,000.145	0.00E+00	6.47E-03	1.29E-02		
Sn-126	1.2238E-05	500.072	1,000.145	0.00E+00	6.12E-03	1.22E-02		
Sr-90	2.3098E+00	500.072	1,000.145	0.00E+00	1.16E+03	2.31E+03		
Tc-99	4.4120E-04	500.072	1,000.145	0.00E+00	2.21E-01	4.41E-01		
Th-229	2.0932E-10	500.072	1,000.145	0.00E+00	1.05E-07	2.09E-07		
Th-230	2.7744E-11	500.072	1,000.145	0.00E+00	1.39E-08	2.77E-08		
Th-232	2.3744E-10	500.072	1,000.145	0.00E+00	1.19E-07	2.37E-07		
Tl-208	1.9459E-08	500.072	1,000.145	0.00E+00	9.73E-06	1.95E-05		
U-232	5.3850E-08	500.072	1,000.145	0.00E+00	2.69E-05	5.39E-05		
U-233	1.3135E-07	500.072	1,000.145	0.00E+00	6.57E-05	1.31E-04		
U-234	1.9143E-07	500.072	1,000.145	0.00E+00	9.57E-05	1.91E-04		
U-235	-2.6159E-06	500.072	0.000	1.03E-02	8.98E-03	1.03E-02		
U-236	1.2719E-05	500.072	1,000.145	0.00E+00	6.36E-03	1.27E-02		
U-238	-3.8857E-08	500.072	0.000	1.80E-04	1.60E-04	1.80E-04		
Y-90	2.3098E+00	500.072	1,000.145	0.00E+00	1.16E+03	2.31E+03		
Other Radionuclides					1.32E+03	2.64E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.85E+01	3.71E+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	This Template was used for the following reasons: This fuel matches on all parameters except enrichment.
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	89.90758798	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		500.072	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		1,000.145	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	2.56		
Bounding:	5.11		

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: TRU SCRAP SNF
 SNF ID #: 904
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL= ; EOL=106.34kg
 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 _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	2.1509E-08	93,768.994	93,768.994	0.00E+00	2.02E-03	2.02E-03		
Am-241	4.6529E-07	93,768.994	93,768.994	0.00E+00	4.36E-02	4.36E-02	0.0150	1.005E+16
Am-242m	0.0000E+00	93,768.994	93,768.994	0.00E+00	0.00E+00	0.00E+00	0.0250	2.131E+15
Am-243	8.3923E-15	93,768.994	93,768.994	0.00E+00	7.87E-10	7.87E-10	0.0375	1.852E+15
C-14	2.1765E-05	93,768.994	93,768.994	0.00E+00	2.04E+00	2.04E+00	0.0575	1.946E+15
Cl-36	5.5188E-08	93,768.994	93,768.994	0.00E+00	5.17E-03	5.17E-03	0.0850	1.196E+15
Cm-243	2.5208E-14	93,768.994	93,768.994	0.00E+00	2.36E-09	2.36E-09	0.1250	7.729E+14
Cm-244	1.1259E-15	93,768.994	93,768.994	0.00E+00	1.06E-10	1.06E-10	0.2250	1.009E+15
Co-60	2.9094E-02	93,768.994	93,768.994	0.00E+00	2.73E+03	2.73E+03	0.3750	4.620E+14
Cs-134	5.1932E-04	93,768.994	93,768.994	0.00E+00	4.87E+01	4.87E+01	0.5750	7.659E+15
Cs-135	4.4996E-05	93,768.994	93,768.994	0.00E+00	4.22E+00	4.22E+00	0.8500	7.397E+13
Cs-137	2.1867E+00	93,768.994	93,768.994	0.00E+00	2.05E+05	2.05E+05	1.2500	2.271E+14
Eu-154	9.2837E-04	93,768.994	93,768.994	0.00E+00	8.71E+01	8.71E+01	1.7500	1.881E+12
Eu-155	2.3180E-02	93,768.994	93,768.994	0.00E+00	2.17E+03	2.17E+03	2.2500	5.379E+09
Fe-55	2.9332E-02	93,768.994	93,768.994	0.00E+00	2.75E+02	2.75E+02	2.7500	2.457E+08
H-3	1.0871E-03	93,768.994	93,768.994	0.00E+00	1.02E+03	1.02E+03	3.5000	2.837E+07
I-129	1.1426E-06	93,768.994	93,768.994	0.00E+00	1.07E-01	1.07E-01	5.0000	5.353E+03
Kr-85	1.4068E-01	93,768.994	93,768.994	0.00E+00	1.32E+04	1.32E+04	7.0000	4.350E+02
Np-237	3.3099E-06	93,768.994	93,768.994	0.00E+00	3.10E-01	3.10E-01	11.0000	3.798E+01
Pa-231	7.8640E-08	93,768.994	93,768.994	0.00E+00	7.37E-03	7.37E-03		
Pb-210	7.4277E-13	93,768.994	93,768.994	0.00E+00	6.96E-08	6.96E-08		
Pm-147	2.2856E-01	93,768.994	93,768.994	0.00E+00	2.14E+04	2.14E+04		
Pu-238	2.0095E-04	93,768.994	93,768.994	0.00E+00	1.88E+01	1.88E+01		
Pu-239	1.9481E-02	93,768.994	93,768.994	0.00E+00	1.83E+03	1.83E+03		
Pu-240	6.8056E-05	93,768.994	93,768.994	0.00E+00	6.38E+00	6.38E+00		
Pu-241	1.0939E-05	93,768.994	93,768.994	0.00E+00	1.03E+00	1.03E+00		
Pu-242	4.3751E-13	93,768.994	93,768.994	0.00E+00	4.10E-08	4.10E-08		
Ra-226	4.0428E-12	93,768.994	93,768.994	0.00E+00	3.79E-07	3.79E-07		
Ra-228	2.1032E-11	93,768.994	93,768.994	0.00E+00	1.97E-06	1.97E-06		
Ru-106	2.9077E-04	93,768.994	93,768.994	0.00E+00	2.73E+01	2.73E+01		
Se-79	1.6492E-05	93,768.994	93,768.994	0.00E+00	1.55E+00	1.55E+00		
Sn-126	3.7564E-05	93,768.994	93,768.994	0.00E+00	3.52E+00	3.52E+00		
Sr-90	1.9396E+00	93,768.994	93,768.994	0.00E+00	1.82E+05	1.82E+05		
Tc-99	4.4842E-04	93,768.994	93,768.994	0.00E+00	4.20E+01	4.20E+01		
Th-229	1.8544E-11	93,768.994	93,768.994	0.00E+00	1.74E-06	1.74E-06		
Th-230	9.0605E-10	93,768.994	93,768.994	0.00E+00	8.50E-05	8.50E-05		
Th-232	2.3674E-11	93,768.994	93,768.994	0.00E+00	2.22E-06	2.22E-06		
Ti-208	7.0323E-09	93,768.994	93,768.994	0.00E+00	6.59E-04	6.59E-04		
U-232	1.9106E-08	93,768.994	93,768.994	0.00E+00	1.79E-03	1.79E-03		
U-233	9.6774E-09	93,768.994	93,768.994	0.00E+00	9.07E-04	9.07E-04		
U-234	4.8796E-06	93,768.994	93,768.994	0.00E+00	4.58E-01	4.58E-01		
U-235	-2.3191E-06	93,768.994	0.000	1.18E-01	0.00E+00	1.18E-01		
U-236	1.2633E-05	93,768.994	93,768.994	0.00E+00	1.18E+00	1.18E+00		
U-238	-9.5407E-08	93,768.994	0.000	5.32E-02	4.42E-02	5.32E-02		
Y-90	1.9396E+00	93,768.994	93,768.994	0.00E+00	1.82E+05	1.82E+05		
Other Radionuclides					2.04E+05	2.04E+05		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							2.35E+03	2.35E+03
							Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: FAST	Used: FAST	This Template was used for the following reasons: This fuel matches on all parameters except cladding (unknown) and enrichment (unknown).
Fuel Cladding:	From SFD: UNKNOWN	Used: ZIRC	
BOL HM Constituents:	From SFD: U METAL	Used: U	
BOL Enrichment %:	From SFD: 10 to 40	Used: 10 to 40	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD: 93,768.994	Estimated: 93,768.994	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:	From SFD: 93,768.994	Estimated: 93,768.994	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier: 141.08	Estimated Burnup/ Given Burnup:	1.69
Bounding:	Burnup Multiplier: 141.08	Estimated Burnup/ Given Burnup:	

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=2285.00kg ; EOL=2221.60kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1977
 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:
 PWR
 1.00

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	6.6376E-10	63,036.295	120,580.802	0.00E+00	4.18E-05	8.00E-05		
Am-241	1.3144E-01	63,036.295	120,580.802	0.00E+00	8.29E+03	1.58E+04	0.0150	8.200E+15
Am-242m	3.0039E-04	63,036.295	120,580.802	0.00E+00	1.89E+01	3.62E+01	0.0250	1.661E+15
Am-243	6.2629E-04	63,036.295	120,580.802	0.00E+00	3.95E+01	7.55E+01	0.0375	1.607E+15
C-14	4.7965E-05	63,036.295	120,580.802	0.00E+00	3.02E+00	5.78E+00	0.0575	1.753E+15
Cl-36	8.0297E-07	63,036.295	120,580.802	0.00E+00	5.06E-02	9.68E-02	0.0850	9.291E+14
Cm-243	3.1993E-04	63,036.295	120,580.802	0.00E+00	2.02E+01	3.86E+01	0.1250	6.787E+14
Cm-244	7.1851E-02	63,036.295	120,580.802	0.00E+00	4.53E+03	8.66E+03	0.2250	7.976E+14
Co-60	9.5220E-03	63,036.295	120,580.802	0.00E+00	6.00E+02	1.15E+03	0.3750	3.422E+14
Cs-134	1.1662E-03	63,036.295	120,580.802	0.00E+00	7.35E+01	1.41E+02	0.5750	7.864E+15
Cs-135	1.4433E-05	63,036.295	120,580.802	0.00E+00	9.10E-01	1.74E+00	0.8500	1.552E+14
Cs-137	1.7603E-04	63,036.295	120,580.802	0.00E+00	1.11E+05	2.12E+05	1.2500	2.097E+14
Eu-154	4.5203E-02	63,036.295	120,580.802	0.00E+00	2.85E+03	5.45E+03	1.7500	4.594E+12
Eu-155	7.1479E-03	63,036.295	120,580.802	0.00E+00	4.51E+02	8.62E+02	2.2500	8.486E+08
Fe-55	6.1919E-04	63,036.295	120,580.802	0.00E+00	3.90E+01	7.47E+01	2.7500	9.536E+08
H-3	3.6386E-02	63,036.295	120,580.802	0.00E+00	2.29E+03	4.39E+03	3.5000	1.250E+08
I-129	9.8288E-07	63,036.295	120,580.802	0.00E+00	6.20E-02	1.19E-01	5.0000	5.341E+07
Kr-85	5.3844E-02	63,036.295	120,580.802	0.00E+00	3.39E+03	6.49E+03	7.0000	6.157E+06
Np-237	1.0546E-05	63,036.295	120,580.802	0.00E+00	6.65E-01	1.27E+00	11.0000	7.072E+05
Pa-231	1.1370E-09	63,036.295	120,580.802	0.00E+00	7.17E-05	1.37E-04		
Pb-210	3.3624E-11	63,036.295	120,580.802	0.00E+00	2.12E-06	4.05E-06		
Pm-147	5.1211E-03	63,036.295	120,580.802	0.00E+00	3.23E+02	6.18E+02		
Pu-238	8.0669E-02	63,036.295	120,580.802	0.00E+00	5.09E+03	9.73E+03		
Pu-239	1.1626E-02	63,036.295	120,580.802	0.00E+00	7.33E+02	1.40E+03		
Pu-240	1.5097E-02	63,036.295	120,580.802	0.00E+00	9.52E+02	1.82E+03		
Pu-241	1.4567E+00	63,036.295	120,580.802	0.00E+00	9.18E+04	1.76E+05		
Pu-242	6.4260E-05	63,036.295	120,580.802	0.00E+00	4.05E+00	7.75E+00		
Ra-226	1.1392E-10	63,036.295	120,580.802	0.00E+00	7.18E-06	1.37E-05		
Ra-228	5.1841E-12	63,036.295	120,580.802	0.00E+00	3.27E-07	6.25E-07		
Ru-106	5.9012E-07	63,036.295	120,580.802	0.00E+00	3.72E-02	7.12E-02		
Se-79	1.2379E-05	63,036.295	120,580.802	0.00E+00	7.80E-01	1.49E+00		
Sn-126	2.5210E-05	63,036.295	120,580.802	0.00E+00	1.59E+00	3.04E+00		
Sr-90	1.1630E+00	63,036.295	120,580.802	0.00E+00	7.33E+04	1.40E+05		
Tc-99	3.9357E-04	63,036.295	120,580.802	0.00E+00	2.48E+01	4.75E+01		
Th-229	8.5691E-11	63,036.295	120,580.802	0.00E+00	5.40E-06	1.03E-05		
Th-230	1.4493E-08	63,036.295	120,580.802	0.00E+00	9.14E-04	1.75E-03		
Th-232	5.2923E-12	63,036.295	120,580.802	0.00E+00	3.34E-07	6.38E-07		
Tl-208	1.9202E-07	63,036.295	120,580.802	0.00E+00	1.21E-02	2.32E-02		
U-232	5.2083E-07	63,036.295	120,580.802	0.00E+00	3.28E-02	6.28E-02		
U-233	2.4386E-08	63,036.295	120,580.802	0.00E+00	1.54E-03	2.94E-03		
U-234	4.7012E-05	63,036.295	120,580.802	0.00E+00	2.96E+00	5.67E+00		
U-235	-1.4492E-06	63,036.295	0.000	1.26E-01	3.51E-02	1.26E-01		
U-236	7.5759E-06	63,036.295	120,580.802	0.00E+00	4.78E-01	9.14E-01		
U-238	-2.6129E-07	63,036.295	0.000	7.48E-01	7.32E-01	7.48E-01		
Y-90	1.1631E+00	63,036.295	120,580.802	0.00E+00	7.33E+04	1.40E+05		
Other Radionuclides					1.06E+05	2.04E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.73E+03	3.31E+03
Total	Total

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-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	2.55999934	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	63,036.295	60,290.401	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	63,666.955	120,580.802	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.79	0.96	1.00
Bounding:	1.51	1.89	

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: UMRR (ROLLA)
 SNF ID #: 881
 Fuel Units & Descr: 28 - 24 CURVED PLATES
 Heavy Metal Mass: BOL=5.10kg ; EOL=4.77kg
 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"
 1.17

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	2.8404E-10	307.592	615.184	0.00E+00	8.74E-08	1.75E-07	Avg. MeV	
Am-241	1.4935E-03	307.592	615.184	0.00E+00	4.59E-01	9.19E-01	0.0150	8.367E+13
Am-242m	4.4390E-07	307.592	615.184	0.00E+00	1.37E-04	2.73E-04	0.0250	1.761E+13
Am-243	1.4913E-06	307.592	615.184	0.00E+00	4.59E-04	9.17E-04	0.0375	1.535E+13
C-14	5.7217E-09	307.592	615.184	0.00E+00	1.76E-06	3.52E-06	0.0575	1.622E+13
Cl-36	1.3124E-32	307.592	615.184	0.00E+00	4.04E-30	8.07E-30	0.0850	9.867E+12
Cm-243	2.0967E-07	307.592	615.184	0.00E+00	6.45E-05	1.29E-04	0.1250	6.902E+12
Cm-244	4.3001E-05	307.592	615.184	0.00E+00	1.32E-02	2.65E-02	0.2250	8.473E+12
Co-60	1.9798E-05	307.592	615.184	0.00E+00	6.09E-03	1.22E-02	0.3750	3.797E+12
Cs-134	9.0795E-02	307.592	615.184	0.00E+00	2.79E+01	5.59E+01	0.5750	6.165E+13
Cs-135	3.4477E-06	307.592	615.184	0.00E+00	1.06E-03	2.12E-03	0.8500	3.007E+12
Cs-137	2.5588E+00	307.592	615.184	0.00E+00	7.87E+02	1.57E+03	1.2500	9.788E+11
Eu-154	5.4847E-02	307.592	615.184	0.00E+00	1.69E+01	3.37E+01	1.7500	3.574E+10
Eu-155	1.9469E-02	307.592	615.184	0.00E+00	5.99E+00	1.20E+01	2.2500	2.363E+09
Fe-55	1.7797E-03	307.592	615.184	0.00E+00	5.47E-01	1.09E+00	2.7500	3.297E+07
H-3	8.0065E-03	307.592	615.184	0.00E+00	2.46E+00	4.93E+00	3.5000	3.926E+06
I-129	7.5300E-07	307.592	615.184	0.00E+00	2.32E-04	4.63E-04	5.0000	3.264E+02
Kr-85	2.0705E-01	307.592	615.184	0.00E+00	6.37E+01	1.27E+02	7.0000	3.627E+01
Np-237	9.5507E-06	307.592	615.184	0.00E+00	2.94E-03	5.88E-03	11.0000	4.080E+00
Pa-231	1.2740E-09	307.592	615.184	0.00E+00	3.92E-07	7.84E-07		
Pb-210	1.1838E-11	307.592	615.184	0.00E+00	3.64E-09	7.28E-09		
Pm-147	6.7974E-01	307.592	615.184	0.00E+00	2.09E+02	4.18E+02		
Pu-238	1.9755E-02	307.592	615.184	0.00E+00	6.08E+00	1.22E+01		
Pu-239	4.2838E-04	307.592	615.184	0.00E+00	1.32E-01	2.64E-01		
Pu-240	2.4390E-04	307.592	615.184	0.00E+00	7.50E-02	1.50E-01		
Pu-241	5.4058E-02	307.592	615.184	0.00E+00	1.66E+01	3.33E+01		
Pu-242	3.6329E-07	307.592	615.184	0.00E+00	1.12E-04	2.23E-04		
Ra-226	8.3742E-11	307.592	615.184	0.00E+00	2.58E-08	5.15E-08		
Ra-228	5.7734E-15	307.592	615.184	0.00E+00	1.78E-12	3.55E-12		
Ru-106	6.1356E-03	307.592	615.184	0.00E+00	1.89E+00	3.77E+00		
Se-79	1.2936E-05	307.592	615.184	0.00E+00	3.98E-03	7.96E-03		
Sn-126	1.1574E-05	307.592	615.184	0.00E+00	3.56E-03	7.12E-03		
Sr-90	2.4417E+00	307.592	615.184	0.00E+00	7.51E+02	1.50E+03		
Tc-99	4.2239E-04	307.592	615.184	0.00E+00	1.30E-01	2.60E-01		
Th-229	2.8568E-12	307.592	615.184	0.00E+00	8.79E-10	1.76E-09		
Th-230	2.5310E-08	307.592	615.184	0.00E+00	7.79E-06	1.56E-05		
Th-232	1.1631E-14	307.592	615.184	0.00E+00	3.58E-12	7.16E-12		
Tl-208	4.6705E-08	307.592	615.184	0.00E+00	1.44E-05	2.87E-05		
U-232	1.3151E-07	307.592	615.184	0.00E+00	4.05E-05	8.09E-05		
U-233	2.1650E-09	307.592	615.184	0.00E+00	6.66E-07	1.33E-06		
U-234	1.8399E-04	307.592	615.184	0.00E+00	5.66E-02	1.13E-01		
U-235	-2.7235E-06	307.592	0.000	1.03E-02	9.45E-03	1.03E-02		
U-236	1.5493E-05	307.592	615.184	0.00E+00	4.77E-03	9.53E-03		
U-238	-4.2851E-09	307.592	0.000	1.13E-04	1.12E-04	1.13E-04		
Y-90	2.4423E+00	307.592	615.184	0.00E+00	7.51E+02	1.50E+03		
Other Radionuclides					7.65E+02	1.53E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.73E+00	1.95E+01
Total	Total

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 (6061)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	93.40659341	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		307.592	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		615.184	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.19		1.00
Bounding:	0.38		

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: UMRR (ROLLA)
 SNF ID #: 146
 Fuel Units & Descr: 28 - 24 CURVED PLATES
 Heavy Metal Mass: BOL=31.90kg ; EOL=26.46kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2035
 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"
 1.17

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	5,149.513	10,299.025	0.00E+00	7.49E-07	1.50E-06	Avg. MeV	
Am-241	1.1190E-03	5,149.513	10,299.025	0.00E+00	5.76E+00	1.15E+01	0.0150	1.987E+15
Am-242m	4.5425E-07	5,149.513	10,299.025	0.00E+00	2.34E-03	4.68E-03	0.0250	4.281E+14
Am-243	1.4921E-06	5,149.513	10,299.025	0.00E+00	7.68E-03	1.54E-02	0.0375	3.950E+14
C-14	5.7244E-09	5,149.513	10,299.025	0.00E+00	2.95E-05	5.90E-05	0.0575	3.884E+14
Cl-36	1.3124E-32	5,149.513	10,299.025	0.00E+00	6.76E-29	1.35E-28	0.0850	2.476E+14
Cr-243	2.3676E-07	5,149.513	10,299.025	0.00E+00	1.22E-03	2.44E-03	0.1250	2.144E+14
Cr-244	5.2042E-05	5,149.513	10,299.025	0.00E+00	2.68E-01	5.36E-01	0.2250	2.099E+14
Co-60	3.8208E-05	5,149.513	10,299.025	0.00E+00	1.97E-01	3.94E-01	0.3750	1.016E+14
Cs-134	4.8693E-01	5,149.513	10,299.025	0.00E+00	2.51E+03	5.01E+03	0.5750	1.395E+15
Cs-135	3.4477E-06	5,149.513	10,299.025	0.00E+00	1.78E-02	3.55E-02	0.8500	1.954E+14
Cs-137	2.8731E+00	5,149.513	10,299.025	0.00E+00	1.48E+04	2.96E+04	1.2500	3.636E+13
Eu-154	8.2053E-02	5,149.513	10,299.025	0.00E+00	4.23E+02	8.45E+02	1.7500	1.525E+12
Eu-155	3.9134E-02	5,149.513	10,299.025	0.00E+00	2.02E+02	4.03E+02	2.2500	3.198E+12
Fe-55	6.7429E-03	5,149.513	10,299.025	0.00E+00	3.47E+01	6.94E+01	2.7500	1.840E+10
H-3	1.0599E-02	5,149.513	10,299.025	0.00E+00	5.46E+01	1.09E+02	3.5000	2.041E+09
I-129	7.5300E-07	5,149.513	10,299.025	0.00E+00	3.88E-03	7.76E-03	5.0000	6.119E+03
Kr-85	2.8595E-01	5,149.513	10,299.025	0.00E+00	1.47E+03	2.94E+03	7.0000	6.823E+02
Np-237	9.5479E-06	5,149.513	10,299.025	0.00E+00	4.92E-02	9.83E-02	11.0000	7.691E+01
Pa-231	8.9297E-10	5,149.513	10,299.025	0.00E+00	4.60E-06	9.20E-06		
Pb-210	3.7609E-12	5,149.513	10,299.025	0.00E+00	1.94E-08	3.87E-08		
Pm-147	2.5452E+00	5,149.513	10,299.025	0.00E+00	1.31E+04	2.62E+04		
Pu-238	2.0550E-02	5,149.513	10,299.025	0.00E+00	1.06E+02	2.12E+02		
Pu-239	4.2838E-04	5,149.513	10,299.025	0.00E+00	2.21E+00	4.41E+00		
Pu-240	2.4401E-04	5,149.513	10,299.025	0.00E+00	1.26E+00	2.51E+00		
Pu-241	6.8764E-02	5,149.513	10,299.025	0.00E+00	3.54E+02	7.08E+02		
Pu-242	3.6329E-07	5,149.513	10,299.025	0.00E+00	1.87E-03	3.74E-03		
Ra-226	3.8045E-11	5,149.513	10,299.025	0.00E+00	1.96E-07	3.92E-07		
Ra-228	2.9902E-15	5,149.513	10,299.025	0.00E+00	1.54E-11	3.08E-11		
Ru-106	1.9055E-01	5,149.513	10,299.025	0.00E+00	9.81E+02	1.96E+03		
Se-79	1.2936E-05	5,149.513	10,299.025	0.00E+00	6.66E-02	1.33E-01		
Sn-126	1.1574E-05	5,149.513	10,299.025	0.00E+00	5.96E-02	1.19E-01		
Sr-90	2.7505E+00	5,149.513	10,299.025	0.00E+00	1.42E+04	2.83E+04		
Tc-99	4.2239E-04	5,149.513	10,299.025	0.00E+00	2.18E+00	4.35E+00		
Th-229	1.8848E-12	5,149.513	10,299.025	0.00E+00	9.71E-09	1.94E-08		
Th-230	1.7042E-08	5,149.513	10,299.025	0.00E+00	8.78E-05	1.76E-04		
Th-232	7.8132E-15	5,149.513	10,299.025	0.00E+00	4.02E-11	8.05E-11		
Tl-208	4.4063E-08	5,149.513	10,299.025	0.00E+00	2.27E-04	4.54E-04		
U-232	1.3151E-07	5,149.513	10,299.025	0.00E+00	6.77E-04	1.35E-03		
U-233	1.9564E-09	5,149.513	10,299.025	0.00E+00	1.01E-05	2.01E-05		
U-234	1.8371E-04	5,149.513	10,299.025	0.00E+00	9.46E-01	1.89E+00		
U-235	-2.7235E-06	5,149.513	0.000	1.36E-02	0.00E+00	1.36E-02		
U-236	1.5493E-05	5,149.513	10,299.025	0.00E+00	7.98E-02	1.60E-01		
U-238	-4.2851E-09	5,149.513	0.000	8.60E-03	8.58E-03	8.60E-03		
Y-90	2.7505E+00	5,149.513	10,299.025	0.00E+00	1.42E+04	2.83E+04		
Other Radionuclides					2.65E+04	5.30E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.61E+02	5.22E+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	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 (6061)	ALUM	
BOL Enrichment %:	U3Si2	U	
	19.75000878	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		5,149.513	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
		10,299.025	

Checks		
Nominal:	Burnup Multiplier	Estimated EOL HM/Given EOL HM
Bounding:	0.51	1.02
	1.03	

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: UNIV OF FLORIDA (ARGONAUT)
 SNF ID #: 272
 Fuel Units & Desc: 259 - ELEMENT
 Heavy Metal Mass: BOL=4.14kg ; EOL=4.09kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2035
 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"
 7.19

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	49.056	98.111	0.00E+00	7.14E-09	1.43E-08	0.0150	1.893E+13
Am-241	1.1190E-03	49.056	98.111	0.00E+00	5.49E-02	1.10E-01	0.0250	4.078E+12
Am-242m	4.5425E-07	49.056	98.111	0.00E+00	2.23E-05	4.46E-05	0.0375	3.763E+12
Am-243	1.4921E-06	49.056	98.111	0.00E+00	7.32E-05	1.46E-04	0.0575	3.700E+12
C-14	5.7244E-09	49.056	98.111	0.00E+00	2.81E-07	5.62E-07	0.0850	2.359E+12
Cl-36	1.3124E-32	49.056	98.111	0.00E+00	6.44E-31	1.29E-30	0.1250	2.043E+12
Cm-243	2.3676E-07	49.056	98.111	0.00E+00	1.16E-05	2.32E-05	0.2250	1.999E+12
Cm-244	5.2042E-05	49.056	98.111	0.00E+00	2.55E-03	5.11E-03	0.3750	9.677E+11
Co-60	3.8208E-05	49.056	98.111	0.00E+00	1.87E-03	3.75E-03	0.5750	1.329E+13
Cs-134	4.8693E-01	49.056	98.111	0.00E+00	2.39E+01	4.78E+01	0.8500	1.861E+12
Cs-135	3.4477E-06	49.056	98.111	0.00E+00	1.69E-04	3.38E-04	1.2500	3.463E+11
Cs-137	2.8731E+00	49.056	98.111	0.00E+00	1.41E+02	2.82E+02	1.7500	1.452E+10
Eu-154	8.2053E-02	49.056	98.111	0.00E+00	4.03E+00	8.05E+00	2.2500	3.047E+10
Eu-155	3.9134E-02	49.056	98.111	0.00E+00	1.92E+00	3.84E+00	2.7500	1.753E+08
Fe-55	6.7429E-03	49.056	98.111	0.00E+00	3.31E-01	6.62E-01	3.5000	1.944E+07
H-3	1.0599E-02	49.056	98.111	0.00E+00	5.20E-01	1.04E+00	5.0000	5.843E+01
I-129	7.5300E-07	49.056	98.111	0.00E+00	3.69E-05	7.39E-05	7.0000	6.515E+00
Kr-85	2.8595E-01	49.056	98.111	0.00E+00	1.40E+01	2.81E+01	11.0000	7.344E-01
Np-237	9.5479E-06	49.056	98.111	0.00E+00	4.68E-04	9.37E-04		
Pa-231	8.9297E-10	49.056	98.111	0.00E+00	4.38E-08	8.76E-08		
Pb-210	3.7609E-12	49.056	98.111	0.00E+00	1.84E-10	3.69E-10		
Pm-147	2.5452E+00	49.056	98.111	0.00E+00	1.25E+02	2.50E+02		
Pu-238	2.0550E-02	49.056	98.111	0.00E+00	1.01E+00	2.02E+00		
Pu-239	4.2838E-04	49.056	98.111	0.00E+00	2.10E-02	4.20E-02		
Pu-240	2.4401E-04	49.056	98.111	0.00E+00	1.20E-02	2.39E-02		
Pu-241	6.8764E-02	49.056	98.111	0.00E+00	3.37E+00	6.75E+00		
Pu-242	3.6329E-07	49.056	98.111	0.00E+00	1.78E-05	3.56E-05		
Ra-226	3.8045E-11	49.056	98.111	0.00E+00	1.87E-09	3.73E-09		
Ra-228	2.9902E-15	49.056	98.111	0.00E+00	1.47E-13	2.93E-13		
Ru-106	1.9055E-01	49.056	98.111	0.00E+00	9.35E+00	1.87E+01		
Se-79	1.2936E-05	49.056	98.111	0.00E+00	6.35E-04	1.27E-03		
Sn-126	1.1574E-05	49.056	98.111	0.00E+00	5.68E-04	1.14E-03		
Sr-90	2.7505E+00	49.056	98.111	0.00E+00	1.35E+02	2.70E+02		
Tc-99	4.2239E-04	49.056	98.111	0.00E+00	2.07E-02	4.14E-02		
Th-229	1.8848E-12	49.056	98.111	0.00E+00	9.25E-11	1.85E-10		
Th-230	1.7042E-08	49.056	98.111	0.00E+00	8.36E-07	1.67E-06		
Th-232	7.8132E-15	49.056	98.111	0.00E+00	3.83E-13	7.67E-13		
Tl-208	4.4063E-08	49.056	98.111	0.00E+00	2.16E-06	4.32E-06		
U-232	1.3151E-07	49.056	98.111	0.00E+00	6.45E-06	1.29E-05		
U-233	1.9564E-09	49.056	98.111	0.00E+00	9.60E-08	1.92E-07		
U-234	1.8371E-04	49.056	98.111	0.00E+00	9.01E-03	1.80E-02		
U-235	2.7235E-06	49.056	0.000	8.34E-03	8.21E-03	8.34E-03		
U-236	1.5493E-05	49.056	98.111	0.00E+00	7.60E-04	1.52E-03		
U-238	4.2851E-09	49.056	0.000	9.54E-05	9.52E-05	9.54E-05		
Y-90	2.7505E+00	49.056	98.111	0.00E+00	1.35E+02	2.70E+02		
Other Radionuclides					2.52E+02	5.05E+02		

Thermal Power	
Nominal Heat (Watts)	Bounding Heat Output (Watts)
2.49E+00	4.97E+00
Total	Total

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-ALX	U	
BOL Enrichment %:	93.15	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	28.179	49.056	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		98.111	

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.04	1.74
Bounding:	0.08	

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: UNIV OF FLORIDA (ARGONAUT)
 SNF ID #: 273
 Fuel Units & Descr: 14 - ELEMENT
 Heavy Metal Mass: BOL=1.00kg ; EOL=1.00kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2035
 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

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	0.597	1.194	0.00E+00	8.69E-11	1.74E-10	Avg. MeV	
Am-241	1.1190E-03	0.597	1.194	0.00E+00	6.68E-04	1.34E-03	0.0150	2.305E+11
Am-242m	4.5425E-07	0.597	1.194	0.00E+00	2.71E-07	5.43E-07	0.0250	4.965E+10
Am-243	1.4921E-06	0.597	1.194	0.00E+00	8.91E-07	1.78E-06	0.0375	4.581E+10
C-14	5.7244E-09	0.597	1.194	0.00E+00	3.42E-09	6.84E-09	0.0575	4.505E+10
Cl-36	1.3124E-32	0.597	1.194	0.00E+00	7.84E-33	1.57E-32	0.0850	2.872E+10
Cm-243	2.3676E-07	0.597	1.194	0.00E+00	1.41E-07	2.83E-07	0.1250	2.487E+10
Cm-244	5.2042E-05	0.597	1.194	0.00E+00	3.11E-05	6.22E-05	0.2250	2.435E+10
Co-60	3.8208E-05	0.597	1.194	0.00E+00	2.28E-05	4.56E-05	0.3750	1.178E+10
Cs-134	4.8693E-01	0.597	1.194	0.00E+00	2.91E-01	5.82E-01	0.5750	1.618E+11
Cs-135	3.4477E-06	0.597	1.194	0.00E+00	2.06E-06	4.12E-06	0.8500	2.266E+10
Cs-137	2.8731E+00	0.597	1.194	0.00E+00	1.72E+00	3.43E+00	1.2500	4.217E+09
Eu-154	8.2053E-02	0.597	1.194	0.00E+00	4.90E-02	9.80E-02	1.7500	1.768E+08
Eu-155	3.9134E-02	0.597	1.194	0.00E+00	2.34E-02	4.67E-02	2.2500	3.709E+08
Fe-55	6.7429E-03	0.597	1.194	0.00E+00	4.03E-03	8.05E-03	2.7500	2.134E+06
H-3	1.0599E-02	0.597	1.194	0.00E+00	6.33E-03	1.27E-02	3.5000	2.367E+05
I-129	7.5300E-07	0.597	1.194	0.00E+00	4.50E-07	8.99E-07	5.0000	1.327E+00
Kr-85	2.8595E-01	0.597	1.194	0.00E+00	1.71E-01	3.42E-01	7.0000	1.502E-01
Np-237	9.5479E-06	0.597	1.194	0.00E+00	5.70E-06	1.14E-05	11.0000	1.710E-02
Pa-231	8.9297E-10	0.597	1.194	0.00E+00	5.33E-10	1.07E-09		
Pb-210	3.7609E-12	0.597	1.194	0.00E+00	2.25E-12	4.49E-12		
Pm-147	2.5452E+00	0.597	1.194	0.00E+00	1.52E+00	3.04E+00		
Pu-238	2.0550E-02	0.597	1.194	0.00E+00	1.23E-02	2.45E-02		
Pu-239	4.2838E-04	0.597	1.194	0.00E+00	2.56E-04	5.12E-04		
Pu-240	2.4401E-04	0.597	1.194	0.00E+00	1.46E-04	2.91E-04		
Pu-241	6.8764E-02	0.597	1.194	0.00E+00	4.11E-02	8.21E-02		
Pu-242	3.6329E-07	0.597	1.194	0.00E+00	2.17E-07	4.34E-07		
Ra-226	3.8045E-11	0.597	1.194	0.00E+00	2.27E-11	4.54E-11		
Ra-228	2.9902E-15	0.597	1.194	0.00E+00	1.79E-15	3.57E-15		
Ru-106	1.9055E-01	0.597	1.194	0.00E+00	1.14E-01	2.28E-01		
Se-79	1.2936E-05	0.597	1.194	0.00E+00	7.73E-06	1.55E-05		
Sn-126	1.1574E-05	0.597	1.194	0.00E+00	6.91E-06	1.38E-05		
Sr-90	2.7505E+00	0.597	1.194	0.00E+00	1.64E+00	3.29E+00		
Tc-99	4.2239E-04	0.597	1.194	0.00E+00	2.52E-04	5.05E-04		
Th-229	1.8848E-12	0.597	1.194	0.00E+00	1.13E-12	2.25E-12		
Th-230	1.7042E-08	0.597	1.194	0.00E+00	1.02E-08	2.04E-08		
Th-232	7.8132E-15	0.597	1.194	0.00E+00	4.67E-15	9.33E-15		
Tl-208	4.4063E-08	0.597	1.194	0.00E+00	2.63E-08	5.26E-08		
U-232	1.3151E-07	0.597	1.194	0.00E+00	7.85E-08	1.57E-07		
U-233	1.9564E-09	0.597	1.194	0.00E+00	1.17E-09	2.34E-09		
U-234	1.8371E-04	0.597	1.194	0.00E+00	1.10E-04	2.19E-04		
U-235	-2.7235E-06	0.597	0.000	4.27E-04	4.25E-04	4.27E-04		
U-236	1.5493E-05	0.597	1.194	0.00E+00	9.25E-06	1.85E-05		
U-238	-4.2851E-09	0.597	0.000	2.68E-04	2.68E-04	2.68E-04		
Y-90	2.7505E+00	0.597	1.194	0.00E+00	1.64E+00	3.29E+00		
Other Radionuclides					3.07E+00	6.14E+00		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.03E-02	6.06E-02
Total	Total

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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	19.8359342	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	0.597		Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.
Bounding:		1.194	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.00	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: UNIV OF MASS-LOWELL
 SNF ID #: 275
 Fuel Units & Descr: 41 - 18 FLAT PLATES
 Heavy Metal Mass: BOL=14.32kg ; EOL=14.32kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2035
 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"
 1.14

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	271.251	542.502	0.00E+00	3.95E-08	7.89E-08		
Am-241	1.1190E-03	271.251	542.502	0.00E+00	3.04E-01	6.07E-01	0.0150	1.047E+14
Am-242m	4.5425E-07	271.251	542.502	0.00E+00	1.23E-04	2.46E-04	0.0250	2.255E+13
Am-243	1.4921E-06	271.251	542.502	0.00E+00	4.05E-04	8.09E-04	0.0375	2.081E+13
C-14	5.7244E-09	271.251	542.502	0.00E+00	1.55E-06	3.11E-06	0.0575	2.046E+13
Cl-36	1.3124E-32	271.251	542.502	0.00E+00	3.56E-00	7.12E-30	0.0850	1.304E+13
Cm-243	2.3676E-07	271.251	542.502	0.00E+00	6.42E-05	1.28E-04	0.1250	1.130E+13
Cm-244	5.2042E-05	271.251	542.502	0.00E+00	1.41E-02	2.82E-02	0.2250	1.105E+13
Co-60	3.8208E-05	271.251	542.502	0.00E+00	1.04E-02	2.07E-02	0.3750	5.351E+12
Cs-134	4.8693E-01	271.251	542.502	0.00E+00	1.32E+02	2.64E+02	0.5750	7.350E+13
Cs-135	3.4477E-06	271.251	542.502	0.00E+00	9.35E-04	1.87E-03	0.8500	1.029E+13
Cs-137	2.8731E+00	271.251	542.502	0.00E+00	7.79E+02	1.56E+03	1.2500	1.915E+12
Eu-154	8.2053E-02	271.251	542.502	0.00E+00	2.23E+01	4.45E+01	1.7500	8.031E+10
Eu-155	3.9134E-02	271.251	542.502	0.00E+00	1.06E+01	2.12E+01	2.2500	1.685E+11
Fe-55	6.7429E-03	271.251	542.502	0.00E+00	1.83E+00	3.66E+00	2.7500	9.691E+08
H-3	1.0599E-02	271.251	542.502	0.00E+00	2.88E+00	5.75E+00	3.5000	1.075E+08
I-129	7.5300E-07	271.251	542.502	0.00E+00	2.04E-04	4.09E-04	5.0000	3.302E+02
Kr-85	2.8595E-01	271.251	542.502	0.00E+00	7.76E+01	1.55E+02	7.0000	3.885E+01
Np-237	9.5479E-06	271.251	542.502	0.00E+00	2.59E-03	5.18E-03	11.0000	4.155E+00
Pa-231	8.9297E-10	271.251	542.502	0.00E+00	2.42E-07	4.84E-07		
Pb-210	3.7609E-12	271.251	542.502	0.00E+00	1.02E-09	2.04E-09		
Pm-147	2.5452E+00	271.251	542.502	0.00E+00	6.90E+02	1.38E+03		
Pu-238	2.0550E-02	271.251	542.502	0.00E+00	5.57E+00	1.11E+01		
Pu-239	4.2838E-04	271.251	542.502	0.00E+00	1.16E-01	2.32E-01		
Pu-240	2.4401E-04	271.251	542.502	0.00E+00	6.62E-02	1.32E-01		
Pu-241	6.8764E-02	271.251	542.502	0.00E+00	1.87E+01	3.73E+01		
Pu-242	3.6329E-07	271.251	542.502	0.00E+00	9.85E-05	1.97E-04		
Ra-226	3.8045E-11	271.251	542.502	0.00E+00	1.03E-08	2.06E-08		
Ra-228	2.9902E-15	271.251	542.502	0.00E+00	8.11E-13	1.62E-12		
Ru-106	1.9055E-01	271.251	542.502	0.00E+00	5.17E+01	1.03E+02		
Se-79	1.2936E-05	271.251	542.502	0.00E+00	3.51E-03	7.02E-03		
Sn-126	1.1574E-05	271.251	542.502	0.00E+00	3.14E-03	6.28E-03		
Sr-90	2.7505E+00	271.251	542.502	0.00E+00	7.46E+02	1.49E+03		
Tc-99	4.2239E-04	271.251	542.502	0.00E+00	1.15E-01	2.29E-01		
Th-229	1.8848E-12	271.251	542.502	0.00E+00	5.11E-10	1.02E-09		
Th-230	1.7042E-08	271.251	542.502	0.00E+00	4.62E-06	9.25E-06		
Th-232	7.8132E-15	271.251	542.502	0.00E+00	2.12E-12	4.24E-12		
Tl-208	4.4063E-08	271.251	542.502	0.00E+00	1.20E-05	2.39E-05		
U-232	1.3151E-07	271.251	542.502	0.00E+00	3.57E-05	7.13E-05		
U-233	1.9564E-09	271.251	542.502	0.00E+00	5.31E-07	1.06E-06		
U-234	1.8371E-04	271.251	542.502	0.00E+00	4.98E-02	9.97E-02		
U-235	-2.7235E-06	271.251	0.000	6.10E-03	5.36E-03	6.10E-03		
U-236	1.5493E-05	271.251	542.502	0.00E+00	4.20E-03	8.40E-03		
U-238	-4.2851E-09	271.251	0.000	3.86E-03	3.86E-03	3.86E-03		
Y-90	2.7505E+00	271.251	542.502	0.00E+00	7.46E+02	1.49E+03		
Other Radionuclides					1.40E+03	2.79E+03		

Thermal Power		
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
1.38E+01	2.75E+01	
Total	Total	

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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	ALUM (1100)	ALUM	
BOL HM Constituents:	U3Si2	U	
BOL Enrichment %:	19.71401492	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		271.251	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup assumed to be twice nominal burnup.
Bounding:	401.054	542.502	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.06		0.98
Bounding:	0.12	1.35	

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: UNIV OF MASS-LOWELL	¹ Fuel decay start date: 2035	Estimated Canister usage: 18"x10" 0.94
SNF ID #: 274	Estimates as of: 2010	
Fuel Units & Descr: 34 - 18 FLAT PLATES	Template: ATR (Light Water, Alum., 60 to 100%, U)	
Heavy Metal Mass: BOL=4.78kg ; EOL=4.50kg	² Template Burnup(MWd): 367.2	
ROD Storage Site: SRS	Template BOL Heavy Metal Mass (MT): 0.00116689	
	Template Decay Time: 5 years	

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	270.469	540.937	0.00E+00	3.93E-08	7.87E-08	Avg. MeV	
Am-241	1.1190E-03	270.469	540.937	0.00E+00	3.03E-01	6.05E-01	0.0150	1.044E+14
Am-242m	4.5425E-07	270.469	540.937	0.00E+00	1.23E-04	2.46E-04	0.0250	2.248E+13
Am-243	1.4921E-06	270.469	540.937	0.00E+00	4.04E-04	8.07E-04	0.0375	2.075E+13
C-14	5.7244E-09	270.469	540.937	0.00E+00	1.55E-06	3.10E-06	0.0575	2.040E+13
Cl-36	1.3124E-32	270.469	540.937	0.00E+00	3.55E-30	7.10E-30	0.0850	1.301E+13
Cm-243	2.3676E-07	270.469	540.937	0.00E+00	6.40E-05	1.28E-04	0.1250	1.126E+13
Cm-244	5.2042E-05	270.469	540.937	0.00E+00	1.41E-02	2.82E-02	0.2250	1.102E+13
Co-60	3.8208E-05	270.469	540.937	0.00E+00	1.03E-02	2.07E-02	0.3750	5.336E+12
Cs-134	4.8693E-01	270.469	540.937	0.00E+00	1.32E+02	2.63E+02	0.5750	7.329E+13
Cs-135	3.4477E-06	270.469	540.937	0.00E+00	9.32E-04	1.86E-03	0.8500	1.026E+13
Cs-137	2.8731E+00	270.469	540.937	0.00E+00	7.77E+02	1.55E+03	1.2500	1.910E+12
Eu-154	8.2053E-02	270.469	540.937	0.00E+00	2.22E+01	4.44E+01	1.7500	8.008E+10
Eu-155	3.9134E-02	270.469	540.937	0.00E+00	1.06E+01	2.12E+01	2.2500	1.680E+11
Fe-55	6.7429E-03	270.469	540.937	0.00E+00	1.82E+00	3.65E+00	2.7500	9.663E-08
H-3	1.0599E-02	270.469	540.937	0.00E+00	2.87E+00	5.73E+00	3.5000	1.072E+08
I-129	7.5300E-07	270.469	540.937	0.00E+00	2.04E-04	4.07E-04	5.0000	3.207E+02
Kr-85	2.8595E-01	270.469	540.937	0.00E+00	7.73E+01	1.55E+02	7.0000	3.576E+01
Np-237	9.5479E-06	270.469	540.937	0.00E+00	2.58E-03	5.16E-03	11.0000	4.030E-00
Pa-231	8.9297E-10	270.469	540.937	0.00E+00	2.42E-07	4.83E-07		
Pb-210	3.7609E-12	270.469	540.937	0.00E+00	1.02E-09	2.03E-09		
Pm-147	2.5452E+00	270.469	540.937	0.00E+00	6.88E+02	1.38E+03		
Pu-238	2.0550E-02	270.469	540.937	0.00E+00	5.56E+00	1.11E+01		
Pu-239	4.2838E-04	270.469	540.937	0.00E+00	1.16E-01	2.32E-01		
Pu-240	2.4401E-04	270.469	540.937	0.00E+00	6.60E-02	1.32E-01		
Pu-241	6.8764E-02	270.469	540.937	0.00E+00	1.86E+01	3.72E+01		
Pu-242	3.6329E-07	270.469	540.937	0.00E+00	9.83E-05	1.97E-04		
Ra-226	3.8045E-11	270.469	540.937	0.00E+00	1.03E-08	2.06E-08		
Ra-228	2.9902E-15	270.469	540.937	0.00E+00	8.09E-13	1.62E-12		
Ru-106	1.9055E-01	270.469	540.937	0.00E+00	5.15E+01	1.03E+02		
Se-79	1.2936E-05	270.469	540.937	0.00E+00	3.50E-03	7.00E-03		
Sn-126	1.1574E-05	270.469	540.937	0.00E+00	3.13E-03	6.26E-03		
Sr-90	2.7505E+00	270.469	540.937	0.00E+00	7.44E+02	1.49E+03		
Tc-99	4.2239E-04	270.469	540.937	0.00E+00	1.14E-01	2.28E-01		
Th-229	1.8848E-12	270.469	540.937	0.00E+00	5.10E-10	1.02E-09		
Th-230	1.7042E-08	270.469	540.937	0.00E+00	4.61E-06	9.22E-06		
Th-232	7.8132E-15	270.469	540.937	0.00E+00	2.11E-12	4.23E-12		
Tl-208	4.4063E-08	270.469	540.937	0.00E+00	1.19E-05	2.38E-05		
U-232	1.3151E-07	270.469	540.937	0.00E+00	3.56E-05	7.11E-05		
U-233	1.9564E-09	270.469	540.937	0.00E+00	5.29E-07	1.06E-06		
U-234	1.8371E-04	270.469	540.937	0.00E+00	4.97E-02	9.94E-02		
U-235	-2.7235E-06	270.469	0.000	9.63E-03	8.89E-03	9.63E-03		
U-236	1.5493E-05	270.469	540.937	0.00E+00	4.19E-03	8.38E-03		
U-238	-4.2851E-09	270.469	0.000	1.10E-04	1.09E-04	1.10E-04		
Y-90	2.7505E+00	270.469	540.937	0.00E+00	7.44E+02	1.49E+03		
Other Radionuclides					1.39E+03	2.78E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.37E+01	2.74E+01
Total	Total

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 (1100)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	93.16325044	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		270.469	
Bounding:		540.937	

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:	0.18	
Bounding:	0.36	

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: UNIV OF MICHIGAN
 SNF ID #: 277
 Fuel Units & Descr: 225 - 18 CURVED PLATES
 Heavy Metal Mass: BOL=190.26kg ; EOL=174.08kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2003
 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"
 9.38

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	15,320.406	30,640.813	0.00E+00	2.23E-06	4.46E-06		
Am-241	1.1190E-03	15,320.406	30,640.813	0.00E+00	1.71E+01	3.43E+01	0.0150	5.912E+15
Am-242m	4.5425E-07	15,320.406	30,640.813	0.00E+00	6.96E-03	1.39E-02	0.0250	1.274E+15
Am-243	1.4921E-06	15,320.406	30,640.813	0.00E+00	2.29E-02	4.57E-02	0.0375	1.175E+15
C-14	5.7244E-09	15,320.406	30,640.813	0.00E+00	8.77E-05	1.75E-04	0.0575	1.156E+15
Cl-36	1.3124E-32	15,320.406	30,640.813	0.00E+00	2.01E-28	4.02E-28	0.0850	7.367E+14
Cm-243	2.3676E-07	15,320.406	30,640.813	0.00E+00	3.63E-03	7.25E-03	0.1250	6.380E+14
Cm-244	5.2042E-05	15,320.406	30,640.813	0.00E+00	7.97E-01	1.59E+00	0.2250	6.244E+14
Co-60	3.8208E-05	15,320.406	30,640.813	0.00E+00	5.85E-01	1.17E+00	0.3750	3.022E+14
Cs-134	4.8693E-01	15,320.406	30,640.813	0.00E+00	7.46E+03	1.49E+04	0.5750	4.151E+15
Cs-135	3.4477E-06	15,320.406	30,640.813	0.00E+00	5.28E-02	1.06E-01	0.8500	5.813E+14
Cs-137	2.8731E+00	15,320.406	30,640.813	0.00E+00	4.40E+04	8.80E+04	1.2500	1.082E+14
Eu-154	8.2053E-02	15,320.406	30,640.813	0.00E+00	1.26E+03	2.51E+03	1.7500	4.536E+12
Eu-155	3.9134E-02	15,320.406	30,640.813	0.00E+00	6.00E+02	1.20E+03	2.2500	9.515E+12
Fe-55	6.7429E-03	15,320.406	30,640.813	0.00E+00	1.03E+02	2.07E+02	2.7500	5.473E+10
H-3	1.0599E-02	15,320.406	30,640.813	0.00E+00	1.62E+02	3.25E+02	3.5000	6.072E+09
I-129	7.5300E-07	15,320.406	30,640.813	0.00E+00	1.15E-02	2.31E-02	5.0000	1.826E+04
Kr-85	2.8595E-01	15,320.406	30,640.813	0.00E+00	4.38E+03	8.76E+03	7.0000	2.037E+03
Np-237	9.5479E-06	15,320.406	30,640.813	0.00E+00	1.46E-01	2.93E-01	11.0000	2.296E+02
Pa-231	8.9297E-10	15,320.406	30,640.813	0.00E+00	1.37E-05	2.74E-05		
Pb-210	3.7609E-12	15,320.406	30,640.813	0.00E+00	5.76E-08	1.15E-07		
Pm-147	2.5452E+00	15,320.406	30,640.813	0.00E+00	3.90E+04	7.80E+04		
Pu-238	2.0550E-02	15,320.406	30,640.813	0.00E+00	3.15E+02	6.30E+02		
Pu-239	4.2838E-04	15,320.406	30,640.813	0.00E+00	6.56E+00	1.31E+01		
Pu-240	2.4401E-04	15,320.406	30,640.813	0.00E+00	3.74E+00	7.48E+00		
Pu-241	6.8764E-02	15,320.406	30,640.813	0.00E+00	1.05E+03	2.11E+03		
Pu-242	3.6329E-07	15,320.406	30,640.813	0.00E+00	5.57E-03	1.11E-02		
Ra-226	3.8045E-11	15,320.406	30,640.813	0.00E+00	5.83E-07	1.17E-06		
Ra-228	2.9902E-15	15,320.406	30,640.813	0.00E+00	4.58E-11	9.16E-11		
Ru-106	1.9055E-01	15,320.406	30,640.813	0.00E+00	2.92E+03	5.84E+03		
Se-79	1.2936E-05	15,320.406	30,640.813	0.00E+00	1.98E-01	3.96E-01		
Sn-126	1.1574E-05	15,320.406	30,640.813	0.00E+00	1.77E-01	3.55E-01		
Sr-90	2.7505E+00	15,320.406	30,640.813	0.00E+00	4.21E+04	8.43E+04		
Tc-99	4.2239E-04	15,320.406	30,640.813	0.00E+00	6.47E+00	1.29E+01		
Th-229	1.8848E-12	15,320.406	30,640.813	0.00E+00	2.89E-08	5.78E-08		
Th-230	1.7042E-08	15,320.406	30,640.813	0.00E+00	2.61E-04	5.22E-04		
Th-232	7.8132E-15	15,320.406	30,640.813	0.00E+00	1.20E-10	2.39E-10		
Tl-208	4.4063E-08	15,320.406	30,640.813	0.00E+00	6.75E-04	1.35E-03		
U-232	1.3151E-07	15,320.406	30,640.813	0.00E+00	2.01E-03	4.03E-03		
U-233	1.9564E-09	15,320.406	30,640.813	0.00E+00	3.00E-05	5.99E-05		
U-234	1.8371E-04	15,320.406	30,640.813	0.00E+00	2.81E+00	5.63E+00		
U-235	-2.7235E-06	15,320.406	0.000	8.12E-02	3.95E-02	8.12E-02		
U-236	1.5493E-05	15,320.406	30,640.813	0.00E+00	2.37E-01	4.75E-01		
U-238	-4.2851E-09	15,320.406	0.000	5.13E-02	5.13E-02	5.13E-02	7.77E+02	1.55E+03
Y-90	2.7505E+00	15,320.406	30,640.813	0.00E+00	4.21E+04	8.43E+04	Total	Total
Other Radionuclides					7.88E+04	1.58E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	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.
Fuel Cladding:	LIGHT WATER	LIGHT WATER	
BOL HM Constituents:	ALUM (6061)	ALUM	
BOL Enrichment %:	U-ALX	U	
	19.74999113	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		15,320.406	
		30,640.813	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup	1.01
Bounding:	0.26		
	0.51		

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: UNIV OF MICHIGAN
 SNF ID #: 276
 Fuel Units & Descr: 130 - 18 CURVED PLATES
 Heavy Metal Mass: BOL=100.85kg ; EOL=89.88kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1992
 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"
 5.42

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	4.5861E-10	10,390.697	20,781.394	0.00E+00	4.77E-06	9.53E-06	0.0150	2.479E+15
Am-241	1.7832E-03	10,390.697	20,781.394	0.00E+00	1.85E+01	3.71E+01	0.0250	5.170E+14
Am-242m	4.3410E-07	10,390.697	20,781.394	0.00E+00	4.51E-03	9.02E-03	0.0375	4.515E+14
Am-243	1.4907E-06	10,390.697	20,781.394	0.00E+00	1.55E-02	3.10E-02	0.0575	4.814E+14
C-14	5.7162E-09	10,390.697	20,781.394	0.00E+00	5.94E-05	1.19E-04	0.0850	2.916E+14
Ci-36	1.3124E-32	10,390.697	20,781.394	0.00E+00	1.36E-28	2.73E-28	0.1250	1.999E+14
Cm-243	1.8568E-07	10,390.697	20,781.394	0.00E+00	1.93E-03	3.86E-03	0.2250	2.512E+14
Cm-244	3.5512E-05	10,390.697	20,781.394	0.00E+00	3.69E-01	7.38E-01	0.3750	1.100E+14
Co-60	1.0261E-05	10,390.697	20,781.394	0.00E+00	1.07E-01	2.13E-01	0.5750	1.786E+15
Cs-134	1.6931E-02	10,390.697	20,781.394	0.00E+00	1.76E+02	3.52E+02	0.8500	4.243E+13
Cs-135	3.4477E-06	10,390.697	20,781.394	0.00E+00	3.58E-02	7.16E-02	1.2500	2.143E+13
Cs-137	2.2800E+00	10,390.697	20,781.394	0.00E+00	2.37E+04	4.74E+04	1.7500	8.982E+11
Eu-154	3.6656E-02	10,390.697	20,781.394	0.00E+00	3.81E+02	7.62E+02	2.2500	1.124E+09
Eu-155	9.6841E-03	10,390.697	20,781.394	0.00E+00	1.01E+02	2.01E+02	2.7500	6.752E+07
Fe-55	4.6977E-04	10,390.697	20,781.394	0.00E+00	4.88E+00	9.76E+00	3.5000	4.293E+06
H-3	6.0485E-03	10,390.697	20,781.394	0.00E+00	6.28E+01	1.26E+02	5.0000	9.986E+03
I-129	7.5300E-07	10,390.697	20,781.394	0.00E+00	7.82E-03	1.56E-02	7.0000	1.106E+03
Kr-85	1.4989E-01	10,390.697	20,781.394	0.00E+00	1.56E+03	3.11E+03	11.0000	1.242E+02
Np-237	9.5534E-06	10,390.697	20,781.394	0.00E+00	9.93E-02	1.99E-01		
Pa-231	1.6550E-09	10,390.697	20,781.394	0.00E+00	1.72E-05	3.44E-05		
Pb-210	2.6631E-11	10,390.697	20,781.394	0.00E+00	2.77E-07	5.53E-07		
Pm-147	1.8156E-01	10,390.697	20,781.394	0.00E+00	1.89E+03	3.77E+03		
Pu-238	1.8990E-02	10,390.697	20,781.394	0.00E+00	1.97E+02	3.95E+02		
Pu-239	4.2838E-04	10,390.697	20,781.394	0.00E+00	4.45E+00	8.90E+00		
Pu-240	2.4379E-04	10,390.697	20,781.394	0.00E+00	2.53E+00	5.07E+00		
Pu-241	4.2511E-02	10,390.697	20,781.394	0.00E+00	4.42E+02	8.83E+02		
Pu-242	3.6329E-07	10,390.697	20,781.394	0.00E+00	3.77E-03	7.55E-03		
Ra-226	1.4725E-10	10,390.697	20,781.394	0.00E+00	1.53E-06	3.06E-06		
Ra-228	8.9760E-15	10,390.697	20,781.394	0.00E+00	9.33E-11	1.87E-10		
Ru-106	1.9752E-04	10,390.697	20,781.394	0.00E+00	2.05E+00	4.10E+00		
Se-79	1.2933E-05	10,390.697	20,781.394	0.00E+00	1.34E-01	2.69E-01		
Sn-126	1.1574E-05	10,390.697	20,781.394	0.00E+00	1.20E-01	2.41E-01		
Sr-90	2.1680E+00	10,390.697	20,781.394	0.00E+00	2.25E+04	4.51E+04		
Tc-99	4.2239E-04	10,390.697	20,781.394	0.00E+00	4.39E+00	8.78E+00		
Th-229	3.9270E-12	10,390.697	20,781.394	0.00E+00	4.08E-08	8.16E-08		
Th-230	3.3578E-08	10,390.697	20,781.394	0.00E+00	3.49E-04	6.98E-04		
Th-232	1.5452E-14	10,390.697	20,781.394	0.00E+00	1.61E-10	3.21E-10		
Th-208	4.6705E-08	10,390.697	20,781.394	0.00E+00	4.85E-04	9.71E-04		
U-232	1.3045E-07	10,390.697	20,781.394	0.00E+00	1.36E-03	2.71E-03		
U-233	2.3739E-09	10,390.697	20,781.394	0.00E+00	2.47E-05	4.93E-05		
U-234	1.8423E-04	10,390.697	20,781.394	0.00E+00	1.91E+00	3.83E+00		
U-235	-2.7235E-06	10,390.697	0.000	4.31E-02	1.48E-02	4.31E-02		
U-236	1.5493E-05	10,390.697	20,781.394	0.00E+00	1.61E-01	3.22E-01		
U-238	-4.2851E-09	10,390.697	0.000	2.72E-02	2.71E-02	2.72E-02		
Y-90	2.1686E+00	10,390.697	20,781.394	0.00E+00	2.25E+04	4.51E+04		
Other Radionuclides					2.26E+04	4.52E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.81E+02	5.62E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: LIGHT WATER	Used: 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 (6061)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	19.7909823	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD: 10,390.697	Estimated: 10,390.697	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		20,781.394	

Checks		
Nominal:	Burnup Multiplier: 0.33	Estimated Burnup/Given Burnup: 1.01
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: UNIV OF MICHIGAN (CONTROL) 1 Fuel decay start date: 2003
 SNF ID #: 1005 Estimates as of: 2010
 Fuel Units & Descr: 82 - 9 CURVED PLATES Template: ATR (Light Water, Alum., 60 to 100%, U)
 Heavy Metal Mass: BOL=34.67kg ; EOL=32.87kg 2 Template Burnup(MWd): 367.2
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 3.42

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	1,708.423	3,416.846	0.00E+00	2.48E-07	4.97E-07	0.0150	6.592E+14
Am-241	1.1190E-03	1,708.423	3,416.846	0.00E+00	1.91E+00	3.82E+00	0.0250	1.420E+14
Am-242m	4.5425E-07	1,708.423	3,416.846	0.00E+00	7.76E-04	1.55E-03	0.0375	1.311E+14
Am-243	1.4921E-06	1,708.423	3,416.846	0.00E+00	2.55E-03	5.10E-03	0.0575	1.289E+14
C-14	5.7244E-09	1,708.423	3,416.846	0.00E+00	9.78E-06	1.96E-05	0.0850	8.215E+13
Cf-252	1.3124E-32	1,708.423	3,416.846	0.00E+00	2.24E-29	4.48E-29	0.1250	7.114E+13
Cm-243	2.3676E-07	1,708.423	3,416.846	0.00E+00	4.04E-04	8.09E-04	0.2250	6.963E+13
Cm-244	5.2042E-05	1,708.423	3,416.846	0.00E+00	8.89E-02	1.78E-01	0.3750	3.370E+13
Co-60	3.8208E-05	1,708.423	3,416.846	0.00E+00	6.53E-02	1.31E-01	0.5750	4.629E+13
Cs-134	4.8693E-01	1,708.423	3,416.846	0.00E+00	8.32E+02	1.66E+03	0.8500	6.482E+13
Cs-135	3.4477E-06	1,708.423	3,416.846	0.00E+00	5.89E-03	1.18E-02	1.2500	1.206E+13
Cs-137	2.8731E+00	1,708.423	3,416.846	0.00E+00	4.91E+03	9.82E+03	1.7500	5.058E+11
Eu-154	8.2053E-02	1,708.423	3,416.846	0.00E+00	1.40E+02	2.80E+02	2.2500	1.061E+12
Eu-155	3.9134E-02	1,708.423	3,416.846	0.00E+00	6.69E+01	1.34E+02	2.7500	6.104E+09
Fe-55	6.7429E-03	1,708.423	3,416.846	0.00E+00	1.15E+01	2.30E+01	3.5000	6.771E+08
H-3	1.0599E-02	1,708.423	3,416.846	0.00E+00	1.81E+01	3.62E+01	5.0000	2.045E+03
I-129	7.5300E-07	1,708.423	3,416.846	0.00E+00	1.29E-03	2.57E-03	7.0000	2.281E+02
Kr-85	2.8595E-01	1,708.423	3,416.846	0.00E+00	4.89E+02	9.77E+02	11.0000	2.571E+01
Np-237	9.5479E-06	1,708.423	3,416.846	0.00E+00	1.63E-02	3.26E-02		
Pa-231	8.9297E-10	1,708.423	3,416.846	0.00E+00	1.53E-06	3.05E-06		
Pb-210	3.7609E-12	1,708.423	3,416.846	0.00E+00	6.43E-09	1.29E-08		
Pm-147	2.5452E+00	1,708.423	3,416.846	0.00E+00	4.35E+03	8.70E+03		
Pu-238	2.0550E-02	1,708.423	3,416.846	0.00E+00	3.51E+01	7.02E+01		
Pu-239	4.2838E-04	1,708.423	3,416.846	0.00E+00	7.32E-01	1.46E+00		
Pu-240	2.4401E-04	1,708.423	3,416.846	0.00E+00	4.17E-01	8.34E-01		
Pu-241	6.8764E-02	1,708.423	3,416.846	0.00E+00	1.17E+02	2.35E+02		
Pu-242	3.6329E-07	1,708.423	3,416.846	0.00E+00	6.21E-04	1.24E-03		
Ra-226	3.8045E-11	1,708.423	3,416.846	0.00E+00	6.50E-08	1.30E-07		
Ra-228	2.9902E-15	1,708.423	3,416.846	0.00E+00	5.11E-12	1.02E-11		
Ru-106	1.9055E-01	1,708.423	3,416.846	0.00E+00	3.26E+02	6.51E+02		
Se-79	1.2936E-05	1,708.423	3,416.846	0.00E+00	2.21E-02	4.42E-02		
Sn-126	1.1574E-05	1,708.423	3,416.846	0.00E+00	1.98E-02	3.95E-02		
Sr-90	2.7505E+00	1,708.423	3,416.846	0.00E+00	4.70E+03	9.40E+03		
Tc-99	4.2239E-04	1,708.423	3,416.846	0.00E+00	7.22E-01	1.44E+00		
Th-229	1.8848E-12	1,708.423	3,416.846	0.00E+00	3.22E-09	6.44E-09		
Th-230	1.7042E-08	1,708.423	3,416.846	0.00E+00	2.91E-05	5.82E-05		
Th-232	7.8132E-15	1,708.423	3,416.846	0.00E+00	1.33E-11	2.67E-11		
Ti-208	4.4063E-08	1,708.423	3,416.846	0.00E+00	7.53E-05	1.51E-04		
U-232	1.3151E-07	1,708.423	3,416.846	0.00E+00	2.25E-04	4.49E-04		
U-233	1.9564E-09	1,708.423	3,416.846	0.00E+00	3.34E-06	6.68E-06		
U-234	1.8371E-04	1,708.423	3,416.846	0.00E+00	3.14E-01	6.28E-01		
U-235	-2.7235E-06	1,708.423	0.000	1.48E-02	1.01E-02	1.48E-02		
U-236	1.5493E-05	1,708.423	3,416.846	0.00E+00	2.65E-02	5.29E-02		
U-238	-4.2851E-09	1,708.423	0.000	9.35E-03	9.34E-03	9.35E-03		
Y-90	2.7505E+00	1,708.423	3,416.846	0.00E+00	4.70E+03	9.40E+03		
Other Radionuclides					8.79E+03	1.76E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.66E+01	1.73E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: LIGHT WATER	Used: 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 (6061)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	19.74999113	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD:	Estimated:	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		1,708.423 3,416.846	

Checks		
Nominal:	Burnup Multiplier:	Estimated Burnup/Given Burnup:
Bounding:	0.16 0.31	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: UNIV OF VIRGINIA
 SNF ID #: 279
 Fuel Units & Descr: 44 - 22 FLAT PLATES
 Heavy Metal Mass: BOL=7.92kg ; EOL=6.86kg
 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'
 1.83

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	1,012.553	2,025.106	0.00E+00	2.03E-06	4.06E-06	Avg. MeV	
Am-241	2.5251E-03	1,012.553	2,025.106	0.00E+00	2.56E+00	5.11E+00	0.0150	1.492E+14
Am-242m	3.9624E-07	1,012.553	2,025.106	0.00E+00	4.01E-04	8.02E-04	0.0250	3.097E+13
Am-243	1.4880E-06	1,012.553	2,025.106	0.00E+00	1.51E-03	3.01E-03	0.0375	2.692E+13
C-14	5.7053E-09	1,012.553	2,025.106	0.00E+00	5.78E-06	1.16E-05	0.0575	2.898E+13
Cl-36	1.3124E-32	1,012.553	2,025.106	0.00E+00	1.33E-29	2.66E-29	0.0850	1.746E+13
Cm-243	1.1419E-07	1,012.553	2,025.106	0.00E+00	1.16E-04	2.31E-04	0.1250	1.153E+13
Cm-244	1.6522E-05	1,012.553	2,025.106	0.00E+00	1.67E-02	3.35E-02	0.2250	1.507E+13
Co-60	7.4047E-07	1,012.553	2,025.106	0.00E+00	7.50E-04	1.50E-03	0.3750	6.557E+12
Cs-134	2.0455E-05	1,012.553	2,025.106	0.00E+00	2.07E-02	4.14E-02	0.5750	1.084E+14
Cs-135	3.4477E-06	1,012.553	2,025.106	0.00E+00	3.49E-03	6.98E-03	0.8500	1.324E+12
Cs-137	1.4365E+00	1,012.553	2,025.106	0.00E+00	1.45E+03	2.91E+03	1.2500	6.403E+11
Eu-154	7.3230E-03	1,012.553	2,025.106	0.00E+00	7.41E+00	1.48E+01	1.7500	3.604E+10
Eu-155	5.9259E-04	1,012.553	2,025.106	0.00E+00	6.00E-01	1.20E+00	2.2500	3.014E+06
Fe-55	2.2791E-06	1,012.553	2,025.106	0.00E+00	2.31E-03	4.62E-03	2.7500	2.875E+06
H-3	1.9698E-03	1,012.553	2,025.106	0.00E+00	1.99E+00	3.99E+00	3.5000	1.667E+03
I-129	7.5300E-07	1,012.553	2,025.106	0.00E+00	7.62E-04	1.52E-03	5.0000	6.811E+02
Kr-85	4.1176E-02	1,012.553	2,025.106	0.00E+00	4.17E+01	8.34E+01	7.0000	7.455E+01
Np-237	9.5752E-06	1,012.553	2,025.106	0.00E+00	9.70E-03	1.94E-02	11.0000	8.311E+00
Pa-231	3.9379E-09	1,012.553	2,025.106	0.00E+00	3.99E-06	7.97E-06		
Pb-210	3.3115E-10	1,012.553	2,025.106	0.00E+00	3.35E-07	6.71E-07		
Pm-147	9.2402E-04	1,012.553	2,025.106	0.00E+00	9.36E-01	1.87E+00		
Pu-238	1.6217E-02	1,012.553	2,025.106	0.00E+00	1.64E+01	3.28E+01		
Pu-239	4.2810E-04	1,012.553	2,025.106	0.00E+00	4.33E-01	8.67E-01		
Pu-240	2.4333E-04	1,012.553	2,025.106	0.00E+00	2.46E-01	4.93E-01		
Pu-241	1.6242E-02	1,012.553	2,025.106	0.00E+00	1.64E+01	3.29E+01		
Pu-242	3.6329E-07	1,012.553	2,025.106	0.00E+00	3.68E-04	7.36E-04		
Ra-226	9.0114E-10	1,012.553	2,025.106	0.00E+00	9.12E-07	1.82E-06		
Ra-228	3.1019E-14	1,012.553	2,025.106	0.00E+00	3.14E-11	6.28E-11		
Ru-106	2.1225E-10	1,012.553	2,025.106	0.00E+00	2.15E-07	4.30E-07		
Se-79	1.2930E-05	1,012.553	2,025.106	0.00E+00	1.31E-02	2.62E-02		
Sn-126	1.1571E-05	1,012.553	2,025.106	0.00E+00	1.17E-02	2.34E-02		
Sr-90	1.3472E+00	1,012.553	2,025.106	0.00E+00	1.36E+03	2.73E+03		
Tc-99	4.2239E-04	1,012.553	2,025.106	0.00E+00	4.28E-01	8.55E-01		
Th-229	1.2407E-11	1,012.553	2,025.106	0.00E+00	1.26E-08	2.51E-08		
Th-230	8.3497E-08	1,012.553	2,025.106	0.00E+00	8.45E-05	1.69E-04		
Th-232	3.8371E-14	1,012.553	2,025.106	0.00E+00	3.89E-11	7.77E-11		
Tl-208	4.0414E-08	1,012.553	2,025.106	0.00E+00	4.09E-05	8.18E-05		
U-232	1.0948E-07	1,012.553	2,025.106	0.00E+00	1.11E-04	2.22E-04		
U-233	3.6275E-09	1,012.553	2,025.106	0.00E+00	3.67E-06	7.35E-06		
U-234	1.8562E-04	1,012.553	2,025.106	0.00E+00	1.88E-01	3.76E-01		
U-235	-2.7235E-06	1,012.553	0.000	1.59E-02	1.32E-02	1.59E-02		
U-236	1.5493E-05	1,012.553	2,025.106	0.00E+00	1.57E-02	3.14E-02		
U-238	-4.2851E-09	1,012.553	0.000	1.88E-04	1.84E-04	1.88E-04		
Y-90	1.3475E+00	1,012.553	2,025.106	0.00E+00	1.36E+03	2.73E+03		
Other Radionuclides					1.39E+03	2.77E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.69E+01	3.39E+01
Total	Total

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 (6061)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	92.93756073	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:	230,236	1,012.553	
Bounding:	280,841	2,025.106	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.41	4.40	
Bounding:	0.81	7.21	

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: UNIV OF VIRGINIA
 SNF ID #: 952
 Fuel Units & Descr: 20 - 22 FLAT PLATES
 Heavy Metal Mass: BOL=24.31kg ; EOL=23.96kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1993
 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"
 0.83

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	327.669	655.337	0.00E+00	1.50E-07	3.01E-07	Avg. MeV	
Am-241	1.7832E-03	327.669	655.337	0.00E+00	5.84E-01	1.17E+00	0.0150	7.818E+13
Am-242m	4.3410E-07	327.669	655.337	0.00E+00	1.42E-04	2.84E-04	0.0250	1.630E+13
Am-243	1.4907E-06	327.669	655.337	0.00E+00	4.88E-04	9.77E-04	0.0375	1.424E+13
C-14	5.7162E-09	327.669	655.337	0.00E+00	1.87E-06	3.75E-06	0.0575	1.518E+13
Cl-36	1.3124E-32	327.669	655.337	0.00E+00	4.30E-30	8.60E-30	0.0850	9.195E+12
Cr-243	1.8568E-07	327.669	655.337	0.00E+00	6.08E-05	1.22E-04	0.1250	6.304E+12
Cr-244	3.5512E-05	327.669	655.337	0.00E+00	1.16E-02	2.33E-02	0.2250	7.922E+12
Co-60	1.0261E-05	327.669	655.337	0.00E+00	3.36E-03	6.72E-03	0.3750	3.470E+12
Cs-134	1.6931E-02	327.669	655.337	0.00E+00	5.55E+00	1.11E+01	0.5750	5.633E+13
Cs-135	3.4477E-06	327.669	655.337	0.00E+00	1.13E-03	2.26E-03	0.8500	1.338E+12
Cs-137	2.2800E+00	327.669	655.337	0.00E+00	7.47E+02	1.49E+03	1.2500	6.759E+11
Eu-154	3.6656E-02	327.669	655.337	0.00E+00	1.20E+01	2.40E+01	1.7500	2.833E+10
Eu-155	9.6841E-03	327.669	655.337	0.00E+00	3.17E+00	6.35E+00	2.2500	3.543E+07
Fe-55	4.6977E-04	327.669	655.337	0.00E+00	1.54E-01	3.08E-01	2.7500	2.129E+06
H-3	6.0485E-03	327.669	655.337	0.00E+00	1.98E+00	3.96E+00	3.5000	1.354E+05
I-129	7.5300E-07	327.669	655.337	0.00E+00	2.47E-04	4.93E-04	5.0000	3.281E+02
Kr-85	1.4989E-01	327.669	655.337	0.00E+00	4.91E+01	9.82E+01	7.0000	3.640E+01
Np-237	9.5534E-06	327.669	655.337	0.00E+00	3.13E-03	6.26E-03	11.0000	4.092E+00
Pa-231	1.6550E-09	327.669	655.337	0.00E+00	5.42E-07	1.08E-06		
Pb-210	2.6631E-11	327.669	655.337	0.00E+00	8.73E-09	1.75E-08		
Pm-147	1.8156E-01	327.669	655.337	0.00E+00	5.95E+01	1.19E+02		
Pu-238	1.8990E-02	327.669	655.337	0.00E+00	6.22E+00	1.24E+01		
Pu-239	4.2838E-04	327.669	655.337	0.00E+00	1.40E-01	2.81E-01		
Pu-240	2.4379E-04	327.669	655.337	0.00E+00	7.99E-02	1.60E-01		
Pu-241	4.2511E-02	327.669	655.337	0.00E+00	1.39E+01	2.79E+01		
Pu-242	3.6329E-07	327.669	655.337	0.00E+00	1.19E-04	2.38E-04		
Ra-226	1.4725E-10	327.669	655.337	0.00E+00	4.82E-08	9.65E-08		
Ra-228	8.9760E-15	327.669	655.337	0.00E+00	2.94E-12	5.88E-12		
Ru-106	1.9752E-04	327.669	655.337	0.00E+00	6.47E-02	1.29E-01		
Se-79	1.2933E-05	327.669	655.337	0.00E+00	4.24E-03	8.48E-03		
Sn-126	1.1574E-05	327.669	655.337	0.00E+00	3.79E-03	7.58E-03		
Sr-90	2.1680E+00	327.669	655.337	0.00E+00	7.10E+02	1.42E+03		
Tc-99	4.2239E-04	327.669	655.337	0.00E+00	1.38E-01	2.77E-01		
Th-229	3.9270E-12	327.669	655.337	0.00E+00	1.29E-09	2.57E-09		
Th-230	3.3578E-08	327.669	655.337	0.00E+00	1.10E-05	2.20E-05		
Th-232	1.5452E-14	327.669	655.337	0.00E+00	5.06E-12	1.01E-11		
Ti-208	4.6705E-08	327.669	655.337	0.00E+00	1.53E-05	3.06E-05		
U-232	1.3045E-07	327.669	655.337	0.00E+00	4.27E-05	8.55E-05		
U-233	2.3739E-09	327.669	655.337	0.00E+00	7.78E-07	1.56E-06		
U-234	1.8423E-04	327.669	655.337	0.00E+00	6.04E-02	1.21E-01		
U-235	-2.7235E-06	327.669	0.000	1.04E-02	9.50E-03	1.04E-02		
U-236	1.5493E-05	327.669	655.337	0.00E+00	5.08E-03	1.02E-02		
U-238	-4.2851E-09	327.669	0.000	6.55E-03	6.55E-03	6.55E-03		
Y-90	2.1686E+00	327.669	655.337	0.00E+00	7.11E+02	1.42E+03		
Other Radionuclides					7.13E+02	1.43E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.87E+00	1.77E+01
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	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 (6061)	ALUM	
BOL HM Constituents:	U3Si2	U	
BOL Enrichment %:	19.77478682	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		327.669	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		655.337	

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.04	
Bounding:	0.09	
		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: US/UK FUEL PINS
 SNF ID #: 356
 Fuel Units & Descr: 66 - ROD
 Heavy Metal Mass: BOL= ; EOL=8.04kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1994
 Estimates as of: 2010
 Template: (Worst Case)
²Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 15 years

Estimated
 Canister usage:
 18"x10"
 0.51

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	1.4157E-06	7,639.694	7,639.694	0.00E+00	1.08E-02	1.08E-02	0.0150	2.005E+16
Am-241	6.2608E+00	7,639.694	7,639.694	0.00E+00	4.78E+04	4.78E+04	0.0250	3.913E+15
Am-242m	1.8448E-02	7,639.694	7,639.694	0.00E+00	1.41E+02	1.41E+02	0.0375	3.495E+15
Am-243	1.6352E-02	7,639.694	7,639.694	0.00E+00	1.25E+02	1.25E+02	0.0575	4.034E+15
C-14	1.2112E-01	7,639.694	7,639.694	0.00E+00	9.25E+02	9.25E+02	0.0850	1.943E+15
Cl-36	2.2860E-03	7,639.694	7,639.694	0.00E+00	1.75E+01	1.75E+01	0.1250	1.890E+15
Cm-243	1.4088E-03	7,639.694	7,639.694	0.00E+00	1.08E+01	1.08E+01	0.2250	1.528E+15
Cm-244	3.6224E-01	7,639.694	7,639.694	0.00E+00	2.77E+03	2.77E+03	0.3750	6.378E+14
Co-60	3.8998E+02	7,639.694	7,639.694	0.00E+00	2.98E+06	2.98E+06	0.5750	9.797E+15
Cs-134	2.8276E-01	7,639.694	7,639.694	0.00E+00	2.16E+03	2.16E+03	0.8500	1.021E+15
Cs-135	4.3976E-04	7,639.694	7,639.694	0.00E+00	3.36E+00	3.36E+00	1.2500	2.214E+17
Cs-137	3.3405E+01	7,639.694	7,639.694	0.00E+00	2.55E+05	2.55E+05	1.7500	3.044E+13
Eu-154	6.2585E+00	7,639.694	7,639.694	0.00E+00	4.78E+04	4.78E+04	2.2500	1.174E+12
Eu-155	1.1271E+00	7,639.694	7,639.694	0.00E+00	8.61E+03	8.61E+03	2.7500	3.232E+10
Fe-55	6.0624E+01	7,639.694	7,639.694	0.00E+00	4.63E+05	4.63E+05	3.5000	6.994E+07
H-3	7.4678E-01	7,639.694	7,639.694	0.00E+00	5.71E+03	5.71E+03	5.0000	1.698E+07
I-129	1.0618E-05	7,639.694	7,639.694	0.00E+00	8.11E-02	8.11E-02	7.0000	1.953E+06
Kr-85	2.1802E+00	7,639.694	7,639.694	0.00E+00	1.67E+04	1.67E+04	11.0000	2.241E+05
Np-237	1.5626E-04	7,639.694	7,639.694	0.00E+00	1.19E+00	1.19E+00		
Pa-231	2.8608E-06	7,639.694	7,639.694	0.00E+00	2.19E-02	2.19E-02		
Pb-210	2.0448E-09	7,639.694	7,639.694	0.00E+00	1.56E-05	1.56E-05		
Pm-147	3.3212E+00	7,639.694	7,639.694	0.00E+00	2.54E+04	2.54E+04		
Pu-238	-3.5403E-01	7,639.694	0.000	2.07E+03	0.00E+00	2.07E+03		
Pu-239	-4.8280E-02	7,639.694	0.000	2.50E+02	0.00E+00	2.50E+02		
Pu-240	-3.0095E-01	7,639.694	0.000	3.19E+02	0.00E+00	3.19E+02		
Pu-241	-2.5280E+01	7,639.694	0.000	8.22E+04	0.00E+00	8.22E+04		
Pu-242	-1.1381E-04	7,639.694	0.000	1.38E+00	5.12E-01	1.38E+00		
Ra-226	1.0977E-08	7,639.694	7,639.694	0.00E+00	8.39E-05	8.39E-05		
Ra-228	5.4624E-07	7,639.694	7,639.694	0.00E+00	4.17E-03	4.17E-03		
Ru-106	3.7939E-03	7,639.694	7,639.694	0.00E+00	2.90E+01	2.90E+01		
Se-79	1.9186E-04	7,639.694	7,639.694	0.00E+00	1.47E+00	1.47E+00		
Sn-126	1.6673E-04	7,639.694	7,639.694	0.00E+00	1.27E+00	1.27E+00		
Sr-90	3.1860E+01	7,639.694	7,639.694	0.00E+00	2.43E+05	2.43E+05		
Tc-99	6.7678E-03	7,639.694	7,639.694	0.00E+00	5.17E+01	5.17E+01		
Th-229	7.2928E-07	7,639.694	7,639.694	0.00E+00	5.57E-03	5.57E-03		
Th-230	2.4191E-06	7,639.694	7,639.694	0.00E+00	1.85E-02	1.85E-02		
Th-232	6.0208E-07	7,639.694	7,639.694	0.00E+00	4.60E-03	4.60E-03		
Th-208	1.0599E-04	7,639.694	7,639.694	0.00E+00	8.10E-01	8.10E-01		
U-232	2.8743E-04	7,639.694	7,639.694	0.00E+00	2.20E+00	2.20E+00		
U-233	3.6128E-04	7,639.694	7,639.694	0.00E+00	2.76E+00	2.76E+00		
U-234	1.2788E-02	7,639.694	7,639.694	0.00E+00	9.77E+01	9.77E+01		
U-235	5.7486E-04	7,639.694	7,639.694	6.92E-03	4.40E+00	4.40E+00		
U-236	2.3485E-04	7,639.694	7,639.694	0.00E+00	1.79E+00	1.79E+00		
U-238	1.1581E-04	7,639.694	7,639.694	8.61E-04	8.86E-01	8.86E-01		
Y-90	3.1860E+01	7,639.694	7,639.694	0.00E+00	2.43E+05	2.43E+05		
Other Radionuclides					6.14E+05	6.14E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.18E+04	5.19E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	GRAPHITE	(Worst Case)	This Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
BOL HM Constituents:	SST (316)	SST/Inconel	
BOL Enrichment %:	PuO2-UO2	U, Th, & Pu	
		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		7,639.694	Nominal burnup set equal to bounding burnup.
		7,639.694	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks		
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup
Bounding:	14.21	
	14.21	
		Estimated EOL HM/ Given EOL HM
		591.64

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: VBWR
 SNF ID #: 855
 Fuel Units & Descr: 7 - ROD
 Heavy Metal Mass: BOL=6.58kg ; EOL=4.04kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1962
 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"
 0.19

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	8.7758E-10	2,413.708	4,827.416	0.00E+00	2.12E-06	4.24E-06	Avg. MeV	
Am-241	1.4352E-01	2,413.708	4,827.416	0.00E+00	3.46E+02	6.93E+02	0.0150	2.597E+14
Am-242m	2.8698E-04	2,413.708	4,827.416	0.00E+00	6.93E-01	1.39E+00	0.0250	5.238E+13
Am-243	6.2565E-04	2,413.708	4,827.416	0.00E+00	1.51E+00	3.02E+00	0.0375	4.996E+13
C-14	4.7901E-05	2,413.708	4,827.416	0.00E+00	1.16E-01	2.31E-01	0.0575	5.772E+13
Ci-36	8.0297E-07	2,413.708	4,827.416	0.00E+00	1.94E-03	3.88E-03	0.0850	2.906E+13
Cm-243	2.5081E-04	2,413.708	4,827.416	0.00E+00	6.05E-01	1.21E+00	0.1250	2.017E+13
Cm-244	4.9015E-02	2,413.708	4,827.416	0.00E+00	1.18E+02	2.37E+02	0.2250	2.492E+13
Co-60	2.5581E-03	2,413.708	4,827.416	0.00E+00	6.17E+00	1.23E+01	0.3750	1.072E+13
Cs-134	4.0536E-05	2,413.708	4,827.416	0.00E+00	9.78E-02	1.96E-01	0.5750	2.493E+14
Cs-135	1.4433E-05	2,413.708	4,827.416	0.00E+00	3.48E-02	6.97E-02	0.8500	3.448E+12
Cs-137	1.3979E+00	2,413.708	4,827.416	0.00E+00	3.37E+03	6.75E+03	1.2500	3.387E+12
Eu-154	2.0203E-02	2,413.708	4,827.416	0.00E+00	4.88E+01	9.75E+01	1.7500	1.014E+11
Eu-155	1.7684E-03	2,413.708	4,827.416	0.00E+00	4.27E+00	8.54E+00	2.2500	1.633E+07
Fe-55	4.3136E-05	2,413.708	4,827.416	0.00E+00	1.04E-01	2.08E-01	2.7500	3.346E+07
H-3	2.0769E-02	2,413.708	4,827.416	0.00E+00	5.01E+01	1.00E+02	3.5000	3.446E+06
I-129	9.8288E-07	2,413.708	4,827.416	0.00E+00	2.37E-03	4.74E-03	5.0000	1.473E+06
Kr-85	2.8214E-02	2,413.708	4,827.416	0.00E+00	6.81E+01	1.36E+02	7.0000	1.698E+05
Np-237	1.1218E-05	2,413.708	4,827.416	0.00E+00	2.71E-02	5.42E-02	11.0000	1.950E+04
Pa-231	1.3036E-09	2,413.708	4,827.416	0.00E+00	3.15E-06	6.29E-06		
Pb-210	8.5078E-11	2,413.708	4,827.416	0.00E+00	2.05E-07	4.11E-07		
Pm-147	3.6531E-04	2,413.708	4,827.416	0.00E+00	8.82E-01	1.76E+00		
Pu-238	7.4564E-02	2,413.708	4,827.416	0.00E+00	1.80E+02	3.60E+02		
Pu-239	1.1623E-02	2,413.708	4,827.416	0.00E+00	2.81E+01	5.61E+01		
Pu-240	1.5132E-02	2,413.708	4,827.416	0.00E+00	3.65E+01	7.31E+01		
Pu-241	9.0036E-01	2,413.708	4,827.416	0.00E+00	2.17E+03	4.35E+03		
Pu-242	6.4260E-05	2,413.708	4,827.416	0.00E+00	1.55E-01	3.10E-01		
Ra-226	2.2804E-10	2,413.708	4,827.416	0.00E+00	5.50E-07	1.10E-06		
Ra-228	5.2713E-12	2,413.708	4,827.416	0.00E+00	1.27E-08	2.54E-08		
Ru-106	6.1160E-10	2,413.708	4,827.416	0.00E+00	1.48E-06	2.95E-06		
Se-79	1.2377E-05	2,413.708	4,827.416	0.00E+00	2.99E-02	5.98E-02		
Sn-126	2.5210E-05	2,413.708	4,827.416	0.00E+00	6.08E-02	1.22E-01		
Sr-90	9.1667E-01	2,413.708	4,827.416	0.00E+00	2.21E+03	4.43E+03		
Tc-99	3.9357E-04	2,413.708	4,827.416	0.00E+00	9.50E-01	1.90E+00		
Th-229	1.2057E-10	2,413.708	4,827.416	0.00E+00	2.91E-07	5.82E-07		
Th-230	2.1043E-08	2,413.708	4,827.416	0.00E+00	5.08E-05	1.02E-04		
Th-232	5.2972E-12	2,413.708	4,827.416	0.00E+00	1.28E-08	2.56E-08		
Ti-208	1.7474E-07	2,413.708	4,827.416	0.00E+00	4.22E-04	8.44E-04		
U-232	4.7368E-07	2,413.708	4,827.416	0.00E+00	1.14E-03	2.29E-03		
U-233	2.5097E-08	2,413.708	4,827.416	0.00E+00	6.06E-05	1.21E-04		
U-234	5.0000E-05	2,413.708	4,827.416	0.00E+00	1.21E-01	2.41E-01		
U-235	-1.4489E-06	2,413.708	0.000	3.29E-03	0.00E+00	3.29E-03		
U-236	7.5824E-06	2,413.708	4,827.416	0.00E+00	1.83E-02	3.66E-02		
U-238	-2.6129E-07	2,413.708	0.000	1.70E-03	1.07E-03	1.70E-03		
Y-90	9.1699E-01	2,413.708	4,827.416	0.00E+00	2.21E+03	4.43E+03		
Other Radionuclides					3.24E+03	6.48E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.55E+01	1.11E+02
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-2	ZIRC
BOL HM Constituents:	UO2	U
BOL Enrichment %:	23.16820093	0 to 5

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:		2,413.708
Bounding:		4,827.416

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:	10.48	
Bounding:	20.97	

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: VBWR (GENEVA) ¹Fuel decay start date: 1961
 SNF ID #: 285 Estimates as of: 2010
 Fuel Units & Descr: 4 - CANISTER OF SCRAP Template: Pathfinder (Light Water, SST, 60 to 100%, U)
 Heavy Metal Mass: BOL=12.54kg ; EOL=12.39kg ²Template Burnup(MWd): 6.01
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x10"
 0.31

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)		
Ac-227	2.3344E-08	135.651	271.303	0.00E+00	3.17E-06	6.33E-06	Avg. MeV	
Am-241	1.1135E-04	135.651	271.303	0.00E+00	1.51E-02	3.02E-02	0.0150	2.025E+13
Am-242m	8.5075E-09	135.651	271.303	0.00E+00	1.15E-06	2.31E-06	0.0250	4.208E+12
Am-243	9.8519E-10	135.651	271.303	0.00E+00	1.34E-07	2.67E-07	0.0375	3.640E+12
C-14	2.3012E-04	135.651	271.303	0.00E+00	3.12E-02	6.24E-02	0.0575	3.923E+12
Cl-36	1.2261E-06	135.651	271.303	0.00E+00	1.66E-04	3.33E-04	0.0850	2.370E+12
Cm-243	2.4875E-10	135.651	271.303	0.00E+00	3.37E-08	6.75E-08	0.1250	1.539E+12
Cm-244	2.3178E-09	135.651	271.303	0.00E+00	3.14E-07	6.29E-07	0.2250	2.041E+12
Co-60	7.0849E-02	135.651	271.303	0.00E+00	9.61E+00	1.92E+01	0.3750	8.899E+11
Cs-134	3.0266E-06	135.651	271.303	0.00E+00	4.11E-04	8.21E-04	0.5750	1.466E+13
Cs-135	3.0316E-05	135.651	271.303	0.00E+00	4.11E-03	8.22E-03	0.8500	1.484E+11
Cs-137	1.4511E+00	135.651	271.303	0.00E+00	1.97E+02	3.94E+02	1.2500	1.475E+12
Eu-154	6.6955E-04	135.651	271.303	0.00E+00	9.08E-02	1.82E-01	1.7500	3.829E+09
Eu-155	6.9850E-04	135.651	271.303	0.00E+00	9.48E-02	1.90E-01	2.2500	7.947E+06
Fe-55	1.2318E-03	135.651	271.303	0.00E+00	1.67E-01	3.34E-01	2.7500	2.297E+05
H-3	2.5141E-03	135.651	271.303	0.00E+00	3.41E-01	6.82E-01	3.5000	3.377E+01
I-129	7.3195E-07	135.651	271.303	0.00E+00	9.93E-05	1.99E-04	5.0000	1.421E+01
Kr-85	4.1281E-02	135.651	271.303	0.00E+00	5.60E+00	1.12E+01	7.0000	1.605E+00
Np-237	1.1489E-06	135.651	271.303	0.00E+00	1.56E-04	3.12E-04	11.0000	1.825E-01
Pa-231	4.5241E-08	135.651	271.303	0.00E+00	6.14E-06	1.23E-05		
Pb-210	6.4476E-13	135.651	271.303	0.00E+00	8.75E-11	1.75E-10		
Pm-147	1.1651E-03	135.651	271.303	0.00E+00	1.58E-01	3.16E-01		
Pu-238	2.9517E-04	135.651	271.303	0.00E+00	4.00E-02	8.01E-02		
Pu-239	6.6772E-04	135.651	271.303	0.00E+00	9.06E-02	1.81E-01		
Pu-240	8.6839E-05	135.651	271.303	0.00E+00	1.18E-02	2.36E-02		
Pu-241	7.1514E-04	135.651	271.303	0.00E+00	9.70E-02	1.94E-01		
Pu-242	1.9717E-09	135.651	271.303	0.00E+00	2.67E-07	5.35E-07		
Ra-226	1.7654E-12	135.651	271.303	0.00E+00	2.39E-10	4.79E-10		
Ra-228	8.2928E-12	135.651	271.303	0.00E+00	1.12E-09	2.25E-09		
Ru-106	1.8419E-10	135.651	271.303	0.00E+00	2.50E-08	5.00E-08		
Se-79	1.3223E-05	135.651	271.303	0.00E+00	1.79E-03	3.59E-03		
Sn-126	1.1493E-05	135.651	271.303	0.00E+00	1.56E-03	3.12E-03		
Sr-90	1.3649E+00	135.651	271.303	0.00E+00	1.85E+02	3.70E+02		
Tc-99	4.6656E-04	135.651	271.303	0.00E+00	6.33E-02	1.27E-01		
Th-229	1.4547E-11	135.651	271.303	0.00E+00	1.97E-09	3.95E-09		
Th-230	1.6617E-10	135.651	271.303	0.00E+00	2.25E-08	4.51E-08		
Th-232	8.3361E-12	135.651	271.303	0.00E+00	1.13E-09	2.26E-09		
Tl-208	2.1664E-08	135.651	271.303	0.00E+00	2.94E-06	5.88E-06		
U-232	5.8669E-08	135.651	271.303	0.00E+00	7.96E-06	1.59E-05		
U-233	3.1847E-09	135.651	271.303	0.00E+00	4.32E-07	8.64E-07		
U-234	3.8769E-07	135.651	271.303	0.00E+00	5.26E-05	1.05E-04		
U-235	-2.7761E-06	135.651	0.000	5.99E-03	5.62E-03	5.99E-03		
U-236	1.6190E-05	135.651	271.303	0.00E+00	2.20E-03	4.39E-03		
U-238	-2.8547E-09	135.651	0.000	3.28E-03	3.28E-03	3.28E-03		
Y-90	1.3652E+00	135.651	271.303	0.00E+00	1.85E+02	3.70E+02		
Other Radionuclides					2.24E+02	4.48E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.37E+00	4.74E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary		
	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	SST (304)	SST
BOL HM Constituents:	UO2	U
BOL Enrichment %:	22.12897667	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:		135.651
Bounding:		271.303

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:	0.23	
Bounding:	0.46	

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
 SNF ID #: 288
 Fuel Units & Descr: 20 - 15 X 15 ROD ARRAY
 Heavy Metal Mass: BOL=9148.29kg ; EOL=8832.18kg
 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:
 PWR
 1.00

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources		
							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	6.6376E-10	300,603.756	601,207.512	0.00E+00	2.00E-04	3.99E-04	0.0150	4.088E+16	
Am-241	1.3144E-01	300,603.756	601,207.512	0.00E+00	3.95E+04	7.90E+04	0.0250	8.280E+15	
Am-242m	3.0039E-04	300,603.756	601,207.512	0.00E+00	9.03E+01	1.81E+02	0.0375	8.014E+15	
Am-243	6.2629E-04	300,603.756	601,207.512	0.00E+00	1.88E+02	3.77E+02	0.0575	8.742E+15	
C-14	4.7965E-05	300,603.756	601,207.512	0.00E+00	1.44E+01	2.88E+01	0.0850	4.632E+15	
Ci-36	8.0297E-07	300,603.756	601,207.512	0.00E+00	2.41E-01	4.83E-01	0.1250	3.384E+15	
Cm-243	3.1993E-04	300,603.756	601,207.512	0.00E+00	9.62E+01	1.92E+02	0.2250	3.977E+15	
Cm-244	7.1851E-02	300,603.756	601,207.512	0.00E+00	2.16E+04	4.32E+04	0.3750	1.706E+15	
Co-60	9.5220E-03	300,603.756	601,207.512	0.00E+00	2.86E+03	5.72E+03	0.5750	3.921E+16	
Cs-134	1.1662E-03	300,603.756	601,207.512	0.00E+00	3.51E+02	7.01E+02	0.8500	7.739E+14	
Cs-135	1.4433E-05	300,603.756	601,207.512	0.00E+00	4.34E+00	8.68E+00	1.2500	1.045E+15	
Cs-137	1.7603E+00	300,603.756	601,207.512	0.00E+00	5.29E+05	1.06E+06	1.7500	2.291E+13	
Eu-154	4.5203E-02	300,603.756	601,207.512	0.00E+00	1.36E+04	2.72E+04	2.2500	4.231E+09	
Eu-155	7.1479E-03	300,603.756	601,207.512	0.00E+00	2.15E+03	4.30E+03	2.7500	4.755E+09	
Fe-55	6.1919E-04	300,603.756	601,207.512	0.00E+00	1.86E+02	3.72E+02	3.5000	6.232E+08	
H-3	3.6386E-02	300,603.756	601,207.512	0.00E+00	1.09E+04	2.19E+04	5.0000	2.663E+08	
I-129	9.8288E-07	300,603.756	601,207.512	0.00E+00	2.95E-01	5.91E-01	7.0000	3.070E+07	
Kr-85	5.3844E-02	300,603.756	601,207.512	0.00E+00	1.62E+04	3.24E+04	11.0000	3.526E+06	
Np-237	1.0546E-05	300,603.756	601,207.512	0.00E+00	3.17E+00	6.34E+00			
Pa-231	1.1370E-09	300,603.756	601,207.512	0.00E+00	3.42E-04	6.84E-04			
Pb-210	3.3624E-11	300,603.756	601,207.512	0.00E+00	1.01E-05	2.02E-05			
Pm-147	5.1211E-03	300,603.756	601,207.512	0.00E+00	1.54E+03	3.08E+03			
Pu-238	8.0669E-02	300,603.756	601,207.512	0.00E+00	2.42E+04	4.85E+04			
Pu-239	1.1626E-02	300,603.756	601,207.512	0.00E+00	3.49E+03	6.99E+03			
Pu-240	1.5097E-02	300,603.756	601,207.512	0.00E+00	4.54E+03	9.08E+03			
Pu-241	1.4567E+00	300,603.756	601,207.512	0.00E+00	4.38E+05	8.76E+05			
Pu-242	6.4260E-05	300,603.756	601,207.512	0.00E+00	1.93E+01	3.86E+01			
Ra-226	1.1392E-10	300,603.756	601,207.512	0.00E+00	3.42E-05	6.85E-05			
Ra-228	5.1841E-12	300,603.756	601,207.512	0.00E+00	1.56E-06	3.12E-06			
Ru-106	5.9012E-07	300,603.756	601,207.512	0.00E+00	1.77E-01	3.55E-01			
Se-79	1.2379E-05	300,603.756	601,207.512	0.00E+00	3.72E+00	7.44E+00			
Sn-126	2.5210E-05	300,603.756	601,207.512	0.00E+00	7.58E+00	1.52E+01			
Sr-90	1.1630E+00	300,603.756	601,207.512	0.00E+00	3.50E+05	6.99E+05			
Tc-99	3.9357E-04	300,603.756	601,207.512	0.00E+00	1.18E+02	2.37E+02			
Th-229	8.5691E-11	300,603.756	601,207.512	0.00E+00	2.58E-05	5.15E-05			
Th-230	1.4493E-08	300,603.756	601,207.512	0.00E+00	4.36E-03	8.71E-03			
Th-232	5.2923E-12	300,603.756	601,207.512	0.00E+00	1.59E-06	3.18E-06			
Ti-208	1.9202E-07	300,603.756	601,207.512	0.00E+00	5.77E-02	1.15E-01			
U-232	5.2083E-07	300,603.756	601,207.512	0.00E+00	1.57E-01	3.13E-01			
U-233	2.4386E-08	300,603.756	601,207.512	0.00E+00	7.33E-03	1.47E-02			
U-234	4.7012E-05	300,603.756	601,207.512	0.00E+00	1.41E+01	2.83E+01			
U-235	-1.4492E-06	300,603.756	0.000	5.90E-01	1.55E-01	5.90E-01			
U-236	7.5759E-06	300,603.756	601,207.512	0.00E+00	2.28E+00	4.55E+00			
U-238	-2.6129E-07	300,603.756	0.000	2.98E+00	2.90E+00	2.98E+00			
Y-90	1.1631E+00	300,603.756	601,207.512	0.00E+00	3.50E+05	6.99E+05			
Other Radionuclides					5.08E+05	1.02E+06			
							Thermal Power		
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
							8.24E+03	1.65E+04	
							Total	Total	

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-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	2.986167273	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	268,593.677	300,603.756	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	268,637.572	601,207.512	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.94	1.12	1.00
Bounding:	1.88	2.08	

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: VEPCO
 SNF ID #: 700
 Fuel Units & Descr: 12 - 15 X 15 ROD ARRAY
 Heavy Metal Mass: BOL=5488.20kg ; 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:
 PWR
 1.00

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	6.6376E-10	166,112.798	332,225.596	0.00E+00	1.10E-04	2.21E-04	0.0150	2.259E+16
Am-241	1.3144E-01	166,112.798	332,225.596	0.00E+00	2.18E+04	4.37E+04	0.0250	4.576E+15
Am-242m	3.0039E-04	166,112.798	332,225.596	0.00E+00	4.99E+01	9.98E+01	0.0375	4.428E+15
Am-243	6.2629E-04	166,112.798	332,225.596	0.00E+00	1.04E+02	2.08E+02	0.0375	4.428E+15
C-14	4.7965E-05	166,112.798	332,225.596	0.00E+00	7.97E+00	1.59E+01	0.0575	4.831E+15
Cl-36	8.0297E-07	166,112.798	332,225.596	0.00E+00	1.33E-01	2.67E-01	0.0850	2.560E+15
Cm-243	3.1993E-04	166,112.798	332,225.596	0.00E+00	5.31E+01	1.06E+02	0.1250	1.870E+15
Cm-244	7.1851E-02	166,112.798	332,225.596	0.00E+00	1.19E+04	2.39E+04	0.2250	2.198E+15
Co-60	9.5220E-03	166,112.798	332,225.596	0.00E+00	1.58E+03	3.16E+03	0.3750	9.428E+14
Cs-134	1.1662E-03	166,112.798	332,225.596	0.00E+00	1.94E+02	3.87E+02	0.5750	2.167E+16
Cs-135	1.4433E-05	166,112.798	332,225.596	0.00E+00	2.40E+00	4.80E+00	0.8500	4.276E+14
Cs-137	1.7603E+00	166,112.798	332,225.596	0.00E+00	2.92E+05	5.85E+05	1.2500	5.777E+14
Eu-154	4.5203E-02	166,112.798	332,225.596	0.00E+00	7.51E+03	1.50E+04	1.7500	1.266E+13
Eu-155	7.1479E-03	166,112.798	332,225.596	0.00E+00	1.19E+03	2.37E+03	2.2500	2.338E+09
Fe-55	6.1919E-04	166,112.798	332,225.596	0.00E+00	1.03E+02	2.06E+02	2.7500	2.627E+09
H-3	3.6386E-02	166,112.798	332,225.596	0.00E+00	6.04E+03	1.21E+04	3.5000	3.444E+08
I-129	9.8288E-07	166,112.798	332,225.596	0.00E+00	1.63E-01	3.27E-01	5.0000	1.472E+08
Kr-85	5.3844E-02	166,112.798	332,225.596	0.00E+00	8.94E+03	1.79E+04	7.0000	1.696E+07
Np-237	1.0546E-05	166,112.798	332,225.596	0.00E+00	1.75E+00	3.50E+00	11.0000	1.949E+06
Pa-231	1.1370E-09	166,112.798	332,225.596	0.00E+00	1.89E-04	3.78E-04		
Pb-210	3.3624E-11	166,112.798	332,225.596	0.00E+00	5.59E-06	1.12E-05		
Pm-147	5.1211E-03	166,112.798	332,225.596	0.00E+00	8.51E+02	1.70E+03		
Pu-238	8.0669E-02	166,112.798	332,225.596	0.00E+00	1.34E+04	2.68E+04		
Pu-239	1.1626E-02	166,112.798	332,225.596	0.00E+00	1.93E+03	3.86E+03		
Pu-240	1.5097E-02	166,112.798	332,225.596	0.00E+00	2.51E+03	5.02E+03		
Pu-241	1.4567E+00	166,112.798	332,225.596	0.00E+00	2.42E+05	4.84E+05		
Pu-242	6.4260E-05	166,112.798	332,225.596	0.00E+00	1.07E+01	2.13E+01		
Ra-226	1.1392E-10	166,112.798	332,225.596	0.00E+00	1.89E-05	3.78E-05		
Ra-228	5.1841E-12	166,112.798	332,225.596	0.00E+00	8.61E-07	1.72E-06		
Ru-106	5.9012E-07	166,112.798	332,225.596	0.00E+00	9.80E-02	1.96E-01		
Se-79	1.2379E-05	166,112.798	332,225.596	0.00E+00	2.06E+00	4.11E+00		
Sn-126	2.5210E-05	166,112.798	332,225.596	0.00E+00	4.19E+00	8.38E+00		
Sr-90	1.1630E+00	166,112.798	332,225.596	0.00E+00	1.93E+05	3.86E+05		
Tc-99	3.9357E-04	166,112.798	332,225.596	0.00E+00	6.54E+01	1.31E+02		
Th-229	8.5691E-11	166,112.798	332,225.596	0.00E+00	1.42E-05	2.85E-05		
Th-230	1.4493E-08	166,112.798	332,225.596	0.00E+00	2.41E-03	4.81E-03		
Th-232	5.2923E-12	166,112.798	332,225.596	0.00E+00	8.79E-07	1.76E-06		
Th-208	1.9202E-07	166,112.798	332,225.596	0.00E+00	3.19E-02	6.38E-02		
U-232	5.2083E-07	166,112.798	332,225.596	0.00E+00	8.65E-02	1.73E-01		
U-233	2.4386E-08	166,112.798	332,225.596	0.00E+00	4.05E-03	8.10E-03		
U-234	4.7012E-05	166,112.798	332,225.596	0.00E+00	7.81E+00	1.56E+01		
U-235	-1.4492E-06	166,112.798	0.000	3.36E-01	9.53E-02	3.36E-01		
U-236	7.5759E-06	166,112.798	332,225.596	0.00E+00	1.26E+00	2.52E+00		
U-238	-2.6129E-07	166,112.798	0.000	1.79E+00	1.75E+00	1.79E+00		
Y-90	1.1631E+00	166,112.798	332,225.596	0.00E+00	1.93E+05	3.86E+05		
Other Radionuclides					2.81E+05	5.61E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.55E+03	9.11E+03
Total	Total

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-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	2.833496228	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	161,133.552	166,112.798	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	173,158.198	332,225.596	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.86	1.03	
Bounding:	1.73	1.92	

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 ASSEMBLY)
 SNF ID #: 993
 Fuel Units & Descr: 1 - 15 X 15 ROD ARRAY
 Heavy Metal Mass: BOL=457.41kg ; EOL=440.00kg
 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:
 HIC
 1.00

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	6.6376E-10	16,560.176	33,120.351	0.00E+00	1.10E-05	2.20E-05	0.0150	2.252E+15
Am-241	1.3144E-01	16,560.176	33,120.351	0.00E+00	2.18E+03	4.35E+03	0.0250	4.562E+14
Am-242m	3.0039E-04	16,560.176	33,120.351	0.00E+00	4.97E+00	9.95E+00	0.0375	4.415E+14
Am-243	6.2629E-04	16,560.176	33,120.351	0.00E+00	1.04E+01	2.07E+01	0.0575	4.816E+14
C-14	4.7965E-05	16,560.176	33,120.351	0.00E+00	7.94E-01	1.59E+00	0.0850	2.552E+14
Cl-36	8.0297E-07	16,560.176	33,120.351	0.00E+00	1.33E-02	2.66E-02	0.1250	1.864E+14
Cm-243	3.1993E-04	16,560.176	33,120.351	0.00E+00	5.30E+00	1.06E+01	0.2250	2.191E+14
Cm-244	7.1851E-02	16,560.176	33,120.351	0.00E+00	1.19E+03	2.38E+03	0.3750	9.399E+13
Co-60	9.5220E-03	16,560.176	33,120.351	0.00E+00	1.58E+02	3.15E+02	0.5750	2.160E+15
Cs-134	1.1662E-03	16,560.176	33,120.351	0.00E+00	1.93E+01	3.86E+01	0.8500	4.263E+13
Cs-135	1.4433E-05	16,560.176	33,120.351	0.00E+00	2.39E-01	4.78E-01	1.2500	5.759E+13
Cs-137	1.7603E+00	16,560.176	33,120.351	0.00E+00	2.92E+04	5.83E+04	1.7500	1.262E+12
Eu-154	4.5203E-02	16,560.176	33,120.351	0.00E+00	7.49E+02	1.50E+03	2.2500	2.331E+08
Eu-155	7.1479E-03	16,560.176	33,120.351	0.00E+00	1.18E+02	2.37E+02	2.7500	2.619E+08
Fe-55	6.1919E-04	16,560.176	33,120.351	0.00E+00	1.03E+01	2.05E+01	3.5000	3.433E+07
H-3	3.6386E-02	16,560.176	33,120.351	0.00E+00	6.03E+02	1.21E+03	5.0000	1.467E+07
I-129	9.8288E-07	16,560.176	33,120.351	0.00E+00	1.63E-02	3.26E-02	7.0000	1.691E+06
Kr-85	5.3844E-02	16,560.176	33,120.351	0.00E+00	8.92E+02	1.78E+03	11.0000	1.943E+05
Np-237	1.0546E-05	16,560.176	33,120.351	0.00E+00	1.75E-01	3.49E-01		
Pa-231	1.1370E-09	16,560.176	33,120.351	0.00E+00	1.88E-05	3.77E-05		
Pb-210	3.3624E-11	16,560.176	33,120.351	0.00E+00	5.57E-07	1.11E-06		
Pm-147	5.1211E-03	16,560.176	33,120.351	0.00E+00	8.48E+01	1.70E+02		
Pu-238	8.0669E-02	16,560.176	33,120.351	0.00E+00	1.34E+03	2.67E+03		
Pu-239	1.1626E-02	16,560.176	33,120.351	0.00E+00	1.93E+02	3.85E+02		
Pu-240	1.5097E-02	16,560.176	33,120.351	0.00E+00	2.50E+02	5.00E+02		
Pu-241	1.4567E+00	16,560.176	33,120.351	0.00E+00	2.41E+04	4.82E+04		
Pu-242	6.4260E-05	16,560.176	33,120.351	0.00E+00	1.06E+00	2.13E+00		
Ra-226	1.1392E-10	16,560.176	33,120.351	0.00E+00	1.89E-06	3.77E-06		
Ra-228	5.1841E-12	16,560.176	33,120.351	0.00E+00	8.58E-08	1.72E-07		
Ru-106	5.9012E-07	16,560.176	33,120.351	0.00E+00	9.77E-03	1.95E-02		
Se-79	1.2379E-05	16,560.176	33,120.351	0.00E+00	2.05E-01	4.10E-01		
Sn-126	2.5210E-05	16,560.176	33,120.351	0.00E+00	4.17E-01	8.35E-01		
Sr-90	1.1630E+00	16,560.176	33,120.351	0.00E+00	1.93E+04	3.85E+04		
Tc-99	3.9357E-04	16,560.176	33,120.351	0.00E+00	6.52E+00	1.30E+01		
Th-229	8.5691E-11	16,560.176	33,120.351	0.00E+00	1.42E-06	2.84E-06		
Th-230	1.4493E-08	16,560.176	33,120.351	0.00E+00	2.40E-04	4.80E-04		
Th-232	5.2923E-12	16,560.176	33,120.351	0.00E+00	8.76E-08	1.75E-07		
Ti-208	1.9202E-07	16,560.176	33,120.351	0.00E+00	3.18E-03	6.36E-03		
U-232	5.2083E-07	16,560.176	33,120.351	0.00E+00	8.63E-03	1.73E-02		
U-233	2.4386E-08	16,560.176	33,120.351	0.00E+00	4.04E-04	8.08E-04		
U-234	4.7012E-05	16,560.176	33,120.351	0.00E+00	7.79E-01	1.56E+00		
U-235	-1.4492E-06	16,560.176	0.000	2.95E-02	5.52E-03	2.95E-02		
U-236	7.5759E-07	16,560.176	33,120.351	0.00E+00	1.25E-01	2.51E-01		
U-238	-2.6129E-06	16,560.176	0.000	1.49E-01	1.45E-01	1.49E-01		
Y-90	1.1631E+00	16,560.176	33,120.351	0.00E+00	1.93E+04	3.85E+04		
Other Radionuclides					2.80E+04	5.60E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.54E+02	9.08E+02
Total	Total

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-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	2.986167273	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	13,429.684	16,560.176	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	14,431.879	33,120.351	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.03	1.23	1.00
Bounding:	2.07	2.29	

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=19.68kg
 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

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6376E-10	592.479	955.137	0.00E+00	3.93E-07	6.34E-07	Avg. MeV	
Am-241	1.3144E-01	592.479	955.137	0.00E+00	7.79E+01	1.26E+02	0.0150	6.495E+13
Am-242m	3.0039E-04	592.479	955.137	0.00E+00	1.78E-01	2.87E-01	0.0250	1.316E+13
Am-243	6.2629E-04	592.479	955.137	0.00E+00	3.71E-01	5.98E-01	0.0375	1.273E+13
C-14	4.7965E-05	592.479	955.137	0.00E+00	2.84E-02	4.58E-02	0.0575	1.389E+13
Cl-36	8.0297E-07	592.479	955.137	0.00E+00	4.76E-04	7.67E-04	0.0850	7.359E+12
Cm-243	3.1993E-04	592.479	955.137	0.00E+00	1.90E-01	3.06E-01	0.1250	5.376E+12
Cm-244	7.1851E-02	592.479	955.137	0.00E+00	4.26E+01	6.86E+01	0.2250	6.318E+12
Co-60	9.5220E-03	592.479	955.137	0.00E+00	5.64E+00	9.09E+00	0.3750	2.711E+12
Cs-134	1.1662E-03	592.479	955.137	0.00E+00	6.91E-01	1.11E+00	0.5750	6.229E+13
Cs-135	1.4433E-05	592.479	955.137	0.00E+00	8.55E-03	1.38E-02	0.8500	1.229E+12
Cs-137	1.7603E+00	592.479	955.137	0.00E+00	1.04E+03	1.68E+03	1.2500	1.661E+12
Eu-154	4.5203E-02	592.479	955.137	0.00E+00	2.68E+01	4.32E+01	1.7500	3.639E+10
Eu-155	7.1479E-03	592.479	955.137	0.00E+00	4.23E+00	6.83E+00	2.2500	6.722E+06
Fe-55	6.1919E-04	592.479	955.137	0.00E+00	3.67E-01	5.91E-01	2.7500	7.554E+06
H-3	3.6386E-02	592.479	955.137	0.00E+00	2.16E+01	3.48E+01	3.5000	9.901E+05
I-129	9.8288E-07	592.479	955.137	0.00E+00	5.82E-04	9.39E-04	5.0000	4.231E+05
Kr-85	5.3844E-02	592.479	955.137	0.00E+00	3.19E+01	5.14E+01	7.0000	4.877E+04
Np-237	1.0546E-05	592.479	955.137	0.00E+00	6.25E-03	1.01E-02	11.0000	5.602E+03
Pa-231	1.1370E-09	592.479	955.137	0.00E+00	6.74E-07	1.09E-06		
Pb-210	3.3624E-11	592.479	955.137	0.00E+00	1.99E-08	3.21E-08		
Pm-147	5.1211E-03	592.479	955.137	0.00E+00	3.03E+00	4.89E+00		
Pu-238	8.0669E-02	592.479	955.137	0.00E+00	4.78E+01	7.70E+01		
Pu-239	1.1626E-02	592.479	955.137	0.00E+00	6.89E+00	1.11E+01		
Pu-240	1.5097E-02	592.479	955.137	0.00E+00	8.94E+00	1.44E+01		
Pu-241	1.4567E+00	592.479	955.137	0.00E+00	6.63E+02	1.39E+03		
Pu-242	6.4260E-05	592.479	955.137	0.00E+00	3.81E-02	6.14E-02		
Ra-226	1.1392E-10	592.479	955.137	0.00E+00	6.75E-08	1.09E-07		
Ra-228	5.1841E-12	592.479	955.137	0.00E+00	3.07E-09	4.95E-09		
Ru-106	5.9012E-07	592.479	955.137	0.00E+00	3.50E-04	5.64E-04		
Se-79	1.2379E-05	592.479	955.137	0.00E+00	7.33E-03	1.18E-02		
Sn-126	2.5210E-05	592.479	955.137	0.00E+00	1.49E-02	2.41E-02		
Sr-90	1.1630E+00	592.479	955.137	0.00E+00	6.89E+02	1.11E+03		
Tc-99	3.9357E-04	592.479	955.137	0.00E+00	2.33E-01	3.76E-01		
Th-229	8.5691E-11	592.479	955.137	0.00E+00	5.08E-08	8.18E-08		
Th-230	1.4493E-08	592.479	955.137	0.00E+00	8.59E-06	1.38E-05		
Th-232	5.2923E-12	592.479	955.137	0.00E+00	3.14E-09	5.05E-09		
Tl-208	1.9202E-07	592.479	955.137	0.00E+00	1.14E-04	1.83E-04		
U-232	5.2083E-07	592.479	955.137	0.00E+00	3.09E-04	4.97E-04		
U-233	2.4386E-08	592.479	955.137	0.00E+00	1.44E-05	2.33E-05		
U-234	4.7012E-05	592.479	955.137	0.00E+00	2.79E-02	4.49E-02		
U-235	-1.4492E-06	592.479	0.000	1.30E-03	4.44E-04	1.30E-03		
U-236	7.5759E-06	592.479	955.137	0.00E+00	4.49E-03	7.24E-03		
U-238	-2.6129E-07	592.479	0.000	6.58E-03	6.43E-03	6.58E-03		
Y-90	1.1631E+00	592.479	955.137	0.00E+00	6.89E+02	1.11E+03		
Other Radionuclides					1.00E+03	1.61E+03		
							Thermal Power	
							Nominal Heat	Bounding
							Output	Heat Output
							(Watts)	(Watts)
							1.62E+01	2.62E+01
							Total	Total

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-4	ZIRC	
BOL HM Constituents:	UO ₂	U	
BOL Enrichment %:	2.986165227	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	592.479	477.568	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	636.693	955.137	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.84	0.81	0.99
Bounding:	1.35	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: VEPCO (T-11)
 SNF ID #: 994
 Fuel Units & Descr: 3 - ROD
 Heavy Metal Mass: BOL=6.73kg ; EOL=6.56kg
 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

Radionuclide	II. Estimates		Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
	m	x _n						Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6376E-10	197.493	318.379	318.379	0.00E+00	1.31E-07	2.11E-07	Avg. MeV	
Am-241	1.3144E-01	197.493	318.379	318.379	0.00E+00	2.60E+01	4.18E+01	0.0150	2.165E+13
Am-242m	3.0039E-04	197.493	318.379	318.379	0.00E+00	5.93E-02	9.56E-02	0.0250	4.385E+12
Am-243	6.2629E-04	197.493	318.379	318.379	0.00E+00	1.24E-01	1.99E-01	0.0375	4.244E+12
C-14	4.7965E-05	197.493	318.379	318.379	0.00E+00	9.47E-03	1.53E-02	0.0575	4.630E+12
Cl-36	8.0297E-07	197.493	318.379	318.379	0.00E+00	1.59E-04	2.56E-04	0.0850	2.453E+12
Cm-243	3.1993E-04	197.493	318.379	318.379	0.00E+00	6.32E-02	1.02E-01	0.1250	1.792E+12
Cm-244	7.1851E-02	197.493	318.379	318.379	0.00E+00	1.42E+01	2.29E+01	0.2250	2.106E+12
Co-60	9.5220E-03	197.493	318.379	318.379	0.00E+00	1.88E+00	3.03E+00	0.3750	9.036E+11
Cs-134	1.1662E-03	197.493	318.379	318.379	0.00E+00	2.30E-01	3.71E-01	0.5750	2.076E+13
Cs-135	1.4433E-05	197.493	318.379	318.379	0.00E+00	2.85E-03	4.60E-03	0.8500	4.098E+11
Cs-137	1.7603E+00	197.493	318.379	318.379	0.00E+00	3.48E+02	5.60E+02	1.2500	5.536E+11
Eu-154	4.5203E-02	197.493	318.379	318.379	0.00E+00	8.93E+00	1.44E+01	1.7500	1.213E+10
Eu-155	7.1479E-03	197.493	318.379	318.379	0.00E+00	1.41E+00	2.28E+00	2.2500	2.241E+06
Fe-55	6.1919E-04	197.493	318.379	318.379	0.00E+00	1.22E-01	1.97E-01	2.7500	2.518E+06
H-3	3.6386E-02	197.493	318.379	318.379	0.00E+00	7.19E+00	1.16E+01	3.5000	3.300E+05
I-129	9.8288E-07	197.493	318.379	318.379	0.00E+00	1.94E-04	3.13E-04	5.0000	1.410E+05
Kr-85	5.3844E-02	197.493	318.379	318.379	0.00E+00	1.06E+01	1.71E+01	7.0000	1.626E+04
Np-237	1.0546E-05	197.493	318.379	318.379	0.00E+00	2.08E-03	3.36E-03	11.0000	1.867E+03
Pa-231	1.1370E-09	197.493	318.379	318.379	0.00E+00	2.25E-07	3.62E-07		
Pb-210	3.3624E-11	197.493	318.379	318.379	0.00E+00	6.64E-09	1.07E-08		
Pm-147	5.1211E-03	197.493	318.379	318.379	0.00E+00	1.01E+00	1.63E+00		
Pu-238	8.0669E-02	197.493	318.379	318.379	0.00E+00	1.59E+01	2.57E+01		
Pu-239	1.1626E-02	197.493	318.379	318.379	0.00E+00	2.30E+00	3.70E+00		
Pu-240	1.5097E-02	197.493	318.379	318.379	0.00E+00	2.98E+00	4.81E+00		
Pu-241	1.4567E+00	197.493	318.379	318.379	0.00E+00	2.88E+02	4.64E+02		
Pu-242	6.4260E-05	197.493	318.379	318.379	0.00E+00	1.27E-02	2.05E-02		
Ra-226	1.1392E-10	197.493	318.379	318.379	0.00E+00	2.25E-08	3.63E-08		
Ra-228	5.1841E-12	197.493	318.379	318.379	0.00E+00	1.02E-09	1.65E-09		
Ru-106	5.9012E-07	197.493	318.379	318.379	0.00E+00	1.17E-04	1.88E-04		
Se-79	1.2379E-05	197.493	318.379	318.379	0.00E+00	2.44E-03	3.94E-03		
Sn-126	2.5210E-05	197.493	318.379	318.379	0.00E+00	4.98E-03	8.03E-03		
Sr-90	1.1630E+00	197.493	318.379	318.379	0.00E+00	2.30E+02	3.70E+02		
Tc-99	3.9357E-04	197.493	318.379	318.379	0.00E+00	7.77E-02	1.25E-01		
Th-229	8.5691E-11	197.493	318.379	318.379	0.00E+00	1.69E-08	2.73E-08		
Th-230	1.4493E-08	197.493	318.379	318.379	0.00E+00	2.86E-06	4.61E-06		
Th-232	5.2923E-12	197.493	318.379	318.379	0.00E+00	1.05E-09	1.68E-09		
Tl-208	1.9202E-07	197.493	318.379	318.379	0.00E+00	3.79E-05	6.11E-05		
U-232	5.2083E-07	197.493	318.379	318.379	0.00E+00	1.03E-04	1.66E-04		
U-233	2.4386E-08	197.493	318.379	318.379	0.00E+00	4.82E-06	7.76E-06		
U-234	4.7012E-05	197.493	318.379	318.379	0.00E+00	9.28E-03	1.50E-02		
U-235	-1.4492E-06	197.493	0.000	0.000	4.34E-04	1.48E-04	4.34E-04		
U-236	7.5759E-06	197.493	318.379	318.379	0.00E+00	1.50E-03	2.41E-03		
U-238	-2.6129E-07	197.493	0.000	0.000	2.19E-03	2.14E-03	2.19E-03		
Y-90	1.1631E+00	197.493	318.379	318.379	0.00E+00	2.30E+02	3.70E+02		
Other Radionuclides						3.34E+02	5.38E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.41E+00	8.73E+00
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:	ZIRC-4	ZIRC	
BOL Enrichment %:	UO2	U	
	2.986165227	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	197.493	159.189	
Bounding:	212.231	318.379	

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:	0.84	0.81	
Bounding:	1.35	1.50	

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: WORCESTER POLY INSTITUTE
 SNF ID #: 287
 Fuel Units & Descr: 26 - 18 FLAT PLATES
 Heavy Metal Mass: BOL=22.78kg ; EOL=22.75kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2035
 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"
 0.72

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	22.160	44.321	0.00E+00	3.22E-09	6.45E-09		
Am-241	1.1190E-03	22.160	44.321	0.00E+00	2.48E-02	4.96E-02		0.0150
Am-242m	4.5425E-07	22.160	44.321	0.00E+00	1.01E-05	2.01E-05		0.0250
Am-243	1.4921E-06	22.160	44.321	0.00E+00	3.31E-05	6.61E-05		0.0375
C-14	5.7244E-09	22.160	44.321	0.00E+00	1.27E-07	2.54E-07		0.0575
Cl-36	1.3124E-32	22.160	44.321	0.00E+00	2.91E-31	5.82E-31		0.0850
Cm-243	2.3676E-07	22.160	44.321	0.00E+00	5.25E-06	1.05E-05		0.1250
Cm-244	5.2042E-05	22.160	44.321	0.00E+00	1.15E-03	2.31E-03		0.2250
Co-60	3.8208E-05	22.160	44.321	0.00E+00	8.47E-04	1.69E-03		0.3750
Cs-134	4.8693E-01	22.160	44.321	0.00E+00	1.08E+01	2.16E+01		0.5750
Cs-135	3.4477E-06	22.160	44.321	0.00E+00	7.64E-05	1.53E-04		0.8500
Cs-137	2.8731E+00	22.160	44.321	0.00E+00	6.37E+01	1.27E+02		1.2500
Eu-154	8.2053E-02	22.160	44.321	0.00E+00	1.82E+00	3.64E+00		1.7500
Eu-155	3.9134E-02	22.160	44.321	0.00E+00	8.67E-01	1.73E+00		2.2500
Fe-55	6.7429E-03	22.160	44.321	0.00E+00	1.49E-01	2.99E-01		2.7500
H-3	1.0599E-02	22.160	44.321	0.00E+00	2.35E-01	4.70E-01		3.5000
I-129	7.5300E-07	22.160	44.321	0.00E+00	1.67E-05	3.34E-05		5.0000
Kr-85	2.8595E-01	22.160	44.321	0.00E+00	6.34E+00	1.27E+01		7.0000
Np-237	9.5479E-06	22.160	44.321	0.00E+00	2.12E-04	4.23E-04		11.0000
Pa-231	8.9297E-10	22.160	44.321	0.00E+00	1.98E-08	3.96E-08		
Pb-210	3.7609E-12	22.160	44.321	0.00E+00	8.33E-11	1.67E-10		
Pm-147	2.5452E+00	22.160	44.321	0.00E+00	5.64E+01	1.13E+02		
Pu-238	2.0550E-02	22.160	44.321	0.00E+00	4.55E-01	9.11E-01		
Pu-239	4.2838E-04	22.160	44.321	0.00E+00	9.49E-03	1.90E-02		
Pu-240	2.4401E-04	22.160	44.321	0.00E+00	5.41E-03	1.08E-02		
Pu-241	6.8764E-02	22.160	44.321	0.00E+00	1.52E+00	3.05E+00		
Pu-242	3.6329E-07	22.160	44.321	0.00E+00	8.05E-06	1.61E-05		
Ra-226	3.8045E-11	22.160	44.321	0.00E+00	8.43E-10	1.69E-09		
Ra-228	2.9902E-15	22.160	44.321	0.00E+00	6.63E-14	1.33E-13		
Ru-106	1.9055E-01	22.160	44.321	0.00E+00	4.22E+00	8.45E+00		
Se-79	1.2936E-05	22.160	44.321	0.00E+00	2.87E-04	5.73E-04		
Sn-126	1.1574E-05	22.160	44.321	0.00E+00	2.56E-04	5.13E-04		
Sr-90	2.7505E+00	22.160	44.321	0.00E+00	6.10E+01	1.22E+02		
Tc-99	4.2239E-04	22.160	44.321	0.00E+00	9.36E-03	1.87E-02		
Th-229	1.8848E-12	22.160	44.321	0.00E+00	4.18E-11	8.35E-11		
Th-230	1.7042E-08	22.160	44.321	0.00E+00	3.78E-07	7.55E-07		
Th-232	7.8132E-15	22.160	44.321	0.00E+00	1.73E-13	3.46E-13		
Tl-208	4.4063E-08	22.160	44.321	0.00E+00	9.76E-07	1.95E-06		
U-232	1.3151E-07	22.160	44.321	0.00E+00	2.91E-06	5.83E-06		
U-233	1.9564E-09	22.160	44.321	0.00E+00	4.34E-08	8.67E-08		
U-234	1.8371E-04	22.160	44.321	0.00E+00	4.07E-03	8.14E-03		
U-235	-2.7235E-06	22.160	0.000	9.78E-03	9.72E-03	9.78E-03		
U-236	1.5493E-05	22.160	44.321	0.00E+00	3.43E-04	6.87E-04		
U-238	-4.2851E-09	22.160	0.000	6.13E-03	6.13E-03	6.13E-03		
Y-90	2.7505E+00	22.160	44.321	0.00E+00	6.10E+01	1.22E+02		
Other Radionuclides					1.14E+02	2.28E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.12E+00	2.25E+00
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 (6061)	ALUM
BOL HM Constituents:	U-ALX	U
BOL Enrichment %:	19.8630137	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:		22.160
Bounding:		44.321

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: ZPRL (TAIWAN)
 SNF ID #: 554
 Fuel Units & Descr: 35 - ASSEMBLY
 Heavy Metal Mass: BOL=23.75kg ; EOL=23.35kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1997
 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"
 0.37

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	2.8404E-10	377.861	755.721	0.00E+00	1.07E-07	2.15E-07	Avg. MeV	
Am-241	1.4935E-03	377.861	755.721	0.00E+00	5.64E-01	1.13E+00	0.0150	1.028E+14
Am-242m	4.4390E-07	377.861	755.721	0.00E+00	1.68E-04	3.35E-04	0.0250	2.163E+13
Am-243	1.4913E-06	377.861	755.721	0.00E+00	5.63E-04	1.13E-03	0.0375	1.886E+13
C-14	5.7217E-09	377.861	755.721	0.00E+00	2.16E-06	4.32E-06	0.0575	1.992E+13
Cl-36	1.3124E-32	377.861	755.721	0.00E+00	4.96E-30	9.92E-30	0.0850	1.212E+13
Cm-243	2.0967E-07	377.861	755.721	0.00E+00	7.92E-05	1.58E-04	0.1250	8.478E+12
Cm-244	4.3001E-05	377.861	755.721	0.00E+00	1.62E-02	3.25E-02	0.2250	1.041E+13
Co-60	1.9798E-05	377.861	755.721	0.00E+00	7.48E-03	1.50E-02	0.3750	4.665E+12
Cs-134	9.0795E-02	377.861	755.721	0.00E+00	3.43E+01	6.86E+01	0.5750	7.573E+13
Cs-135	3.4477E-06	377.861	755.721	0.00E+00	1.30E-03	2.61E-03	0.8500	3.694E+12
Cs-137	2.5588E+00	377.861	755.721	0.00E+00	9.67E+02	1.93E+03	1.2500	1.202E+12
Eu-154	5.4847E-02	377.861	755.721	0.00E+00	2.07E+01	4.14E+01	1.7500	4.391E+10
Eu-155	1.9469E-02	377.861	755.721	0.00E+00	7.36E+00	1.47E+01	2.2500	2.903E+09
Fe-55	1.7797E-03	377.861	755.721	0.00E+00	6.72E-01	1.34E+00	2.7500	4.050E+07
H-3	8.0065E-03	377.861	755.721	0.00E+00	3.03E+00	6.05E+00	3.5000	4.823E+06
I-129	7.5300E-07	377.861	755.721	0.00E+00	2.85E-04	5.69E-04	5.0000	4.153E+02
Kr-85	2.0705E-01	377.861	755.721	0.00E+00	7.82E+01	1.56E+02	7.0000	4.621E+01
Np-237	9.5507E-06	377.861	755.721	0.00E+00	3.61E-03	7.22E-03	11.0000	5.202E+00
Pa-231	1.2740E-09	377.861	755.721	0.00E+00	4.81E-07	9.63E-07		
Pb-210	1.1838E-11	377.861	755.721	0.00E+00	4.47E-09	8.95E-09		
Pm-147	6.7974E-01	377.861	755.721	0.00E+00	2.57E+02	5.14E+02		
Pu-238	1.9755E-02	377.861	755.721	0.00E+00	7.46E+00	1.49E+01		
Pu-239	4.2838E-04	377.861	755.721	0.00E+00	1.62E-01	3.24E-01		
Pu-240	2.4390E-04	377.861	755.721	0.00E+00	9.22E-02	1.84E-01		
Pu-241	5.4058E-02	377.861	755.721	0.00E+00	2.04E+01	4.09E+01		
Pu-242	3.6329E-07	377.861	755.721	0.00E+00	1.37E-04	2.75E-04		
Ra-226	8.3742E-11	377.861	755.721	0.00E+00	3.16E-08	6.33E-08		
Ra-228	5.7734E-15	377.861	755.721	0.00E+00	2.18E-12	4.36E-12		
Ru-106	6.1356E-03	377.861	755.721	0.00E+00	2.32E+00	4.64E+00		
Se-79	1.2936E-05	377.861	755.721	0.00E+00	4.89E-03	9.78E-03		
Sn-126	1.1574E-05	377.861	755.721	0.00E+00	4.37E-03	8.75E-03		
Sr-90	2.4417E+00	377.861	755.721	0.00E+00	9.23E+02	1.85E+03		
Tc-99	4.2239E-04	377.861	755.721	0.00E+00	1.60E-01	3.19E-01		
Th-229	2.8568E-12	377.861	755.721	0.00E+00	1.08E-09	2.16E-09		
Th-230	2.5310E-08	377.861	755.721	0.00E+00	9.56E-06	1.91E-05		
Th-232	1.1631E-14	377.861	755.721	0.00E+00	4.39E-12	8.79E-12		
Tl-208	4.6705E-08	377.861	755.721	0.00E+00	1.76E-05	3.53E-05		
U-232	1.3151E-07	377.861	755.721	0.00E+00	4.97E-05	9.94E-05		
U-233	2.1650E-09	377.861	755.721	0.00E+00	8.18E-07	1.64E-06		
U-234	1.8399E-04	377.861	755.721	0.00E+00	6.95E-02	1.39E-01		
U-235	-2.7235E-06	377.861	0.000	1.01E-02	9.11E-03	1.01E-02		
U-236	1.5493E-05	377.861	755.721	0.00E+00	5.85E-03	1.17E-02		
U-238	-4.2851E-09	377.861	0.000	6.41E-03	6.40E-03	6.41E-03		
Y-90	2.4423E+00	377.861	755.721	0.00E+00	9.23E+02	1.85E+03		
Other Radionuclides					9.39E+02	1.88E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.20E+01	2.39E+01
Total	Total

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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	19.74998117	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		377.861	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		755.721	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.05		1.00
Bounding:	0.10		

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).

2010 Summary, Totals for all Spent Fuels

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.98E+01	1.01E+02	Avg. MeV	
Am-241	2.11E+06	3.90E+06	0.0150	3.468E+18
Am-242m	5.13E+03	9.53E+03	0.0250	7.215E+17
Am-243	4.06E+03	7.59E+03	0.0375	6.619E+17
C-14	1.83E+04	2.79E+04	0.0575	7.155E+17
Cl-36	2.98E+02	4.67E+02	0.0850	4.082E+17
Cm-243	1.69E+03	3.23E+03	0.1250	3.055E+17
Cm-244	2.32E+05	4.45E+05	0.2250	3.484E+17
Co-60	7.49E+06	9.79E+06	0.3750	1.566E+17
Cs-134	1.85E+06	3.20E+06	0.5750	2.792E+18
Cs-135	3.13E+02	5.78E+02	0.8500	1.568E+17
Cs-137	3.81E+07	7.02E+07	1.2500	7.709E+17
Eu-154	8.37E+05	1.51E+06	1.7500	1.915E+15
Eu-155	2.94E+05	5.27E+05	2.2500	1.558E+15
Fe-55	7.67E+05	9.71E+05	2.7500	6.484E+14
H-3	2.45E+05	4.21E+05	3.5000	1.197E+12
I-129	1.95E+01	3.63E+01	5.0000	2.905E+09
Kr-85	1.86E+06	3.42E+06	7.0000	3.343E+08
Np-237	2.02E+02	3.76E+02	11.0000	3.837E+07
Pa-231	7.04E+01	1.43E+02		
Pb-210	1.74E-02	2.74E-02		
Pm-147	7.51E+06	1.38E+07		
Pu-238	9.72E+05	1.79E+06		
Pu-239	4.75E+05	7.71E+05		
Pu-240	3.65E+05	6.21E+05		
Pu-241	1.54E+07	3.21E+07		
Pu-242	5.06E+02	8.38E+02		
Ra-226	3.71E-02	5.39E-02		
Ra-228	3.39E+00	6.94E+00		
Ru-106	6.26E+05	1.14E+06		
Se-79	2.91E+02	5.39E+02		
Sn-126	2.81E+02	5.15E+02		
Sr-90	3.12E+07	5.72E+07		
Tc-99	8.85E+03	1.63E+04		
Th-229	3.35E+01	6.86E+01		
Th-230	3.34E+00	4.79E+00		
Th-232	8.01E+00	8.17E+00		
Ti-208	8.93E+03	1.82E+04		
U-232	2.42E+04	4.92E+04		
U-233	1.82E+04	2.21E+04		
U-234	7.25E+03	1.02E+04		
U-235	1.43E+02	2.16E+02		
U-236	2.83E+02	4.98E+02		
U-238	7.77E+02	7.89E+02		
Y-90	3.12E+07	5.72E+07		
Other Radionuclides	4.90E+07	8.86E+07		
			Thermal Power	
			Nominal Heat	
			Output	Bounding Heat
			(Watts)	Output (Watts)
			7.18E+05	1.25E+06
			Total	Total

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	1398.6	1441.8	165.3	27.0	171.4	419.0

Bare Fuel Transfers	
166	Assemblies

2010 Summary, Totals for 18" x 10' Canister

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.59E+00	9.16E+00	Avg. MeV	
Am-241	5.74E+05	1.05E+06	0.0150	1.305E+18
Am-242m	1.16E+03	2.17E+03	0.0250	2.748E+17
Am-243	1.12E+03	2.09E+03	0.0375	2.490E+17
C-14	1.17E+04	1.80E+04	0.0575	2.654E+17
Cl-36	2.11E+02	3.30E+02	0.0850	1.563E+17
Cm-243	1.23E+02	2.36E+02	0.1250	1.256E+17
Cm-244	2.33E+04	4.29E+04	0.2250	1.332E+17
Co-60	5.65E+06	7.33E+06	0.3750	6.144E+16
Cs-134	1.04E+06	1.92E+06	0.5750	9.315E+16
Cs-135	5.80E+01	1.07E+02	0.8500	8.575E+16
Cs-137	1.21E+07	2.20E+07	1.2500	5.650E+17
Eu-154	4.05E+05	7.27E+05	1.7500	8.941E+14
Eu-155	1.33E+05	2.43E+05	2.2500	1.075E+15
Fe-55	6.23E+05	7.63E+05	2.7500	5.166E+13
H-3	7.10E+04	1.14E+05	3.5000	7.325E+11
I-129	4.29E+00	7.74E+00	5.0000	2.832E+08
Kr-85	8.52E+05	1.57E+06	7.0000	3.249E+07
Np-237	6.08E+01	1.10E+02	11.0000	3.723E+06
Pa-231	5.69E+00	1.13E+01		
Pb-210	4.64E-03	6.65E-03		
Pm-147	5.13E+06	9.50E+06		
Pu-238	2.83E+05	4.62E+05		
Pu-239	4.93E+04	6.17E+04		
Pu-240	2.71E+04	4.93E+04		
Pu-241	2.73E+06	8.54E+06		
Pu-242	1.30E+02	1.52E+02		
Ra-226	1.19E-02	1.68E-02		
Ra-228	2.47E-01	4.89E-01		
Ru-106	3.79E+05	7.04E+05		
Se-79	7.58E+01	1.35E+02		
Sn-126	7.20E+01	1.30E+02		
Sr-90	1.12E+07	2.06E+07		
Tc-99	2.39E+03	4.30E+03		
Th-229	3.05E+00	6.08E+00		
Th-230	1.11E+00	1.56E+00		
Th-232	5.95E-01	6.30E-01		
Tl-208	6.43E+02	1.29E+03		
U-232	1.74E+03	3.48E+03		
U-233	1.76E+03	1.93E+03		
U-234	2.77E+03	3.99E+03		
U-235	5.68E+01	9.74E+01		
U-236	9.07E+01	1.58E+02		
U-238	1.64E+01	2.26E+01		
Y-90	1.12E+07	2.06E+07		
Other Radionuclides	1.99E+07	3.54E+07		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.93E+05	4.88E+05
Total	Total

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	1398.6	0.0	0.0	0.0	0.0	0.0

Bare Fuel Transfers	
0	Assemblies

2010 Summary, Totals for 18" x 15' Canister

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.88E+01	3.53E+01	Avg. MeV	
Am-241	4.60E+05	7.38E+05	0.0150	9.753E+17
Am-242m	2.48E+03	4.73E+03	0.0250	2.039E+17
Am-243	1.32E+03	2.34E+03	0.0375	1.901E+17
C-14	3.74E+03	4.23E+03	0.0575	1.968E+17
Cl-36	4.57E+01	5.43E+01	0.0850	1.162E+17
Cm-243	1.02E+03	2.03E+03	0.1250	8.821E+16
Cm-244	1.11E+05	2.14E+05	0.2250	9.852E+16
Co-60	1.34E+06	1.46E+06	0.3750	4.479E+16
Cs-134	8.03E+05	1.26E+06	0.5750	8.312E+17
Cs-135	1.27E+02	2.29E+02	0.8500	5.725E+16
Cs-137	1.18E+07	2.05E+07	1.2500	1.235E+17
Eu-154	2.83E+05	4.92E+05	1.7500	6.063E+14
Eu-155	1.36E+05	2.45E+05	2.2500	4.816E+14
Fe-55	1.37E+05	1.95E+05	2.7500	2.297E+14
H-3	1.05E+05	1.74E+05	3.5000	4.584E+11
I-129	5.80E+00	1.02E+01	5.0000	1.361E+09
Kr-85	5.95E+05	1.04E+06	7.0000	1.567E+08
Np-237	5.13E+01	8.79E+01	11.0000	1.800E+07
Pa-231	2.68E+01	5.01E+01		
Pb-210	8.30E-03	1.12E-02		
Pm-147	2.27E+06	4.17E+06		
Pu-238	3.72E+05	7.24E+05		
Pu-239	1.93E+05	2.45E+05		
Pu-240	1.42E+05	1.84E+05		
Pu-241	6.34E+06	9.30E+06		
Pu-242	1.38E+02	2.47E+02		
Ra-226	1.83E-02	2.27E-02		
Ra-228	1.69E+00	3.33E+00		
Ru-106	2.45E+05	4.38E+05		
Se-79	8.89E+01	1.54E+02		
Sn-126	1.33E+02	2.45E+02		
Sr-90	9.42E+06	1.59E+07		
Tc-99	2.53E+03	4.23E+03		
Th-229	1.57E+01	3.06E+01		
Th-230	1.62E+00	1.96E+00		
Th-232	3.45E+00	3.54E+00		
Tl-208	3.43E+03	6.43E+03		
U-232	9.28E+03	1.74E+04		
U-233	4.06E+03	6.80E+03		
U-234	3.30E+03	3.84E+03		
U-235	2.16E+01	3.07E+01		
U-236	7.58E+01	1.10E+02		
U-238	4.20E+01	4.30E+01		
Y-90	9.42E+06	1.59E+07		
Other Radionuclides	1.46E+07	2.49E+07		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.09E+05	3.41E+05
Total	Total

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	1441.8	0.0	0.0	0.0	0.0

Bare Fuel Transfers	
0	Assemblies

2010 Summary, Totals for 24" x 10' Canister

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	5.45E-04	1.09E-03	Avg. MeV	
Am-241	1.65E+03	3.29E+03	0.0150	1.734E+17
Am-242m	3.48E-01	6.97E-01	0.0250	3.605E+16
Am-243	1.22E+00	2.45E+00	0.0375	3.144E+16
C-14	4.69E-03	9.38E-03	0.0575	3.368E+16
Cl-36	1.08E-26	2.16E-26	0.0850	2.035E+16
Cm-243	1.35E-01	2.70E-01	0.1250	1.377E+16
Cm-244	2.41E+01	4.82E+01	0.2250	1.756E+16
Co-60	4.37E+00	8.73E+00	0.3750	7.643E+15
Cs-134	2.59E+03	5.18E+03	0.5750	1.247E+17
Cs-135	2.83E+00	5.66E+00	0.8500	2.108E+15
Cs-137	1.67E+06	3.34E+06	1.2500	1.204E+15
Eu-154	2.01E+04	4.03E+04	1.7500	5.526E+13
Eu-155	3.96E+03	7.91E+03	2.2500	4.847E+09
Fe-55	1.02E+02	2.04E+02	2.7500	2.740E+09
H-3	3.75E+03	7.50E+03	3.5000	1.259E+07
I-129	6.18E-01	1.24E+00	5.0000	7.116E+05
Kr-85	8.91E+04	1.78E+05	7.0000	7.857E+04
Np-237	7.85E+00	1.57E+01	11.0000	8.805E+03
Pa-231	1.67E-03	3.34E-03		
Pb-210	4.08E-05	8.17E-05		
Pm-147	3.98E+04	7.97E+04		
Pu-238	1.50E+04	3.00E+04		
Pu-239	3.52E+02	7.03E+02		
Pu-240	2.00E+02	4.00E+02		
Pu-241	2.74E+04	5.49E+04		
Pu-242	2.98E-01	5.97E-01		
Ra-226	1.88E-04	3.75E-04		
Ra-228	1.02E-08	2.04E-08		
Ru-106	5.22E+00	1.04E+01		
Se-79	1.06E+01	2.12E+01		
Sn-126	9.50E+00	1.90E+01		
Sr-90	1.58E+06	3.16E+06		
Tc-99	3.47E+02	6.94E+02		
Th-229	4.18E-06	8.37E-06		
Th-230	3.44E-02	6.88E-02		
Th-232	1.58E-08	3.16E-08		
Tl-208	3.78E-02	7.56E-02		
U-232	1.03E-01	2.07E-01		
U-233	2.12E-03	4.24E-03	Thermal Power	
U-234	1.52E+02	3.03E+02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	4.95E+00	7.19E+00	1.96E+04	3.92E+04
U-236	1.27E+01	2.54E+01		
U-238	7.88E-02	8.23E-02	Total	Total
Y-90	1.58E+06	3.16E+06		
Other Radionuclides	1.59E+06	3.18E+06		

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	0.0	165.3	0.0	0.0	0.0

Bare Fuel Transfers	
0	Assemblies

2010 Summary, Totals for 24" x 15' Canister

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.35E+01	4.15E+01	Avg. MeV	
Am-241	6.30E+01	1.11E+02	0.0150	5.207E+16
Am-242m	4.37E-01	7.72E-01	0.0250	1.075E+16
Am-243	8.78E-02	1.55E-01	0.0375	9.202E+15
C-14	2.61E+01	4.60E+01	0.0575	1.004E+16
Cf-36	5.10E-01	9.01E-01	0.0850	6.368E+15
Cm-243	1.10E-01	1.94E-01	0.1250	4.078E+15
Cm-244	5.84E+00	1.03E+01	0.2250	5.685E+15
Co-60	9.17E+02	1.62E+03	0.3750	2.307E+15
Cs-134	2.08E+02	3.67E+02	0.5750	3.494E+16
Cs-135	8.06E+00	1.42E+01	0.8500	6.914E+14
Cs-137	5.24E+05	9.28E+05	1.2500	4.374E+14
Eu-154	5.42E+03	9.58E+03	1.7500	4.171E+13
Eu-155	7.52E+02	1.33E+03	2.2500	1.679E+09
Fe-55	9.32E+00	1.65E+01	2.7500	2.687E+14
H-3	1.05E+03	1.86E+03	3.5000	1.091E+06
I-129	4.46E-01	7.89E-01	5.0000	3.394E+05
Kr-85	3.37E+04	5.95E+04	7.0000	2.540E+04
Np-237	3.52E-02	6.22E-02	11.0000	2.005E+03
Pa-231	3.38E+01	5.98E+01		
Pb-210	3.36E-03	5.94E-03		
Pm-147	1.04E+03	1.83E+03		
Pu-238	1.29E+02	2.29E+02		
Pu-239	7.75E+00	1.37E+01		
Pu-240	4.56E+00	8.05E+00		
Pu-241	6.70E+02	1.18E+03		
Pu-242	1.15E-02	2.03E-02		
Ra-226	4.07E-03	7.20E-03		
Ra-228	1.29E+00	2.27E+00		
Ru-106	1.10E-02	1.94E-02		
Se-79	9.97E+00	1.76E+01		
Sn-126	1.12E+01	1.98E+01		
Sr-90	5.33E+05	9.42E+05		
Tc-99	9.16E+01	1.62E+02		
Th-229	1.32E+01	2.33E+01		
Th-230	2.91E-01	5.13E-01		
Th-232	3.60E+00	3.62E+00		
Tl-208	4.33E+03	7.65E+03		
U-232	1.17E+04	2.07E+04		
U-233	1.12E+04	1.22E+04		
U-234	2.30E+02	4.07E+02		
U-235	1.88E-02	3.13E-02		
U-236	3.74E-02	6.60E-02		
U-238	1.51E-03	1.59E-03		
Y-90	5.33E+05	9.42E+05		
Other Radionuclides	5.80E+05	1.03E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.44E+03	1.65E+04
Total	Total

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	0.0	0.0	27.0	0.0	0.0

Bare Fuel Transfers	
0	Assemblies

2010 Summary, Totals for High Integrity Canister (HIC)

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.84E+00	1.52E+01	Avg. MeV	
Am-241	2.91E+04	3.36E+04	0.0150	4.755E+16
Am-242m	3.49E+02	3.59E+02	0.0250	9.916E+15
Am-243	9.28E+01	1.13E+02	0.0375	9.147E+15
C-14	3.01E+01	4.91E+01	0.0575	9.533E+15
Cf-252	4.56E-01	8.20E-01	0.0850	5.686E+15
Cm-243	1.22E+02	1.32E+02	0.1250	3.834E+15
Cm-244	7.52E+03	9.67E+03	0.2250	4.866E+15
Co-60	1.01E+04	1.27E+04	0.3750	2.127E+15
Cs-134	5.31E+03	5.53E+03	0.5750	4.193E+16
Cs-135	1.52E+01	2.00E+01	0.8500	8.361E+14
Cs-137	7.84E+05	1.12E+06	1.2500	1.366E+15
Eu-154	1.11E+04	1.54E+04	1.7500	2.766E+13
Eu-155	1.13E+04	1.19E+04	2.2500	1.132E+12
Fe-55	1.75E+03	2.36E+03	2.7500	9.812E+13
H-3	5.96E+03	7.60E+03	3.5000	3.024E+09
I-129	4.91E-01	7.57E-01	5.0000	6.129E+07
Kr-85	3.32E+04	5.27E+04	7.0000	7.058E+06
Np-237	1.98E+00	2.36E+00	11.0000	8.102E+05
Pa-231	4.10E+00	2.18E+01		
Pb-210	4.13E-04	2.18E-03		
Pm-147	6.15E+04	6.38E+04		
Pu-238	1.23E+04	1.50E+04		
Pu-239	3.56E+03	8.84E+03		
Pu-240	7.48E+03	7.96E+03		
Pu-241	1.74E+05	3.06E+05		
Pu-242	9.11E+00	1.11E+01		
Ra-226	5.13E-04	2.66E-03		
Ra-228	1.55E-01	8.29E-01		
Ru-106	2.70E+03	2.77E+03		
Se-79	6.09E+00	1.17E+01		
Sn-126	1.48E+01	2.15E+01		
Sr-90	5.11E+05	8.30E+05		
Tc-99	1.71E+02	2.32E+02		
Th-229	1.59E+00	8.51E+00		
Th-230	3.75E-02	1.91E-01		
Th-232	3.56E-01	3.59E-01		
Ti-208	5.23E+02	2.79E+03		
U-232	1.42E+03	7.56E+03		
U-233	1.09E+03	1.21E+03		
U-234	3.50E+01	1.58E+02		
U-235	2.10E-01	4.45E-01		
U-236	2.48E+00	2.77E+00		
U-238	4.69E-01	5.38E-01		
Y-90	5.11E+05	8.30E+05		
Other Radionuclides	8.03E+05	1.16E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.01E+04	1.59E+04
Total	Total

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	0.0	0.0	0.0	171.4	0.0

Bare Fuel Transfers	
0	Assemblies

2010 Summary, Totals for MCO

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.41E-03	6.82E-03	Avg. MeV	
Am-241	7.55E+05	1.51E+06	0.0150	7.448E+17
Am-242m	5.44E+02	1.09E+03	0.0250	1.521E+17
Am-243	6.04E+02	1.21E+03	0.0375	1.410E+17
C-14	6.82E+02	1.36E+03	0.0575	1.610E+17
Cf-252	3.48E-01	6.96E-01	0.0850	8.445E+16
Cm-243	1.09E+02	2.18E+02	0.1250	5.624E+16
Cm-244	2.45E+04	4.90E+04	0.2250	7.245E+16
Co-60	1.57E+03	3.13E+03	0.3750	3.134E+16
Cs-134	1.18E+02	2.37E+02	0.5750	6.793E+17
Cs-135	7.86E+01	1.57E+02	0.8500	7.066E+15
Cs-137	9.19E+06	1.84E+07	1.2500	4.125E+15
Eu-154	5.65E+04	1.13E+05	1.7500	1.966E+14
Eu-155	2.85E+03	5.71E+03	2.2500	1.734E+10
Fe-55	3.94E+01	7.88E+01	2.7500	6.351E+09
H-3	2.41E+04	4.83E+04	3.5000	9.201E+08
I-129	6.61E+00	1.32E+01	5.0000	3.917E+08
Kr-85	2.04E+05	4.09E+05	7.0000	4.490E+07
Np-237	6.64E+01	1.33E+02	11.0000	5.144E+06
Pa-231	9.55E-03	1.91E-02		
Pb-210	2.02E-04	4.05E-04		
Pm-147	4.46E+03	8.92E+03		
Pu-238	1.76E+05	3.52E+05		
Pu-239	2.12E+05	4.24E+05		
Pu-240	1.70E+05	3.41E+05		
Pu-241	4.77E+06	9.55E+06		
Pu-242	1.32E+02	2.64E+02		
Ra-226	8.01E-04	1.60E-03		
Ra-228	2.37E-06	4.73E-06		
Ru-106	4.52E-03	9.04E-03		
Se-79	8.37E+01	1.67E+02		
Sn-126	1.09E+01	2.19E+01		
Sr-90	6.50E+06	1.30E+07		
Tc-99	2.79E+03	5.59E+03		
Th-229	6.16E-05	1.23E-04		
Th-230	1.26E-01	2.52E-01		
Th-232	2.42E-06	4.83E-06		
Tl-208	7.58E-02	1.52E-01		
U-232	2.05E-01	4.11E-01		
U-233	1.80E-02	3.61E-02		
U-234	4.93E+02	9.86E+02		
U-235	4.76E+01	5.71E+01		
U-236	8.92E+01	1.78E+02		
U-238	7.02E+02	7.05E+02		
Y-90	6.50E+06	1.30E+07		
Other Radionuclides	8.82E+06	1.77E+07		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.33E+05	2.65E+05
Total	Total

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	0.0	0.0	0.0	0.0	419.0

Bare Fuel Transfers	
0	Assemblies

2010 Summary, Totals for Bare Fuel Transfers

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.09E-02	8.17E-02	Avg. MeV	
Am-241	2.88E+05	5.72E+05	0.0150	1.694E+17
Am-242m	5.95E+02	1.18E+03	0.0250	3.407E+16
Am-243	9.30E+02	1.84E+03	0.0375	3.199E+16
C-14	2.14E+03	4.27E+03	0.0575	3.909E+16
Cl-36	4.02E+01	8.04E+01	0.0850	1.882E+16
Cm-243	3.12E+02	6.15E+02	0.1250	1.375E+16
Cm-244	6.58E+04	1.30E+05	0.2250	1.619E+16
Co-60	4.91E+05	9.83E+05	0.3750	6.945E+15
Cs-134	6.44E+02	1.28E+03	0.5750	1.484E+17
Cs-135	2.29E+01	4.55E+01	0.8500	3.116E+15
Cs-137	2.02E+06	4.00E+06	1.2500	7.526E+16
Eu-154	5.57E+04	1.11E+05	1.7500	9.343E+13
Eu-155	5.88E+03	1.17E+04	2.2500	3.922E+11
Fe-55	5.42E+03	1.08E+04	2.7500	1.225E+11
H-3	3.40E+04	6.73E+04	3.5000	1.890E+09
I-129	1.21E+00	2.39E+00	5.0000	8.075E+08
Kr-85	5.37E+04	1.06E+05	7.0000	9.305E+07
Np-237	1.40E+01	2.76E+01	11.0000	1.069E+07
Pa-231	5.13E-02	1.02E-01		
Pb-210	4.73E-04	9.44E-04		
Pm-147	3.20E+03	6.37E+03		
Pu-238	1.13E+05	2.06E+05		
Pu-239	1.70E+04	2.95E+04		
Pu-240	1.78E+04	3.82E+04		
Pu-241	1.32E+06	4.32E+06		
Pu-242	9.65E+01	1.63E+02		
Ra-226	1.29E-03	2.57E-03		
Ra-228	1.03E-02	2.07E-02		
Ru-106	3.28E-01	6.52E-01		
Se-79	1.63E+01	3.23E+01		
Sn-126	2.92E+01	5.76E+01		
Sr-90	1.44E+06	2.85E+06		
Tc-99	5.31E+02	1.05E+03		
Th-229	3.03E-02	6.05E-02		
Th-230	1.20E-01	2.38E-01		
Th-232	1.04E-02	2.08E-02		
Tl-208	1.70E+00	3.39E+00		
U-232	4.60E+00	9.19E+00		
U-233	6.25E+00	1.25E+01	Thermal Power	
U-234	2.71E+02	5.40E+02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	1.17E+01	2.31E+01	4.47E+04	8.81E+04
U-236	1.21E+01	2.40E+01		
U-238	1.62E+01	1.85E+01	Total	Total
Y-90	1.44E+06	2.85E+06		
Other Radionuclides	2.66E+06	5.29E+06		

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	0.0	0.0	0.0	0.0	0.0

Bare Fuel Transfers		BWR	PWR
166	Assemblies	87	79

2010 Summary, DBE category: Stable Metals, Intact

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.25E-03	4.42E-03	Avg. MeV	
Am-241	2.06E+04	3.96E+04	0.0150	1.532E+18
Am-242m	9.95E+00	1.94E+01	0.0250	3.258E+17
Am-243	3.85E+01	6.74E+01	0.0375	2.965E+17
C-14	1.53E+00	3.03E+00	0.0575	2.991E+17
Cl-36	1.45E-03	2.89E-03	0.0850	1.875E+17
Cm-243	8.62E+00	1.52E+01	0.1250	1.516E+17
Cm-244	5.53E+03	9.08E+03	0.2250	1.596E+17
Co-60	1.36E+03	2.61E+03	0.3750	7.451E+16
Cs-134	1.78E+06	3.07E+06	0.5750	1.119E+18
Cs-135	2.13E+01	4.05E+01	0.8500	1.249E+17
Cs-137	1.35E+07	2.53E+07	1.2500	2.661E+16
Eu-154	3.89E+05	7.11E+05	1.7500	1.040E+15
Eu-155	1.76E+05	3.13E+05	2.2500	1.531E+15
Fe-55	9.91E+04	1.81E+05	2.7500	1.008E+13
H-3	4.30E+04	7.99E+04	3.5000	1.144E+12
I-129	4.00E+00	7.58E+00	5.0000	6.158E+07
Kr-85	1.10E+06	2.05E+06	7.0000	7.059E+06
Np-237	6.37E+01	1.17E+02	11.0000	8.083E+05
Pa-231	7.80E-03	1.52E-02		
Pb-210	1.65E-04	3.29E-04		
Pm-147	7.03E+06	1.29E+07		
Pu-238	2.05E+05	3.60E+05		
Pu-239	1.01E+04	1.98E+04		
Pu-240	5.35E+03	1.05E+04		
Pu-241	9.32E+05	1.78E+06		
Pu-242	6.04E+00	1.12E+01		
Ra-226	7.04E-04	1.39E-03		
Ra-228	6.23E-06	1.24E-05		
Ru-106	6.03E+05	1.10E+06		
Se-79	6.95E+01	1.32E+02		
Sn-126	6.17E+01	1.17E+02		
Sr-90	1.28E+07	2.40E+07		
Tc-99	2.27E+03	4.31E+03		
Th-229	2.30E-05	4.50E-05		
Th-230	1.33E-01	2.60E-01		
Th-232	8.10E-06	1.61E-05		
Tl-208	2.16E-01	4.06E-01		
U-232	6.19E-01	1.16E+00		
U-233	1.57E-02	3.03E-02	Nominal Heat	
U-234	7.55E+02	1.44E+03	Output (Watts)	Bounding Heat Output (Watts)
U-235	2.21E+01	3.68E+01	2.15E+05	3.97E+05
U-236	8.31E+01	1.57E+02		
U-238	3.50E+00	3.54E+00	Total	Total
Y-90	1.28E+07	2.40E+07		
Other Radionuclides	1.95E+07	3.62E+07		

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	1012.2	235.8	165.3	0.0	1.0	0.0

Bare Fuel Transfers	
0	Assemblies

2010 Summary, DBE category: Stable Metals, Not Intact

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.89E-06	2.89E-06	Avg. MeV	
Am-241	4.82E-05	4.82E-05	0.0150	8.747E+12
Am-242m	0.00E+00	0.00E+00	0.0250	1.829E+12
Am-243	7.74E-13	7.74E-13	0.0375	1.602E+12
C-14	2.01E-03	2.01E-03	0.0575	1.694E+12
Cl-36	5.09E-06	5.09E-06	0.0850	1.033E+12
Cm-243	2.06E-12	2.06E-12	0.1250	6.685E+11
Cm-244	8.57E-14	8.57E-14	0.2250	8.786E+11
Co-60	1.39E+00	1.39E+00	0.3750	3.887E+11
Cs-134	8.92E-03	8.92E-03	0.5750	6.685E+12
Cs-135	4.15E-03	4.15E-03	0.8500	6.315E+10
Cs-137	1.80E+02	1.80E+02	1.2500	1.244E+11
Eu-154	5.72E-02	5.72E-02	1.7500	1.628E+09
Eu-155	1.06E+00	1.06E+00	2.2500	7.971E+05
Fe-55	7.13E-02	7.13E-02	2.7500	3.037E+04
H-3	7.57E-01	7.57E-01	3.5000	9.126E+02
I-129	1.05E-04	1.05E-04	5.0000	5.803E+00
Kr-85	9.39E+00	9.39E+00	7.0000	4.899E-01
Np-237	3.05E-04	3.05E-04	11.0000	4.449E-02
Pa-231	8.95E-06	8.95E-06		
Pb-210	1.27E-10	1.27E-10		
Pm-147	5.62E+00	5.62E+00		
Pu-238	1.78E-02	1.78E-02		
Pu-239	1.80E+00	1.80E+00		
Pu-240	6.27E-03	6.27E-03		
Pu-241	7.93E-04	7.93E-04		
Pu-242	4.03E-11	4.03E-11		
Ra-226	5.75E-10	5.75E-10		
Ra-228	2.04E-09	2.04E-09		
Ru-106	8.61E-04	8.61E-04		
Se-79	1.52E-03	1.52E-03		
Sn-126	3.46E-03	3.46E-03		
Sr-90	1.59E+02	1.59E+02		
Tc-99	4.13E-02	4.13E-02		
Th-229	2.13E-09	2.13E-09		
Th-230	1.04E-07	1.04E-07		
Th-232	2.18E-09	2.18E-09		
Tl-208	6.20E-07	6.20E-07		
U-232	1.68E-06	1.68E-06		
U-233	8.99E-07	8.99E-07		
U-234	4.50E-04	4.50E-04		
U-235	4.24E-04	6.38E-04		
U-236	1.16E-03	1.16E-03		
U-238	2.79E-04	2.88E-04		
Y-90	1.59E+02	1.59E+02		
Other Radionuclides	1.77E+02	1.77E+02		

	Thermal Power	
	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	2.03E+00	2.03E+00
U-238		
Total		

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	0.0	0.0	0.0	1.0	0.0

Bare Fuel Transfers	
0	Assemblies

2010 Summary, DBE category: Non-Metals, Intact

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.66E+01	8.55E+01	Avg. MeV	
Am-241	1.07E+06	2.07E+06	0.0150	9.495E+17
Am-242m	3.73E+03	7.48E+03	0.0250	1.941E+17
Am-243	2.93E+03	5.80E+03	0.0375	1.804E+17
C-14	1.10E+04	1.95E+04	0.0575	2.060E+17
Cl-36	1.97E+02	3.57E+02	0.0850	1.088E+17
Cm-243	1.41E+03	2.83E+03	0.1250	7.810E+16
Cm-244	1.86E+05	3.67E+05	0.2250	9.303E+16
Co-60	2.56E+06	4.61E+06	0.3750	4.060E+16
Cs-134	6.03E+04	1.22E+05	0.5750	8.170E+17
Cs-135	1.60E+02	3.15E+02	0.8500	2.057E+16
Cs-137	1.13E+07	2.18E+07	1.2500	3.548E+17
Eu-154	2.81E+05	5.57E+05	1.7500	5.505E+14
Eu-155	8.80E+04	1.78E+05	2.2500	1.854E+13
Fe-55	8.69E+04	1.68E+05	2.7500	5.375E+14
H-3	1.27E+05	2.36E+05	3.5000	4.585E+10
I-129	6.82E+00	1.31E+01	5.0000	2.322E+09
Kr-85	4.00E+05	7.73E+05	7.0000	2.674E+08
Np-237	5.80E+01	1.12E+02	11.0000	3.070E+07
Pa-231	6.59E+01	1.21E+02		
Pb-210	1.12E-02	1.90E-02		
Pm-147	3.49E+05	7.05E+05		
Pu-238	5.10E+05	9.72E+05		
Pu-239	2.15E+05	2.79E+05		
Pu-240	1.63E+05	2.41E+05		
Pu-241	7.23E+06	1.76E+07		
Pu-242	3.21E+02	5.09E+02		
Ra-226	2.05E-02	3.33E-02		
Ra-228	3.16E+00	5.98E+00		
Ru-106	1.92E+04	3.89E+04		
Se-79	1.04E+02	1.98E+02		
Sn-126	1.67E+02	3.24E+02		
Sr-90	8.48E+06	1.62E+07		
Tc-99	2.71E+03	5.16E+03		
Th-229	3.13E+01	5.88E+01		
Th-230	1.70E+00	2.72E+00		
Th-232	7.44E+00	7.59E+00		
Ti-208	8.37E+03	1.53E+04		
U-232	2.26E+04	4.14E+04		
U-233	1.68E+04	2.06E+04		
U-234	2.96E+03	4.57E+03		
U-235	4.87E+01	9.34E+01		
U-236	6.42E+01	1.14E+02		
U-238	4.18E+01	5.06E+01		
Y-90	8.48E+06	1.62E+07		
Other Radionuclides	1.47E+07	2.80E+07		
			Thermal Power	
			Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
			2.34E+05	4.38E+05
			Total	Total

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	164.7	781.1	0.0	27.0	1.0	18.0
Bare Fuel Transfers			BWR	PWR		
166	Assemblies	87	79			

2010 Summary, DBE category: Non-Metals, Not Intact

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.12E+00	1.57E+01	Avg. MeV	
Am-241	2.72E+05	3.40E+05	0.0150	1.753E+17
Am-242m	9.13E+02	1.07E+03	0.0250	3.554E+16
Am-243	6.98E+02	9.45E+02	0.0375	3.232E+16
C-14	3.42E+03	3.88E+03	0.0575	3.709E+16
Cl-36	6.34E+01	7.20E+01	0.0850	1.964E+16
Cm-243	2.40E+02	3.42E+02	0.1250	1.454E+16
Cm-244	3.37E+04	5.61E+04	0.2250	1.670E+16
Co-60	4.39E+06	4.62E+06	0.3750	7.186E+15
Cs-134	8.63E+03	9.87E+03	0.5750	1.334E+17
Cs-135	4.00E+01	5.27E+01	0.8500	3.913E+15
Cs-137	2.54E+06	3.56E+06	1.2500	3.446E+17
Eu-154	1.09E+05	1.33E+05	1.7500	1.183E+14
Eu-155	2.42E+04	2.79E+04	2.2500	7.270E+12
Fe-55	5.74E+05	6.15E+05	2.7500	1.007E+14
H-3	2.84E+04	4.12E+04	3.5000	5.857E+09
I-129	1.28E+00	1.93E+00	5.0000	3.517E+08
Kr-85	1.00E+05	1.43E+05	7.0000	4.050E+07
Np-237	9.95E+00	1.45E+01	11.0000	4.650E+06
Pa-231	4.46E+00	2.25E+01		
Pb-210	8.99E-04	2.82E-03		
Pm-147	9.50E+04	1.29E+05		
Pu-238	9.75E+04	1.48E+05		
Pu-239	1.18E+04	2.25E+04		
Pu-240	1.94E+04	2.61E+04		
Pu-241	2.47E+06	3.49E+06		
Pu-242	6.57E+01	9.57E+01		
Ra-226	1.84E-03	4.36E-03		
Ra-228	2.25E-01	9.54E-01		
Ru-106	3.21E+03	4.84E+03		
Se-79	1.94E+01	3.07E+01		
Sn-126	2.83E+01	4.41E+01		
Sr-90	2.05E+06	2.88E+06		
Tc-99	6.18E+02	8.42E+02		
Th-229	2.25E+00	9.79E+00		
Th-230	1.73E-01	3.60E-01		
Th-232	5.38E-01	5.46E-01		
Th-208	5.61E+02	2.87E+03		
U-232	1.52E+03	7.76E+03		
U-233	1.22E+03	1.46E+03		
U-234	4.12E+02	6.09E+02		
U-235	2.19E+01	2.56E+01		
U-236	1.64E+01	2.05E+01		
U-238	3.05E+01	3.10E+01		
Y-90	2.05E+06	2.88E+06		
Other Radionuclides	3.80E+06	5.00E+06		
			Thermal Power	
			Nominal Heat	
			Output	Bounding Heat
			(Watts)	Output (Watts)
			1.11E+05	1.33E+05
			Total	Total

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	198.0	415.7	0.0	0.0	156.4	0.0

Bare Fuel Transfers	
0	Assemblies

2010 Summary, DBE category: Other, Intact

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.28E-02	2.02E-02	Avg. MeV	
Am-241	5.61E+04	6.94E+04	0.0150	9.715E+16
Am-242m	6.19E+01	1.17E+02	0.0250	2.000E+16
Am-243	5.34E+01	9.81E+01	0.0375	1.774E+16
C-14	3.18E+03	3.22E+03	0.0575	1.948E+16
Cl-36	3.78E+01	3.85E+01	0.0850	1.116E+16
Cm-243	2.42E+01	4.70E+01	0.1250	7.386E+15
Cm-244	3.33E+03	6.42E+03	0.2250	9.573E+15
Co-60	5.31E+05	5.40E+05	0.3750	4.159E+15
Cs-134	7.07E+01	1.33E+02	0.5750	7.617E+16
Cs-135	1.35E+01	1.84E+01	0.8500	8.883E+14
Cs-137	1.84E+06	2.05E+06	1.2500	4.038E+16
Eu-154	9.83E+03	1.17E+04	1.7500	2.418E+13
Eu-155	1.19E+03	1.69E+03	2.2500	2.158E+11
Fe-55	4.91E+03	5.01E+03	2.7500	6.117E+09
H-3	3.06E+04	3.22E+04	3.5000	1.260E+08
I-129	1.03E+00	1.20E+00	5.0000	4.345E+07
Kr-85	4.80E+04	5.31E+04	7.0000	4.996E+06
Np-237	8.63E+00	9.65E+00	11.0000	5.732E+05
Pa-231	2.31E-02	3.72E-02		
Pb-210	4.96E-03	4.97E-03		
Pm-147	1.61E+03	2.15E+03		
Pu-238	1.58E+04	2.15E+04		
Pu-239	2.86E+04	3.19E+04		
Pu-240	1.32E+04	1.54E+04		
Pu-241	3.60E+05	4.43E+05		
Pu-242	8.81E+00	1.39E+01		
Ra-226	1.33E-02	1.34E-02		
Ra-228	1.42E-03	1.59E-03		
Ru-106	1.23E+01	2.32E+01		
Se-79	1.78E+01	1.99E+01		
Sn-126	1.91E+01	2.40E+01		
Sr-90	1.57E+06	1.73E+06		
Tc-99	5.64E+02	6.29E+02		
Th-229	5.21E-03	5.70E-03		
Th-230	1.22E+00	1.22E+00		
Th-232	2.85E-03	2.86E-03		
Tl-208	1.04E-01	1.47E-01		
U-232	2.80E-01	3.97E-01		
U-233	1.10E+00	1.20E+00		
U-234	2.65E+03	2.66E+03		
U-235	2.43E+00	3.03E+00		
U-236	3.16E+01	3.30E+01		
U-238	4.55E+00	4.80E+00		
Y-90	1.57E+06	1.73E+06		
Other Radionuclides	2.41E+06	2.63E+06		
			Thermal Power	
			Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
			3.19E+04	3.51E+04
			Total	Total

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	21.7	9.1	0.0	0.0	1.0	0.0

Bare Fuel Transfers	
0	Assemblies

2010 Summary, DBE category: Other, Not Intact

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9.13E-03	1.62E-02	Avg. MeV	
Am-241	6.93E+05	1.39E+06	0.0150	7.139E+17
Am-242m	4.21E+02	8.41E+02	0.0250	1.460E+17
Am-243	3.43E+02	6.76E+02	0.0375	1.349E+17
C-14	6.70E+02	1.34E+03	0.0575	1.537E+17
Cf-252	1.42E-01	2.12E-01	0.0850	8.109E+16
Cm-243	2.98E-02	5.64E-02	0.1250	5.384E+16
Cm-244	3.27E+03	6.54E+03	0.2250	6.955E+16
Co-60	1.25E+04	1.39E+04	0.3750	3.014E+16
Cs-134	2.79E+02	3.80E+02	0.5750	6.464E+17
Cs-135	7.83E+01	1.51E+02	0.8500	6.574E+15
Cs-137	8.87E+06	1.75E+07	1.2500	4.520E+15
Eu-154	4.80E+04	9.58E+04	1.7500	1.817E+14
Eu-155	4.81E+03	6.92E+03	2.2500	8.565E+11
Fe-55	1.71E+03	1.74E+03	2.7500	3.937E+10
H-3	1.64E+04	3.16E+04	3.5000	1.431E+09
I-129	6.33E+00	1.25E+01	5.0000	1.271E+08
Kr-85	2.10E+05	4.03E+05	7.0000	1.441E+07
Np-237	6.19E+01	1.23E+02	11.0000	1.641E+06
Pa-231	2.33E-02	3.89E-02		
Pb-210	1.67E-04	3.33E-04		
Pm-147	4.13E+04	4.56E+04		
Pu-238	1.44E+05	2.88E+05		
Pu-239	2.10E+05	4.17E+05		
Pu-240	1.64E+05	3.28E+05		
Pu-241	4.39E+06	8.77E+06		
Pu-242	1.04E+02	2.09E+02		
Ra-226	7.05E-04	1.41E-03		
Ra-228	1.51E-04	2.94E-04		
Ru-106	1.09E+03	1.09E+03		
Se-79	8.05E+01	1.59E+02		
Sn-126	4.61E+00	5.27E+00		
Sr-90	6.36E+06	1.25E+07		
Tc-99	2.68E+03	5.31E+03		
Th-229	1.35E-03	2.69E-03		
Th-230	1.17E-01	2.35E-01		
Th-232	2.58E-02	2.58E-02		
Tl-208	4.23E-01	8.45E-01		
U-232	1.15E+00	2.29E+00		
U-233	8.65E+01	8.66E+01		
U-234	4.72E+02	9.44E+02		
U-235	4.76E+01	5.71E+01		
U-236	8.76E+01	1.74E+02		
U-238	6.97E+02	6.99E+02		
Y-90	6.36E+06	1.25E+07		
Other Radionuclides	8.54E+06	1.68E+07		
			Thermal Power	
			Nominal Heat	
			Output	Bounding Heat
			(Watts)	Output (Watts)
			1.26E+05	2.49E+05
			Total	Total

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	2.0	0.0	0.0	0.0	11.0	401.0

Bare Fuel Transfers	
0	Assemblies

United States Department of Energy

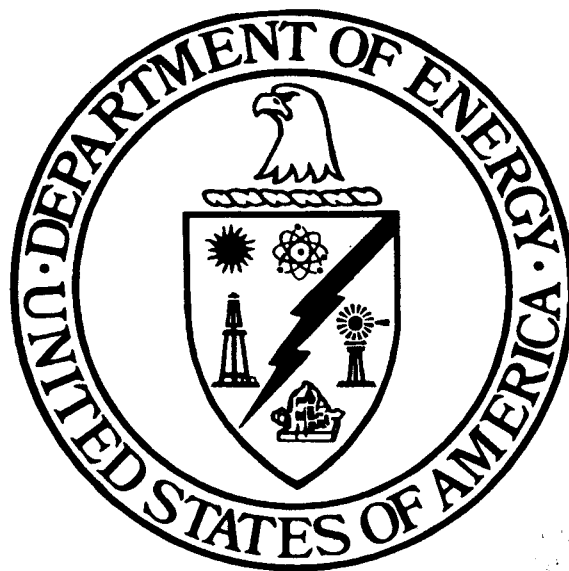
National Spent Nuclear Fuel Program

Source Term Estimates for DOE Spent Nuclear Fuels

Appendix D

Source Term Estimates for the Year 2030

Volume III



January 2004

U.S. Department of Energy
Assistant Secretary for Environmental Management
Office of Nuclear Material and Spent Fuel

See Volume I of DOE/SNF/REP-078 for approvals.

This document was developed and is controlled in accordance with NSNFP procedures. Unless noted otherwise, information must be evaluated for adequacy relative to its specific use if relied on to support design or decisions important to safety or waste isolation.

Source Term Estimates for DOE Spent Nuclear Fuels
Appendix D
Source Term Estimates for the Year 2030
Volume III

January 2004

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Idaho National Engineering and Environmental Laboratory
Idaho Falls, Idaho 83415

Prepared for the
U.S. Department of Energy
Assistant Secretary for Environmental Management
Under DOE Idaho Operations Office
Contract DE-AC07-99ID13727

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ACRR (PULSED CORE)
 SNF ID #: 757
 Fuel Units & Descr: 251 - ELEMENT
 Heavy Metal Mass: BOL=120.83kg ; EOL=120.83kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 Estimates as of: 2030
 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: 5 years

Estimated
 Canister usage:
 18"x10"
 2.26

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	1.9667E-09	2,282.862	4,565.724	0.00E+00	4.49E-06	8.98E-06	Avg. MeV	
Am-241	4.9468E-05	2,282.862	4,565.724	0.00E+00	1.13E-01	2.26E-01	0.0150	8.978E+14
Am-242m	9.7537E-09	2,282.862	4,565.724	0.00E+00	2.23E-05	4.45E-05	0.0250	1.915E+14
Am-243	9.8802E-10	2,282.862	4,565.724	0.00E+00	2.26E-06	4.51E-06	0.0375	1.709E+14
C-14	2.3095E-04	2,282.862	4,565.724	0.00E+00	5.27E-01	1.05E+00	0.0575	1.718E+14
Cl-36	1.2261E-06	2,282.862	4,565.724	0.00E+00	2.80E-03	5.60E-03	0.0850	1.089E+14
Cm-243	5.1581E-10	2,282.862	4,565.724	0.00E+00	1.18E-06	2.36E-06	0.1250	8.686E+13
Cm-244	7.3012E-09	2,282.862	4,565.724	0.00E+00	1.67E-05	3.33E-05	0.2250	9.015E+13
Co-60	3.6556E+00	2,282.862	4,565.724	0.00E+00	8.35E+03	1.67E+04	0.3750	4.376E+13
Cs-134	7.2063E-02	2,282.862	4,565.724	0.00E+00	1.65E+02	3.29E+02	0.5750	5.305E+13
Cs-135	3.0316E-05	2,282.862	4,565.724	0.00E+00	6.92E-02	1.38E-01	0.8500	2.568E+13
Cs-137	2.9002E+00	2,282.862	4,565.724	0.00E+00	6.62E+03	1.32E+04	1.2500	1.240E+15
Eu-154	7.5025E-03	2,282.862	4,565.724	0.00E+00	1.71E+01	3.43E+01	1.7500	4.379E+11
Eu-155	4.6123E-02	2,282.862	4,565.724	0.00E+00	1.05E+02	2.11E+02	2.2500	1.253E+12
Fe-55	3.6439E+00	2,282.862	4,565.724	0.00E+00	8.32E+03	1.66E+04	2.7500	7.109E+09
H-3	1.3524E-02	2,282.862	4,565.724	0.00E+00	3.09E+01	6.17E+01	3.5000	7.849E+08
I-129	7.3195E-07	2,282.862	4,565.724	0.00E+00	1.67E-03	3.34E-03	5.0000	1.891E+02
Kr-85	2.8686E-01	2,282.862	4,565.724	0.00E+00	6.55E+02	1.31E+03	7.0000	2.123E+01
Np-237	1.1478E-06	2,282.862	4,565.724	0.00E+00	2.62E-03	5.24E-03	11.0000	2.406E+00
Pa-231	1.0990E-08	2,282.862	4,565.724	0.00E+00	2.51E-05	5.02E-05		
Pb-210	8.0782E-15	2,282.862	4,565.724	0.00E+00	1.84E-11	3.69E-11		
Pm-147	3.2097E+00	2,282.862	4,565.724	0.00E+00	7.33E+03	1.47E+04		
Pu-238	3.7404E-04	2,282.862	4,565.724	0.00E+00	8.54E-01	1.71E+00		
Pu-239	6.6839E-04	2,282.862	4,565.724	0.00E+00	1.53E+00	3.05E+00		
Pu-240	8.7121E-05	2,282.862	4,565.724	0.00E+00	1.99E-01	3.98E-01		
Pu-241	3.0283E-03	2,282.862	4,565.724	0.00E+00	6.91E+00	1.38E+01		
Pu-242	1.9717E-09	2,282.862	4,565.724	0.00E+00	4.50E-06	9.00E-06		
Ra-226	7.3527E-14	2,282.862	4,565.724	0.00E+00	1.68E-10	3.36E-10		
Ra-228	6.0965E-12	2,282.862	4,565.724	0.00E+00	1.39E-08	2.78E-08		
Ru-106	1.6531E-01	2,282.862	4,565.724	0.00E+00	3.77E+02	7.55E+02		
Se-79	1.3228E-05	2,282.862	4,565.724	0.00E+00	3.02E-02	6.04E-02		
Sn-126	1.1494E-05	2,282.862	4,565.724	0.00E+00	2.62E-02	5.25E-02		
Sr-90	2.7854E+00	2,282.862	4,565.724	0.00E+00	6.36E+03	1.27E+04		
Tc-99	4.6656E-04	2,282.862	4,565.724	0.00E+00	1.07E+00	2.13E+00		
Th-229	2.9368E-12	2,282.862	4,565.724	0.00E+00	6.70E-09	1.34E-08		
Th-230	3.2662E-11	2,282.862	4,565.724	0.00E+00	7.46E-08	1.49E-07		
Th-232	8.3045E-12	2,282.862	4,565.724	0.00E+00	1.90E-08	3.79E-08		
Ti-208	2.6722E-08	2,282.862	4,565.724	0.00E+00	6.10E-05	1.22E-04		
U-232	7.7720E-08	2,282.862	4,565.724	0.00E+00	1.77E-04	3.55E-04		
U-233	2.9834E-09	2,282.862	4,565.724	0.00E+00	6.81E-06	1.36E-05		
U-234	3.5275E-07	2,282.862	4,565.724	0.00E+00	8.05E-04	1.61E-03		
U-235	-2.7761E-06	2,282.862	0.000	5.51E-02	4.88E-02	5.51E-02		
U-236	1.6190E-05	2,282.862	4,565.724	0.00E+00	3.70E-02	7.39E-02		
U-238	-2.8547E-09	2,282.862	0.000	3.20E-02	3.20E-02	3.20E-02		
Y-90	2.7870E+00	2,282.862	4,565.724	0.00E+00	6.36E+03	1.27E+04		
Other Radionuclides					1.20E+04	2.40E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.42E+02	4.85E+02
Total	Total

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:	SST	SST	
BOL HM Constituents:	UO2-BaO2	U	
BOL Enrichment %:	21.10367543	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		2,282.862	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup assumed to be twice nominal burnup.
Bounding:	199.976	4,565.724	

Checks			
	Burnup Multiplier	Estimated Burnup/Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.40		
Bounding:	0.81	22.83	

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: AMERICIUM TARGETS
 SNF ID #: 776
 Fuel Units & Descr: 12 - ROD
 Heavy Metal Mass: BOL=.15kg ; EOL=.12kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1970
 Estimates as of: 2030
 Template: (Worst Case)
²Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 50 years

Estimated
 Canister usage:
 HIC
 3.00

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.5200E-06	30.563	61.127	0.00E+00	7.70E-05	1.54E-04	Avg. MeV	
Am-241	8.6432E+00	30.563	61.127	0.00E+00	2.64E+02	5.28E+02	0.0150	5.192E+13
Am-242m	1.5728E-02	30.563	61.127	0.00E+00	4.81E-01	9.61E-01	0.0250	1.023E+13
Am-243	1.6288E-02	30.563	61.127	9.57E+00	1.01E+01	1.06E+01	0.0375	8.674E+12
C-14	1.2068E-01	30.563	61.127	0.00E+00	3.69E+00	7.38E+00	0.0575	1.634E+13
Cl-36	2.2849E-03	30.563	61.127	0.00E+00	6.98E-02	1.40E-01	0.0850	5.684E+12
Cr-243	6.0144E-04	30.563	61.127	0.00E+00	1.84E-02	3.68E-02	0.1250	3.878E+12
Cr-244	9.4880E-02	30.563	61.127	0.00E+00	2.90E+00	5.80E+00	0.2250	4.741E+12
Co-60	3.9052E+00	30.563	61.127	0.00E+00	1.19E+02	2.39E+02	0.3750	2.052E+12
Cs-134	2.2139E-06	30.563	61.127	0.00E+00	6.77E-05	1.35E-04	0.5750	3.396E+13
Cs-135	4.3976E-04	30.563	61.127	0.00E+00	1.34E-02	2.69E-02	0.8500	7.437E+11
Cs-137	1.4887E+01	30.563	61.127	0.00E+00	4.55E+02	9.10E+02	1.2500	1.823E+13
Eu-154	3.7342E-01	30.563	61.127	0.00E+00	1.14E+01	2.28E+01	1.7500	2.191E+10
Eu-155	8.4893E-03	30.563	61.127	0.00E+00	2.59E-01	5.19E-01	2.2500	9.473E+07
Fe-55	5.3750E-03	30.563	61.127	0.00E+00	1.64E-01	3.29E-01	2.7500	1.631E+08
H-3	1.0472E-01	30.563	61.127	0.00E+00	3.20E+00	6.40E+00	3.5000	8.928E+04
I-129	1.0618E-05	30.563	61.127	0.00E+00	3.25E-04	6.49E-04	5.0000	3.772E+04
Kr-85	2.2717E-01	30.563	61.127	0.00E+00	6.94E+00	1.39E+01	7.0000	4.295E+03
Np-237	1.6400E-04	30.563	61.127	0.00E+00	5.01E-03	1.00E-02	11.0000	4.898E+02
Pa-231	2.8688E-06	30.563	61.127	0.00E+00	8.77E-05	1.75E-04		
Pb-210	4.7312E-08	30.563	61.127	0.00E+00	1.45E-06	2.89E-06		
Pm-147	3.2198E-04	30.563	61.127	0.00E+00	9.84E-03	1.97E-02		
Pu-238	-1.1924E+00	30.563	0.000	1.93E+01	0.00E+00	1.93E+01		
Pu-239	-4.8600E-02	30.563	0.000	2.33E+00	8.47E-01	2.33E+00		
Pu-240	-3.0127E-01	30.563	0.000	2.98E+00	0.00E+00	2.98E+00		
Pu-241	-1.2917E+02	30.563	0.000	7.67E+02	0.00E+00	7.67E+02		
Pu-242	-1.1381E-04	30.563	0.000	1.29E-02	9.41E-03	1.29E-02		
Ra-226	1.0760E-07	30.563	61.127	0.00E+00	3.29E-06	6.58E-06		
Ra-228	6.0160E-07	30.563	61.127	0.00E+00	1.84E-05	3.68E-05		
Ru-106	1.3388E-13	30.563	61.127	0.00E+00	4.09E-12	8.18E-12		
Se-79	1.9179E-04	30.563	61.127	0.00E+00	5.86E-03	1.17E-02		
Sn-126	1.6669E-04	30.563	61.127	0.00E+00	5.09E-03	1.02E-02		
Sr-90	1.3859E+01	30.563	61.127	0.00E+00	4.24E+02	8.47E+02		
Tc-99	6.7678E-03	30.563	61.127	0.00E+00	2.07E-01	4.14E-01		
Th-229	2.2592E-06	30.563	61.127	0.00E+00	6.90E-05	1.38E-04		
Th-230	7.5955E-06	30.563	61.127	0.00E+00	2.32E-04	4.64E-04		
Th-232	-4.2431E-09	30.563	0.000	3.04E-06	2.91E-06	3.04E-06		
Ti-208	7.5795E-05	30.563	61.127	0.00E+00	2.32E-03	4.63E-03		
U-232	2.0521E-04	30.563	61.127	0.00E+00	6.27E-03	1.25E-02		
U-233	3.6128E-04	30.563	61.127	0.00E+00	1.10E-02	2.21E-02		
U-234	1.2788E-02	30.563	61.127	0.00E+00	3.91E-01	7.82E-01		
U-235	5.7486E-04	30.563	61.127	6.45E-05	1.76E-02	3.52E-02		
U-236	2.3485E-04	30.563	61.127	0.00E+00	7.18E-03	1.44E-02		
U-238	1.1581E-04	30.563	61.127	8.03E-06	3.55E-03	7.09E-03		
Y-90	1.3861E+01	30.563	61.127	0.00E+00	4.24E+02	8.47E+02		
Other Radionuclides					1.57E+03	3.14E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.67E+01	3.39E+01
Total	Total

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 didn't closely match any existing templates, therefore the worst case template was used.
	From SFD	Used	
Reactor Moderator:	GRAPHITE	(Worst Case)	
Fuel Cladding:	ALUM (1100)	SST/Inconel	
BOL HM Constituents:	Am2O3	U, Th, & Pu	
BOL Enrichment %:		0 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:		30.563	
Bounding:		61.127	

Checks			Estimated EOL HM/Given EOL HM 160.66
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	6.09		
Bounding:	12.18		

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: ANP
 SNF ID #: 451
 Fuel Units & Descr: 9 - CONCENTRIC TUBES
 Heavy Metal Mass: BOL=1.12kg ; EOL=1.10kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1957
 Estimates as of: 2030
 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: 65 years

Estimated
 Canister usage:
 18"x10"
 0.69

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	4.5940E-08	15.303	30.607	0.00E+00	7.03E-07	1.41E-06	Avg. MeV	
Am-241	1.1471E-04	15.303	30.607	0.00E+00	1.76E-03	3.51E-03	0.0150	1.117E+12
Am-242m	7.4210E-09	15.303	30.607	0.00E+00	1.14E-07	2.27E-07	0.0250	2.321E+11
Am-243	9.8236E-10	15.303	30.607	0.00E+00	1.50E-08	3.01E-08	0.0375	2.017E+11
C-14	2.2928E-04	15.303	30.607	0.00E+00	3.51E-03	7.02E-03	0.0575	2.164E+11
Cl-36	1.2260E-06	15.303	30.607	0.00E+00	1.88E-05	3.75E-05	0.0850	1.307E+11
Cm-243	1.2000E-10	15.303	30.607	0.00E+00	1.84E-09	3.67E-09	0.1250	8.477E+10
Cm-244	7.3577E-10	15.303	30.607	0.00E+00	1.13E-08	2.25E-08	0.2250	1.127E+11
Co-60	1.3732E-03	15.303	30.607	0.00E+00	2.10E-02	4.20E-02	0.3750	4.914E+10
Cs-134	1.2709E-10	15.303	30.607	0.00E+00	1.94E-09	3.89E-09	0.5750	8.267E+11
Cs-135	3.0316E-05	15.303	30.607	0.00E+00	4.64E-04	9.28E-04	0.8500	8.029E+09
Cs-137	7.2579E-01	15.303	30.607	0.00E+00	1.11E+01	2.22E+01	1.2500	5.811E+09
Eu-154	5.9750E-05	15.303	30.607	0.00E+00	9.14E-04	1.83E-03	1.7500	2.066E+08
Eu-155	1.0577E-05	15.303	30.607	0.00E+00	1.62E-04	3.24E-04	2.2500	3.907E+04
Fe-55	4.1631E-07	15.303	30.607	0.00E+00	6.37E-06	1.27E-05	2.7500	1.749E+04
H-3	4.6722E-04	15.303	30.607	0.00E+00	7.15E-03	1.43E-02	3.5000	1.968E+00
I-129	7.3195E-07	15.303	30.607	0.00E+00	1.12E-05	2.24E-05	5.0000	8.141E-01
Kr-85	5.9418E-03	15.303	30.607	0.00E+00	9.09E-02	1.82E-01	7.0000	9.016E-02
Np-237	1.1499E-06	15.303	30.607	0.00E+00	1.76E-05	3.52E-05	11.0000	1.014E-02
Pa-231	7.0899E-08	15.303	30.607	0.00E+00	1.08E-06	2.17E-06		
Pb-210	2.2363E-12	15.303	30.607	0.00E+00	3.42E-11	6.84E-11		
Pm-147	4.2296E-07	15.303	30.607	0.00E+00	6.47E-06	1.29E-05		
Pu-238	2.3295E-04	15.303	30.607	0.00E+00	3.56E-03	7.13E-03		
Pu-239	6.6722E-04	15.303	30.607	0.00E+00	1.02E-02	2.04E-02		
Pu-240	8.6556E-05	15.303	30.607	0.00E+00	1.32E-03	2.65E-03		
Pu-241	1.6889E-04	15.303	30.607	0.00E+00	2.58E-03	5.17E-03		
Pu-242	1.9717E-09	15.303	30.607	0.00E+00	3.02E-08	6.03E-08		
Ra-226	4.5740E-12	15.303	30.607	0.00E+00	7.00E-11	1.40E-10		
Ra-228	8.3511E-12	15.303	30.607	0.00E+00	1.28E-10	2.56E-10		
Ru-106	2.0516E-19	15.303	30.607	0.00E+00	3.14E-18	6.28E-18		
Se-79	1.3220E-05	15.303	30.607	0.00E+00	2.02E-04	4.05E-04		
Sn-126	1.1489E-05	15.303	30.607	0.00E+00	1.76E-04	3.52E-04		
Sr-90	6.6872E-01	15.303	30.607	0.00E+00	1.02E+01	2.05E+01		
Tc-99	4.6639E-04	15.303	30.607	0.00E+00	7.14E-03	1.43E-02		
Th-229	2.3727E-11	15.303	30.607	0.00E+00	3.63E-10	7.26E-10		
Th-230	2.7354E-10	15.303	30.607	0.00E+00	4.19E-09	8.37E-09		
Th-232	8.3594E-12	15.303	30.607	0.00E+00	1.28E-10	2.56E-10		
Th-208	1.6228E-08	15.303	30.607	0.00E+00	2.48E-07	4.97E-07		
U-232	4.3960E-08	15.303	30.607	0.00E+00	6.73E-07	1.35E-06		
U-233	3.3344E-09	15.303	30.607	0.00E+00	5.10E-08	1.02E-07		
U-234	4.0749E-07	15.303	30.607	0.00E+00	6.24E-06	1.25E-05		
U-235	-2.7761E-06	15.303	0.000	2.25E-03	2.21E-03	2.25E-03		
U-236	1.6190E-05	15.303	30.607	0.00E+00	2.48E-04	4.96E-04		
U-238	-2.8547E-09	15.303	0.000	2.55E-05	2.55E-05	2.55E-05		
Y-90	6.6889E-01	15.303	30.607	0.00E+00	1.02E+01	2.05E+01		
Other Radionuclides					1.39E+01	2.78E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.25E-01	2.46E-01
Total	Total

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 cladding (SST is conservative).
Fuel Cladding:	NICHROME	SST	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	93.20218125	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		15.303	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		30.607	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.29		1.00
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: APPR (AGE-2)
 SNF ID #: 6
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=25kg ; EOL=22kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1959
 Estimates as of: 2030
 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: 65 years

Estimated
 Canister usage:
 18"x10"
 0.08

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	4.5940E-08	28.717	57.435	0.00E+00	1.32E-06	2.64E-06	0.0150	2.096E+12
Am-241	1.1471E-04	28.717	57.435	0.00E+00	3.29E-03	6.59E-03	0.0250	4.356E+11
Am-242m	7.4210E-09	28.717	57.435	0.00E+00	2.13E-07	4.26E-07	0.0375	3.785E+11
Am-243	9.8236E-10	28.717	57.435	0.00E+00	2.82E-08	5.64E-08	0.0575	4.062E+11
C-14	2.2928E-04	28.717	57.435	0.00E+00	6.58E-03	1.32E-02	0.0850	2.453E+11
Ci-36	1.2260E-06	28.717	57.435	0.00E+00	3.52E-05	7.04E-05	0.1250	1.591E+10
Cm-243	1.2000E-04	28.717	57.435	0.00E+00	3.45E-09	6.89E-09	0.2250	2.114E+11
Cm-244	7.3577E-10	28.717	57.435	0.00E+00	2.11E-08	4.23E-08	0.3750	9.222E+10
Co-60	1.3732E-03	28.717	57.435	0.00E+00	3.94E-02	7.89E-02	0.5750	1.551E+12
Cs-134	1.2709E-10	28.717	57.435	0.00E+00	3.65E-09	7.30E-09	0.8500	1.507E+10
Cs-135	3.0316E-05	28.717	57.435	0.00E+00	8.71E-04	1.74E-03	1.2500	1.091E+10
Cs-137	7.2579E-01	28.717	57.435	0.00E+00	2.08E+01	4.17E+01	1.7500	3.877E+08
Eu-154	5.9750E-05	28.717	57.435	0.00E+00	1.72E-03	3.43E-03	2.2500	7.331E+04
Eu-155	1.0577E-05	28.717	57.435	0.00E+00	3.04E-04	6.08E-04	2.7500	3.282E+04
Fe-55	4.1631E-07	28.717	57.435	0.00E+00	1.20E-05	2.39E-05	3.5000	3.343E+00
H-3	4.6722E-04	28.717	57.435	0.00E+00	1.34E-02	2.68E-02	5.0000	1.380E+00
I-129	7.3195E-07	28.717	57.435	0.00E+00	2.10E-05	4.20E-05	7.0000	1.526E-01
Kr-85	5.9418E-03	28.717	57.435	0.00E+00	1.71E-01	3.41E-01	11.0000	1.714E-02
Np-237	1.1499E-06	28.717	57.435	0.00E+00	3.30E-05	6.60E-05		
Pa-231	7.0899E-08	28.717	57.435	0.00E+00	2.04E-06	4.07E-06		
Pb-210	2.2363E-12	28.717	57.435	0.00E+00	6.42E-11	1.28E-10		
Pm-147	4.2296E-07	28.717	57.435	0.00E+00	1.21E-05	2.43E-05		
Pu-238	2.3295E-04	28.717	57.435	0.00E+00	6.69E-03	1.34E-02		
Pu-239	6.6722E-04	28.717	57.435	0.00E+00	1.92E-02	3.83E-02		
Pu-240	8.6556E-05	28.717	57.435	0.00E+00	2.49E-03	4.97E-03		
Pu-241	1.6889E-04	28.717	57.435	0.00E+00	4.85E-03	9.70E-03		
Pu-242	1.9717E-09	28.717	57.435	0.00E+00	5.66E-08	1.13E-07		
Ra-226	4.5740E-12	28.717	57.435	0.00E+00	1.31E-10	2.63E-10		
Ra-228	8.3511E-12	28.717	57.435	0.00E+00	2.40E-10	4.80E-10		
Ru-106	2.0516E-19	28.717	57.435	0.00E+00	5.89E-18	1.18E-17		
Se-79	1.3220E-05	28.717	57.435	0.00E+00	3.80E-04	7.59E-04		
Sn-126	1.1489E-05	28.717	57.435	0.00E+00	3.30E-04	6.60E-04		
Sr-90	6.6872E-01	28.717	57.435	0.00E+00	1.92E+01	3.84E+01		
Tc-99	4.6639E-04	28.717	57.435	0.00E+00	1.34E-02	2.68E-02		
Th-229	2.3727E-11	28.717	57.435	0.00E+00	6.81E-10	1.36E-09		
Th-230	2.7354E-10	28.717	57.435	0.00E+00	7.86E-09	1.57E-08		
Th-232	8.3594E-12	28.717	57.435	0.00E+00	2.40E-10	4.80E-10		
Ti-208	1.6228E-08	28.717	57.435	0.00E+00	4.66E-07	9.32E-07		
U-232	4.3960E-08	28.717	57.435	0.00E+00	1.26E-06	2.52E-06		
U-233	3.3344E-09	28.717	57.435	0.00E+00	9.58E-08	1.92E-07		
U-234	4.0749E-07	28.717	57.435	0.00E+00	1.17E-05	2.34E-05		
U-235	-2.7761E-06	28.717	0.000	4.95E-04	4.15E-04	4.95E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.6190E-05	28.717	57.435	0.00E+00	4.65E-04	9.30E-04	2.34E-01	4.68E-01
U-238	-2.8547E-09	28.717	0.000	5.81E-06	5.73E-06	5.81E-06	Total	Total
Y-90	6.6889E-01	28.717	57.435	0.00E+00	1.92E+01	3.84E+01		
Other Radionuclides					2.61E+01	5.22E+01		

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:	SST (304L)	SST	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	92.98701299	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		28.717	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		57.435	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	2.50		1.00
Bounding:	5.00		

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: ARKANSAS
 SNF ID #: 7
 Fuel Units & Descr: 3 - SCRAP
 Heavy Metal Mass: BOL=12.60kg ; EOL=11.90kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1986
 Estimates as of: 2030
 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"
 0.17

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	8.7758E-10	670.422	1,340.843	0.00E+00	5.88E-07	1.18E-06	0.0150	7.214E+13
Am-241	1.4352E-01	670.422	1,340.843	0.00E+00	9.62E+01	1.92E+02	0.0250	1.455E+13
Am-242m	2.8698E-04	670.422	1,340.843	0.00E+00	1.92E-01	3.85E-01	0.0375	1.388E+13
Am-243	6.2565E-04	670.422	1,340.843	0.00E+00	4.19E-01	8.39E-01	0.0575	1.603E+13
C-14	4.7901E-05	670.422	1,340.843	0.00E+00	3.21E-02	6.42E-02	0.0850	8.073E+12
Cl-36	8.0297E-07	670.422	1,340.843	0.00E+00	5.38E-04	1.08E-03	0.1250	5.602E+12
Cm-243	2.5081E-04	670.422	1,340.843	0.00E+00	1.68E-01	3.36E-01	0.2250	6.922E+12
Cm-244	4.9015E-02	670.422	1,340.843	0.00E+00	3.29E+01	6.57E+01	0.3750	2.976E+12
Co-60	2.5581E-03	670.422	1,340.843	0.00E+00	1.72E+00	3.43E+00	0.5750	6.923E+12
Cs-134	4.0536E-05	670.422	1,340.843	0.00E+00	2.72E-02	5.44E-02	0.8500	9.577E+11
Cs-135	1.4433E-05	670.422	1,340.843	0.00E+00	9.68E-03	1.94E-02	1.2500	9.408E+11
Cs-137	1.3979E+00	670.422	1,340.843	0.00E+00	9.37E+02	1.87E+03	1.7500	2.818E+10
Eu-154	2.0203E-02	670.422	1,340.843	0.00E+00	1.35E+01	2.71E+01	2.2500	4.537E+06
Eu-155	1.7684E-03	670.422	1,340.843	0.00E+00	1.19E+00	2.37E+00	2.7500	9.294E+06
Fe-55	4.3136E-05	670.422	1,340.843	0.00E+00	2.89E-02	5.78E-02	3.5000	9.572E+05
H-3	2.0769E-02	670.422	1,340.843	0.00E+00	1.39E+01	2.78E+01	5.0000	4.092E+05
I-129	9.8288E-07	670.422	1,340.843	0.00E+00	6.59E-04	1.32E-03	7.0000	4.716E+04
Kr-85	2.8214E-02	670.422	1,340.843	0.00E+00	1.89E+01	3.78E+01	11.0000	5.416E+03
Np-237	1.1218E-05	670.422	1,340.843	0.00E+00	7.52E-03	1.50E-02		
Pa-231	1.3036E-09	670.422	1,340.843	0.00E+00	8.74E-07	1.75E-06		
Pb-210	8.5078E-11	670.422	1,340.843	0.00E+00	5.70E-08	1.14E-07		
Pm-147	3.6531E-04	670.422	1,340.843	0.00E+00	2.45E-01	4.90E-01		
Pu-238	7.4564E-02	670.422	1,340.843	0.00E+00	5.00E+01	1.00E+02		
Pu-239	1.1623E-02	670.422	1,340.843	0.00E+00	7.79E+00	1.56E+01		
Pu-240	1.5132E-02	670.422	1,340.843	0.00E+00	1.01E+01	2.03E+01		
Pu-241	9.0036E-01	670.422	1,340.843	0.00E+00	6.04E+02	1.21E+03		
Pu-242	6.4260E-05	670.422	1,340.843	0.00E+00	4.31E-02	8.62E-02		
Ra-226	2.2804E-10	670.422	1,340.843	0.00E+00	1.53E-07	3.06E-07		
Ra-228	5.2713E-12	670.422	1,340.843	0.00E+00	3.53E-09	7.07E-09		
Ru-106	6.1160E-10	670.422	1,340.843	0.00E+00	4.10E-07	8.20E-07		
Se-79	1.2377E-05	670.422	1,340.843	0.00E+00	8.30E-03	1.66E-02		
Sn-126	2.5210E-05	670.422	1,340.843	0.00E+00	1.69E-02	3.38E-02		
Sr-90	9.1667E-01	670.422	1,340.843	0.00E+00	6.15E+02	1.23E+03		
Tc-99	3.9357E-04	670.422	1,340.843	0.00E+00	2.64E-01	5.28E-01		
Th-229	1.2057E-10	670.422	1,340.843	0.00E+00	8.08E-08	1.62E-07		
Th-230	2.1043E-08	670.422	1,340.843	0.00E+00	1.41E-05	2.82E-05		
Th-232	5.2972E-12	670.422	1,340.843	0.00E+00	3.55E-09	7.10E-09		
Tl-208	1.7474E-07	670.422	1,340.843	0.00E+00	1.17E-04	2.34E-04		
U-232	4.7368E-07	670.422	1,340.843	0.00E+00	3.18E-04	6.35E-04		
U-233	2.5097E-08	670.422	1,340.843	0.00E+00	1.68E-05	3.37E-05		
U-234	5.0000E-05	670.422	1,340.843	0.00E+00	3.35E-02	6.70E-02		
U-235	-1.4489E-06	670.422	0.000	7.90E-04	0.00E+00	7.90E-04		
U-236	7.5824E-06	670.422	1,340.843	0.00E+00	5.08E-03	1.02E-02		
U-238	-2.6129E-07	670.422	0.000	4.11E-03	3.94E-03	4.11E-03		
Y-90	9.1699E-01	670.422	1,340.843	0.00E+00	6.15E+02	1.23E+03		
Other Radionuclides					9.00E+02	1.80E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.54E+01	3.08E+01
Total	Total

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-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	2.9	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	592.200	670.422	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		1,340.843	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.52	1.13	1.01
Bounding:	3.04		

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: ARMF (PLATES) 1Fuel decay start date: 1987
 SNF ID #: 8 Estimates as of: 2030
 Fuel Units & Descr: 15 - FLAT PLATES IN CAN Template: ATR (Light Water, Alum., 60 to 100%, U)
 Heavy Metal Mass: BOL=.20kg ; EOL=.20kg 2Template Burnup(MWd): 367.2
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x10"
 1.00

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	0.023	0.046	0.00E+00	4.57E-11	9.14E-11	Avg. MeV	
Am-241	2.5251E-03	0.023	0.046	0.00E+00	5.75E-05	1.15E-04	0.0150	3.363E+09
Am-242m	3.9624E-07	0.023	0.046	0.00E+00	9.02E-09	1.80E-08	0.0250	6.965E+08
Am-243	1.4880E-06	0.023	0.046	0.00E+00	3.39E-08	6.78E-08	0.0375	6.054E+08
C-14	5.7053E-09	0.023	0.046	0.00E+00	1.30E-10	2.60E-10	0.0575	6.516E+08
Cf-252	1.3124E-32	0.023	0.046	0.00E+00	2.99E-34	5.98E-34	0.0850	3.937E+08
Cm-243	1.1419E-07	0.023	0.046	0.00E+00	2.60E-09	5.20E-09	0.1250	2.616E+08
Cm-244	1.6522E-05	0.023	0.046	0.00E+00	3.76E-07	7.52E-07	0.2250	3.469E+08
Co-60	7.4047E-07	0.023	0.046	0.00E+00	1.69E-08	3.37E-08	0.3750	1.475E+08
Cs-134	2.0455E-05	0.023	0.046	0.00E+00	4.66E-07	9.32E-07	0.5750	2.437E+09
Cs-135	3.4477E-06	0.023	0.046	0.00E+00	7.85E-08	1.57E-07	0.8500	2.977E+07
Cs-137	1.4365E+00	0.023	0.046	0.00E+00	3.27E-02	6.54E-02	1.2500	1.440E+07
Eu-154	7.3230E-03	0.023	0.046	0.00E+00	1.67E-04	3.33E-04	1.7500	8.105E+05
Eu-155	5.9259E-04	0.023	0.046	0.00E+00	1.35E-05	2.70E-05	2.2500	6.786E+01
Fe-55	2.2791E-06	0.023	0.046	0.00E+00	5.19E-08	1.04E-07	2.7500	6.471E+01
H-3	1.9698E-03	0.023	0.046	0.00E+00	4.49E-05	8.97E-05	3.5000	7.945E-02
I-129	7.5300E-07	0.023	0.046	0.00E+00	1.71E-08	3.43E-08	5.0000	3.301E-02
Kr-85	4.1176E-02	0.023	0.046	0.00E+00	9.38E-04	1.88E-03	7.0000	3.675E-03
Np-237	9.5752E-06	0.023	0.046	0.00E+00	2.18E-07	4.36E-07	11.0000	4.142E-04
Pa-231	3.9379E-09	0.023	0.046	0.00E+00	8.97E-11	1.79E-10		
Pb-210	3.3115E-10	0.023	0.046	0.00E+00	7.54E-12	1.51E-11		
Pm-147	9.2402E-04	0.023	0.046	0.00E+00	2.10E-05	4.21E-05		
Pu-238	1.6217E-02	0.023	0.046	0.00E+00	3.69E-04	7.39E-04		
Pu-239	4.2810E-04	0.023	0.046	0.00E+00	9.75E-06	1.95E-05		
Pu-240	2.4333E-04	0.023	0.046	0.00E+00	5.54E-06	1.11E-05		
Pu-241	1.6242E-02	0.023	0.046	0.00E+00	3.70E-04	7.40E-04		
Pu-242	3.6329E-07	0.023	0.046	0.00E+00	8.27E-09	1.65E-08		
Ra-226	9.0114E-10	0.023	0.046	0.00E+00	2.05E-11	4.10E-11		
Ra-228	3.1019E-14	0.023	0.046	0.00E+00	7.06E-16	1.41E-15		
Ru-106	2.1225E-10	0.023	0.046	0.00E+00	4.83E-12	9.67E-12		
Se-79	1.2930E-05	0.023	0.046	0.00E+00	2.94E-07	5.89E-07		
Sn-126	1.1571E-05	0.023	0.046	0.00E+00	2.63E-07	5.27E-07		
Sr-90	1.3472E+00	0.023	0.046	0.00E+00	3.07E-02	6.14E-02		
Tc-99	4.2239E-04	0.023	0.046	0.00E+00	9.62E-06	1.92E-05		
Th-229	1.2407E-11	0.023	0.046	0.00E+00	2.83E-13	5.65E-13		
Th-230	8.3497E-08	0.023	0.046	0.00E+00	1.90E-09	3.80E-09		
Th-232	3.8371E-14	0.023	0.046	0.00E+00	8.74E-16	1.75E-15		
Tl-208	4.0414E-08	0.023	0.046	0.00E+00	9.20E-10	1.84E-09		
U-232	1.0948E-07	0.023	0.046	0.00E+00	2.49E-09	4.99E-09		
U-233	3.6275E-09	0.023	0.046	0.00E+00	8.26E-11	1.65E-10		
U-234	1.8562E-04	0.023	0.046	0.00E+00	4.23E-06	8.45E-06		
U-235	2.7235E-06	0.023	0.000	3.93E-04	3.93E-04	3.93E-04		
U-236	1.5493E-05	0.023	0.046	0.00E+00	3.53E-07	7.06E-07		
U-238	4.2851E-09	0.023	0.000	5.39E-06	5.39E-06	5.39E-06		
Y-90	1.3475E+00	0.023	0.046	0.00E+00	3.07E-02	6.14E-02		
Other Radionuclides					3.12E-02	6.23E-02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.91E-04	7.73E-04
Total	Total

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 (1100)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	91.89393939	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	0.023		Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		0.046	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.00	0.00	1.00
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: ARMF/CFRMF MARK I
 SNF ID #: 9
 Fuel Units & Descr: 56 - 15 FLAT PLATES
 Heavy Metal Mass: BOL=11.29kg ; EOL=11.29kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1991
 Estimates as of: 2030
 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"
 2.33

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	2.0068E-09	1.298	13.739	0.00E+00	2.61E-09	2.76E-08	0.0150	1.012E+12
Am-241	2.5251E-03	1.298	13.739	0.00E+00	3.28E-03	3.47E-02	0.0250	2.101E+11
Am-242m	3.9624E-07	1.298	13.739	0.00E+00	5.14E-07	5.44E-06	0.0375	1.826E+11
Am-243	1.4880E-06	1.298	13.739	0.00E+00	1.93E-06	2.04E-05	0.0575	1.966E+11
C-14	5.7053E-09	1.298	13.739	0.00E+00	7.41E-09	7.84E-08	0.0850	1.185E+11
Cl-36	1.3124E-32	1.298	13.739	0.00E+00	1.70E-32	1.80E-31	0.1250	7.836E+10
Cm-243	1.1419E-07	1.298	13.739	0.00E+00	1.48E-07	1.57E-06	0.2250	1.027E+11
Cm-244	1.6522E-05	1.298	13.739	0.00E+00	2.15E-05	2.27E-04	0.3750	4.449E+10
Co-60	7.4047E-07	1.298	13.739	0.00E+00	9.61E-07	1.02E-05	0.5750	7.352E+11
Cs-134	2.0455E-05	1.298	13.739	0.00E+00	2.66E-05	2.81E-04	0.8500	8.981E+09
Cs-135	3.4477E-06	1.298	13.739	0.00E+00	4.48E-06	4.74E-05	1.2500	4.344E+09
Cs-137	1.4365E+00	1.298	13.739	0.00E+00	1.87E+00	1.97E+01	1.7500	2.445E+08
Eu-154	7.3230E-03	1.298	13.739	0.00E+00	9.51E-03	1.01E-01	2.2500	2.045E+04
Eu-155	5.9259E-04	1.298	13.739	0.00E+00	7.69E-04	8.14E-03	2.7500	1.951E+04
Fe-55	2.2791E-06	1.298	13.739	0.00E+00	2.96E-06	3.13E-05	3.5000	1.362E+01
H-3	1.9698E-03	1.298	13.739	0.00E+00	2.56E-03	2.71E-02	5.0000	5.593E+00
I-129	7.5300E-07	1.298	13.739	0.00E+00	9.78E-07	1.03E-05	7.0000	6.155E-01
Kr-85	4.1176E-02	1.298	13.739	0.00E+00	5.35E-02	5.66E-01	11.0000	6.886E-02
Np-237	9.5752E-06	1.298	13.739	0.00E+00	1.24E-05	1.32E-04		
Pa-231	3.9379E-09	1.298	13.739	0.00E+00	5.11E-09	5.41E-08		
Pb-210	3.3115E-10	1.298	13.739	0.00E+00	4.30E-10	4.55E-09		
Pm-147	9.2402E-04	1.298	13.739	0.00E+00	1.20E-03	1.27E-02		
Pu-238	1.6217E-02	1.298	13.739	0.00E+00	2.11E-02	2.23E-01		
Pu-239	4.2810E-04	1.298	13.739	0.00E+00	5.56E-04	5.88E-03		
Pu-240	2.4333E-04	1.298	13.739	0.00E+00	3.16E-04	3.34E-03		
Pu-241	1.6242E-02	1.298	13.739	0.00E+00	2.11E-02	2.23E-01		
Pu-242	3.6329E-07	1.298	13.739	0.00E+00	4.72E-07	4.99E-06		
Ra-226	9.0114E-10	1.298	13.739	0.00E+00	1.17E-09	1.24E-08		
Ra-228	3.1019E-14	1.298	13.739	0.00E+00	4.03E-14	4.26E-13		
Ru-106	2.1225E-10	1.298	13.739	0.00E+00	2.76E-10	2.92E-09		
Se-79	1.2930E-05	1.298	13.739	0.00E+00	1.68E-05	1.78E-04		
Sn-126	1.1571E-05	1.298	13.739	0.00E+00	1.50E-05	1.59E-04		
Sr-90	1.3472E+00	1.298	13.739	0.00E+00	1.75E+00	1.85E+01		
Tc-99	4.2239E-04	1.298	13.739	0.00E+00	5.48E-04	5.80E-03		
Th-229	1.2407E-11	1.298	13.739	0.00E+00	1.61E-11	1.70E-10		
Th-230	8.3497E-08	1.298	13.739	0.00E+00	1.08E-07	1.15E-06		
Th-232	3.8371E-14	1.298	13.739	0.00E+00	4.98E-14	5.27E-13		
Ti-208	4.0414E-08	1.298	13.739	0.00E+00	5.25E-08	5.55E-07		
U-232	1.0948E-07	1.298	13.739	0.00E+00	1.42E-07	1.50E-06		
U-233	3.6275E-09	1.298	13.739	0.00E+00	4.71E-09	4.98E-08		
U-234	1.8562E-04	1.298	13.739	0.00E+00	2.41E-04	2.55E-03		
U-235	-2.7235E-06	1.298	0.000	2.25E-02	2.25E-02	2.25E-02		
U-236	1.5493E-05	1.298	13.739	0.00E+00	2.01E-05	2.13E-04		
U-238	-4.2851E-09	1.298	0.000	2.92E-04	2.92E-04	2.92E-04		
Y-90	1.3475E+00	1.298	13.739	0.00E+00	1.75E+00	1.85E+01		
Other Radionuclides					1.78E+00	1.88E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.23E-02	2.31E-01
Total	Total

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 (1100)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	92.29270621	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nomina:	1.298		Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	13.739		Bounding burnup taken directly from SFD (converted to MWd).

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nomina:	0.00	0.00	1.00
Bounding:	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: ARMF/CFRMF MARK I LL
 SNF ID #: 10
 Fuel Units & Descr: 2 - 15 FLAT PLATES
 Heavy Metal Mass: BOL=.24kg ; EOL=.24kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1991
 Estimates as of: 2030
 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"
 0.08

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	2.0068E-09	0.027	0.287	0.00E+00	5.45E-11	5.76E-10	0.0150	2.116E+10
Am-241	2.5251E-03	0.027	0.287	0.00E+00	6.85E-05	7.25E-04	0.0250	4.393E+09
Am-242m	3.9624E-07	0.027	0.287	0.00E+00	1.08E-08	1.14E-07	0.0375	3.818E+09
Am-243	1.4880E-06	0.027	0.287	0.00E+00	4.04E-08	4.27E-07	0.0575	4.110E+09
C-14	5.7053E-09	0.027	0.287	0.00E+00	1.55E-10	1.64E-09	0.0850	2.478E+09
Ci-36	1.3124E-32	0.027	0.287	0.00E+00	3.56E-34	3.77E-33	0.1250	1.638E+09
Cm-243	1.1419E-07	0.027	0.287	0.00E+00	3.10E-09	3.28E-08	0.2250	2.147E+09
Cm-244	1.6522E-05	0.027	0.287	0.00E+00	4.48E-07	4.75E-06	0.3750	9.299E+08
Co-60	7.4047E-07	0.027	0.287	0.00E+00	2.01E-08	2.13E-07	0.5750	1.537E+10
Cs-134	2.0455E-05	0.027	0.287	0.00E+00	5.55E-07	5.87E-06	0.8500	1.877E+08
Cs-135	3.4477E-06	0.027	0.287	0.00E+00	9.36E-08	9.90E-07	1.2500	9.081E+07
Cs-137	1.4365E+00	0.027	0.287	0.00E+00	3.90E-02	4.13E-01	1.7500	5.112E+06
Eu-154	7.3230E-03	0.027	0.287	0.00E+00	1.99E-04	2.10E-03	2.2500	4.275E+02
Eu-155	5.9259E-04	0.027	0.287	0.00E+00	1.61E-05	1.70E-04	2.7500	4.079E+02
Fe-55	2.2791E-06	0.027	0.287	0.00E+00	6.19E-08	6.55E-07	3.5000	2.809E-01
H-3	1.9698E-03	0.027	0.287	0.00E+00	5.35E-05	5.66E-04	5.0000	1.153E-01
I-129	7.5300E-07	0.027	0.287	0.00E+00	2.04E-08	2.16E-07	7.0000	1.268E-02
Kr-85	4.1176E-02	0.027	0.287	0.00E+00	1.12E-03	1.18E-02	11.0000	1.418E-03
Np-237	9.5752E-06	0.027	0.287	0.00E+00	2.60E-07	2.75E-06		
Pa-231	3.9379E-09	0.027	0.287	0.00E+00	1.07E-10	1.13E-09		
Pb-210	3.3115E-10	0.027	0.287	0.00E+00	8.99E-12	9.51E-11		
Pm-147	9.2402E-04	0.027	0.287	0.00E+00	2.51E-05	2.65E-04		
Pu-238	1.6217E-02	0.027	0.287	0.00E+00	4.40E-04	4.66E-03		
Pu-239	4.2810E-04	0.027	0.287	0.00E+00	1.16E-05	1.23E-04		
Pu-240	2.4333E-04	0.027	0.287	0.00E+00	6.60E-06	6.99E-05		
Pu-241	1.6242E-02	0.027	0.287	0.00E+00	4.41E-04	4.66E-03		
Pu-242	3.6329E-07	0.027	0.287	0.00E+00	9.86E-09	1.04E-07		
Ra-226	9.0114E-10	0.027	0.287	0.00E+00	2.45E-11	2.59E-10		
Ra-228	3.1019E-14	0.027	0.287	0.00E+00	8.42E-16	8.91E-15		
Ru-106	2.1225E-10	0.027	0.287	0.00E+00	5.76E-12	6.10E-11		
Se-79	1.2930E-05	0.027	0.287	0.00E+00	3.51E-07	3.71E-06		
Sn-126	1.1571E-05	0.027	0.287	0.00E+00	3.14E-07	3.32E-06		
Sr-90	1.3472E+00	0.027	0.287	0.00E+00	3.66E-02	3.87E-01		
Tc-99	4.2239E-04	0.027	0.287	0.00E+00	1.15E-05	1.21E-04		
Th-229	1.2407E-11	0.027	0.287	0.00E+00	3.37E-13	3.56E-12		
Th-230	8.3497E-08	0.027	0.287	0.00E+00	2.27E-09	2.40E-08		
Th-232	3.8371E-14	0.027	0.287	0.00E+00	1.04E-15	1.10E-14		
Ti-208	4.0414E-08	0.027	0.287	0.00E+00	1.10E-09	1.16E-08		
U-232	1.0948E-07	0.027	0.287	0.00E+00	2.97E-09	3.14E-08		
U-233	3.6275E-09	0.027	0.287	0.00E+00	9.84E-11	1.04E-09		
U-234	1.8562E-04	0.027	0.287	0.00E+00	5.04E-06	5.33E-05		
U-235	-2.7235E-06	0.027	0.000	4.75E-04	4.75E-04	4.75E-04		
U-236	1.5493E-05	0.027	0.287	0.00E+00	4.20E-07	4.45E-06		
U-238	-4.2851E-09	0.027	0.000	5.38E-06	5.38E-06	5.38E-06		
Y-90	1.3475E+00	0.027	0.287	0.00E+00	3.66E-02	3.87E-01		
Other Radionuclides					3.71E-02	3.93E-01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.67E-04	4.82E-03
Total	Total

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 (1100)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	93.22033898	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	0.027		Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	0.287		Bounding burnup taken directly from SFD (converted to MWd).

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.00	0.00	1.00
Bounding:	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: ARMF/CFRMMF MARK II
SNF ID #: 11

Fuel Units & Descr: 8 - 15 FLAT PLATES
Heavy Metal Mass: BOL=1.16kg ; EOL=1.16kg
ROD Storage Site: SRS

¹Fuel decay start date: 1991
Estimates as of: 2030
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"
0.33

II. Estimates	m	x _n	x _b	b			y _n		y _b		Gamma Sources	
				Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)	Avg. MeV			
Ac-227	2.0068E-09	0.134	1.417	0.00E+00	2.69E-10	2.84E-09						
Am-241	2.5251E-03	0.134	1.417	0.00E+00	3.38E-04	3.58E-03					0.0150	1.044E+11
Am-242m	3.9624E-07	0.134	1.417	0.00E+00	5.30E-08	5.61E-07					0.0250	2.166E+10
Am-243	1.4880E-06	0.134	1.417	0.00E+00	1.99E-07	2.11E-06					0.0375	1.883E+10
C-14	5.7053E-09	0.134	1.417	0.00E+00	7.64E-10	8.08E-09					0.0575	2.027E+10
Cl-36	1.3124E-32	0.134	1.417	0.00E+00	1.76E-33	1.86E-32					0.0850	1.222E+10
Cm-243	1.1419E-07	0.134	1.417	0.00E+00	1.53E-08	1.62E-07					0.1250	8.080E+09
Cm-244	1.6522E-05	0.134	1.417	0.00E+00	2.21E-06	2.34E-05					0.2250	1.059E+10
Co-60	7.4047E-07	0.134	1.417	0.00E+00	9.91E-08	1.05E-06					0.3750	4.587E+09
Cs-134	2.0455E-05	0.134	1.417	0.00E+00	2.74E-06	2.90E-05					0.5750	7.581E+10
Cs-135	3.4477E-06	0.134	1.417	0.00E+00	4.62E-07	4.88E-06					0.8500	9.259E+08
Cs-137	1.4365E+00	0.134	1.417	0.00E+00	1.92E-01	2.03E+00					1.2500	4.479E+08
Eu-154	7.3230E-03	0.134	1.417	0.00E+00	9.80E-04	1.04E-02					1.7500	2.521E+07
Eu-155	5.9259E-04	0.134	1.417	0.00E+00	7.93E-05	8.39E-04					2.2500	2.109E+03
Fe-55	2.2791E-06	0.134	1.417	0.00E+00	3.05E-07	3.23E-06					2.7500	2.012E+03
H-3	1.9698E-03	0.134	1.417	0.00E+00	2.64E-04	2.79E-03					3.5000	1.387E+00
I-129	7.5300E-07	0.134	1.417	0.00E+00	1.01E-07	1.07E-06					5.0000	5.694E-01
Kr-85	4.1176E-02	0.134	1.417	0.00E+00	5.51E-03	5.83E-02					7.0000	6.263E-02
Np-237	9.5752E-06	0.134	1.417	0.00E+00	1.28E-06	1.36E-05					11.0000	7.004E-03
Pa-231	3.9379E-09	0.134	1.417	0.00E+00	5.27E-10	5.58E-09						
Pb-210	3.3115E-10	0.134	1.417	0.00E+00	4.43E-11	4.69E-10						
Pm-147	9.2402E-04	0.134	1.417	0.00E+00	1.24E-04	1.31E-03						
Pu-238	1.6217E-02	0.134	1.417	0.00E+00	2.17E-03	2.30E-02						
Pu-239	4.2810E-04	0.134	1.417	0.00E+00	5.73E-05	6.06E-04						
Pu-240	2.4333E-04	0.134	1.417	0.00E+00	3.26E-05	3.45E-04						
Pu-241	1.6242E-02	0.134	1.417	0.00E+00	2.17E-03	2.30E-02						
Pu-242	3.6329E-07	0.134	1.417	0.00E+00	4.86E-08	5.15E-07						
Ra-226	9.0114E-10	0.134	1.417	0.00E+00	1.21E-10	1.28E-09						
Ra-228	3.1019E-14	0.134	1.417	0.00E+00	4.15E-15	4.39E-14						
Ru-106	2.1225E-10	0.134	1.417	0.00E+00	2.84E-11	3.01E-10						
Se-79	1.2930E-05	0.134	1.417	0.00E+00	1.73E-06	1.83E-05						
Sn-126	1.1571E-05	0.134	1.417	0.00E+00	1.55E-06	1.64E-05						
Sr-90	1.3472E+00	0.134	1.417	0.00E+00	1.80E-01	1.91E+00						
Tc-99	4.2239E-04	0.134	1.417	0.00E+00	5.65E-05	5.98E-04						
Th-229	1.2407E-11	0.134	1.417	0.00E+00	1.66E-12	1.76E-11						
Th-230	8.3497E-08	0.134	1.417	0.00E+00	1.12E-08	1.18E-07						
Th-232	3.8371E-14	0.134	1.417	0.00E+00	5.14E-15	5.44E-14						
Tl-208	4.0414E-08	0.134	1.417	0.00E+00	5.41E-09	5.72E-08						
U-232	1.0948E-07	0.134	1.417	0.00E+00	1.47E-08	1.55E-07						
U-233	3.6275E-09	0.134	1.417	0.00E+00	4.86E-10	5.14E-09						
U-234	1.8562E-04	0.134	1.417	0.00E+00	2.48E-05	2.63E-04						
U-235	-2.7235E-06	0.134	0.000	2.34E-03	2.34E-03	2.34E-03						
U-236	1.5493E-05	0.134	1.417	0.00E+00	2.07E-06	2.19E-05						
U-238	-4.2851E-09	0.134	0.000	2.69E-05	2.69E-05	2.69E-05						
Y-90	1.3475E+00	0.134	1.417	0.00E+00	1.80E-01	1.91E+00						
Other Radionuclides					1.83E-01	1.94E+00						

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.30E-03	2.38E-02
Total	Total

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 (1100)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	93.12714777	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	0.134		Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup taken directly from SFD (converted to MWd).
Bounding:	1.417		

Checks			
	Bumup Multiplier	Estimated Bumup/ Given Bumup	Estimated EOL HM/ Given EOL HM
Nominal:	0.00	0.00	1.00
Bounding:	0.00	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: ARMF/CFRMM MARK III
 SNF ID #: 12
 Fuel Units & Descr: 4 - 15 FLAT PLATES
 Heavy Metal Mass: BOL= 10kg ; EOL= 10kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1991
 Estimates as of: 2030
 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"
 0.17

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	2.0068E-09	0.011	0.117	0.00E+00	2.22E-11	2.34E-10	Avg. MeV	
Am-241	2.5251E-03	0.011	0.117	0.00E+00	2.79E-05	2.95E-04	0.0150	8.609E+09
Am-242m	3.9624E-07	0.011	0.117	0.00E+00	4.37E-09	4.63E-08	0.0250	1.787E+09
Am-243	1.4880E-06	0.011	0.117	0.00E+00	1.64E-08	1.74E-07	0.0375	1.553E+09
C-14	5.7053E-09	0.011	0.117	0.00E+00	6.30E-11	6.67E-10	0.0575	1.672E+09
Cl-36	1.3124E-32	0.011	0.117	0.00E+00	1.45E-34	1.53E-33	0.0850	1.008E+09
Cm-243	1.1419E-07	0.011	0.117	0.00E+00	1.26E-09	1.33E-08	0.1250	6.664E+08
Cm-244	1.6522E-05	0.011	0.117	0.00E+00	1.82E-07	1.93E-06	0.2250	8.734E+08
Co-60	7.4047E-07	0.011	0.117	0.00E+00	8.17E-09	8.65E-08	0.3750	3.783E+08
Cs-134	2.0455E-05	0.011	0.117	0.00E+00	2.26E-07	2.39E-06	0.5750	6.252E+09
Cs-135	3.4477E-06	0.011	0.117	0.00E+00	3.81E-08	4.03E-07	0.8500	7.637E+07
Cs-137	1.4365E+00	0.011	0.117	0.00E+00	1.59E-02	1.68E-01	1.2500	3.694E+07
Eu-154	7.3230E-03	0.011	0.117	0.00E+00	8.08E-05	8.56E-04	1.7500	2.079E+06
Eu-155	5.9259E-04	0.011	0.117	0.00E+00	6.54E-06	6.92E-05	2.2500	1.739E+02
Fe-55	2.2791E-06	0.011	0.117	0.00E+00	2.52E-08	2.66E-07	2.7500	1.659E+02
H-3	1.9698E-03	0.011	0.117	0.00E+00	2.17E-05	2.30E-04	3.5000	1.168E-01
I-129	7.5300E-07	0.011	0.117	0.00E+00	8.31E-09	8.80E-08	5.0000	4.800E-02
Kr-85	4.1176E-02	0.011	0.117	0.00E+00	4.55E-04	4.81E-03	7.0000	5.285E-03
Np-237	9.5752E-06	0.011	0.117	0.00E+00	1.06E-07	1.12E-06	11.0000	5.915E-04
Pa-231	3.9379E-09	0.011	0.117	0.00E+00	4.35E-11	4.60E-10		
Pb-210	3.3115E-10	0.011	0.117	0.00E+00	3.66E-12	3.87E-11		
Pm-147	9.2402E-04	0.011	0.117	0.00E+00	1.02E-05	1.08E-04		
Pu-238	1.6217E-02	0.011	0.117	0.00E+00	1.79E-04	1.89E-03		
Pu-239	4.2810E-04	0.011	0.117	0.00E+00	4.73E-06	5.00E-05		
Pu-240	2.4333E-04	0.011	0.117	0.00E+00	2.69E-06	2.84E-05		
Pu-241	1.6242E-02	0.011	0.117	0.00E+00	1.79E-04	1.90E-03		
Pu-242	3.6329E-07	0.011	0.117	0.00E+00	4.01E-09	4.24E-08		
Ra-226	9.0114E-10	0.011	0.117	0.00E+00	9.95E-12	1.05E-10		
Ra-228	3.1019E-14	0.011	0.117	0.00E+00	3.42E-16	3.62E-15		
Ru-106	2.1225E-10	0.011	0.117	0.00E+00	2.34E-12	2.48E-11		
Se-79	1.2930E-05	0.011	0.117	0.00E+00	1.43E-07	1.51E-06		
Sn-126	1.1571E-05	0.011	0.117	0.00E+00	1.28E-07	1.35E-06		
Sr-90	1.3472E+00	0.011	0.117	0.00E+00	1.49E-02	1.57E-01		
Tc-99	4.2239E-04	0.011	0.117	0.00E+00	4.66E-06	4.93E-05		
Th-229	1.2407E-11	0.011	0.117	0.00E+00	1.37E-13	1.45E-12		
Th-230	8.3497E-08	0.011	0.117	0.00E+00	9.22E-10	9.76E-09		
Th-232	3.8371E-14	0.011	0.117	0.00E+00	4.24E-16	4.48E-15		
Tl-208	4.0414E-08	0.011	0.117	0.00E+00	4.46E-10	4.72E-09		
U-232	1.0948E-07	0.011	0.117	0.00E+00	1.21E-09	1.28E-08		
U-233	3.6275E-09	0.011	0.117	0.00E+00	4.00E-11	4.24E-10		
U-234	1.8562E-04	0.011	0.117	0.00E+00	2.05E-06	2.17E-05	Nominal Output (Watts)	Bounding Heat Output (Watts)
U-235	-2.7235E-06	0.011	0.000	1.90E-04	1.90E-04	1.90E-04	1.90E-04	1.96E-03
U-236	1.5493E-05	0.011	0.117	0.00E+00	1.71E-07	1.81E-06		
U-238	-4.2851E-09	0.011	0.000	2.69E-06	2.69E-06	2.69E-06	Total	Total
Y-90	1.3475E+00	0.011	0.117	0.00E+00	1.49E-02	1.57E-01		
Other Radionuclides					1.51E-02	1.60E-01		

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 (1100)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	91.6666667	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	0.011		
Bounding:	0.117		

Nominal burnup taken directly from SFD (converted to MWd).
 Bounding burnup taken directly from SFD (converted to MWd).

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.00	0.00	
Bounding:	0.00	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: ASTRA (AUSTRIA)
 SNF ID #: 645
 Fuel Units & Descr: 33 - MTR TYPE
 Heavy Metal Mass: BOL=9.03kg ; EOL=4.36kg
 ROD Storage Site: SFIS

¹Fuel decay start date: 1985
 Estimates as of: 2030
 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"
 0.92

Radionuclide	II. Estimates		x _b	b	y _n	y _b	Gamma Sources	
	m	x _n					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	2.0068E-09	4,418.982	8,547.324	0.00E+00	8.87E-06	1.72E-05	0.0150	6.295E+14
Am-241	2.5251E-03	4,418.982	8,547.324	0.00E+00	1.12E+01	2.16E+01	0.0250	1.307E+14
Am-242m	3.9624E-07	4,418.982	8,547.324	0.00E+00	1.75E-03	3.39E-03	0.0375	1.136E+14
Am-243	1.4880E-06	4,418.982	8,547.324	0.00E+00	6.58E-03	1.27E-02	0.0575	1.223E+14
C-14	5.7053E-09	4,418.982	8,547.324	0.00E+00	2.52E-05	4.88E-05	0.0850	7.369E+13
Cl-36	1.3124E-32	4,418.982	8,547.324	0.00E+00	5.80E-29	1.12E-28	0.1250	4.867E+13
Cm-243	1.1419E-07	4,418.982	8,547.324	0.00E+00	5.05E-04	9.76E-04	0.2250	6.362E+13
Cm-244	1.6522E-05	4,418.982	8,547.324	0.00E+00	7.30E-02	1.41E-01	0.3750	2.767E+13
Co-60	7.4047E-07	4,418.982	8,547.324	0.00E+00	3.27E-03	6.33E-03	0.5750	4.574E+14
Cs-134	2.0455E-05	4,418.982	8,547.324	0.00E+00	9.04E-02	1.75E-01	0.8500	5.587E+12
Cs-135	3.4477E-06	4,418.982	8,547.324	0.00E+00	1.52E-02	2.95E-02	1.2500	2.702E+12
Cs-137	1.4365E+00	4,418.982	8,547.324	0.00E+00	6.35E+03	1.23E+04	1.7500	1.521E+11
Eu-154	7.3230E-03	4,418.982	8,547.324	0.00E+00	3.24E+01	6.26E+01	2.2500	1.272E+07
Eu-155	5.9259E-04	4,418.982	8,547.324	0.00E+00	2.62E+00	5.07E+00	2.7500	1.214E+07
Fe-55	2.2791E-06	4,418.982	8,547.324	0.00E+00	1.01E-02	1.95E-02	3.5000	7.031E+03
H-3	1.9698E-03	4,418.982	8,547.324	0.00E+00	8.70E+00	1.68E+01	5.0000	2.873E+03
I-129	7.5300E-07	4,418.982	8,547.324	0.00E+00	3.33E-03	6.44E-03	7.0000	3.144E+02
Kr-85	4.1176E-02	4,418.982	8,547.324	0.00E+00	1.82E+02	3.52E+02	11.0000	3.505E+01
Np-237	9.5752E-06	4,418.982	8,547.324	0.00E+00	4.23E-02	8.18E-02		
Pa-231	3.9379E-09	4,418.982	8,547.324	0.00E+00	1.74E-05	3.37E-05		
Pb-210	3.3115E-10	4,418.982	8,547.324	0.00E+00	1.46E-06	2.83E-06		
Pm-147	9.2402E-04	4,418.982	8,547.324	0.00E+00	4.08E+00	7.90E+00		
Pu-238	1.6217E-02	4,418.982	8,547.324	0.00E+00	7.17E+01	1.39E+02		
Pu-239	4.2810E-04	4,418.982	8,547.324	0.00E+00	1.89E+00	3.66E+00		
Pu-240	2.4333E-04	4,418.982	8,547.324	0.00E+00	1.08E+00	2.08E+00		
Pu-241	1.6242E-02	4,418.982	8,547.324	0.00E+00	7.18E+01	1.39E+02		
Pu-242	3.6329E-07	4,418.982	8,547.324	0.00E+00	1.61E-03	3.11E-03		
Ra-226	9.0114E-10	4,418.982	8,547.324	0.00E+00	3.98E-06	7.70E-06		
Ra-228	3.1019E-14	4,418.982	8,547.324	0.00E+00	1.37E-10	2.65E-10		
Ru-106	2.1225E-10	4,418.982	8,547.324	0.00E+00	9.38E-07	1.81E-06		
Se-79	1.2930E-05	4,418.982	8,547.324	0.00E+00	5.71E-02	1.11E-01		
Sn-126	1.1571E-05	4,418.982	8,547.324	0.00E+00	5.11E-02	9.89E-02		
Sr-90	1.3472E+00	4,418.982	8,547.324	0.00E+00	5.95E+03	1.15E+04		
Tc-99	4.2239E-04	4,418.982	8,547.324	0.00E+00	1.87E+00	3.61E+00		
Th-229	1.2407E-11	4,418.982	8,547.324	0.00E+00	5.48E-08	1.06E-07		
Th-230	8.3497E-08	4,418.982	8,547.324	0.00E+00	3.69E-04	7.14E-04		
Th-232	3.8371E-14	4,418.982	8,547.324	0.00E+00	1.70E-10	3.28E-10		
Th-208	4.0414E-08	4,418.982	8,547.324	0.00E+00	1.79E-04	3.45E-04		
U-232	1.0948E-07	4,418.982	8,547.324	0.00E+00	4.84E-04	9.36E-04		
U-233	3.6275E-09	4,418.982	8,547.324	0.00E+00	1.60E-05	3.10E-05		
U-234	1.8562E-04	4,418.982	8,547.324	0.00E+00	8.20E-01	1.59E+00		
U-235	-2.7235E-06	4,418.982	0.000	1.82E-02	6.12E-03	1.82E-02		
U-236	1.5493E-05	4,418.982	8,547.324	0.00E+00	6.85E-02	1.32E-01		
U-238	-4.2851E-09	4,418.982	0.000	2.10E-04	1.91E-04	2.10E-04		
Y-90	1.3475E+00	4,418.982	8,547.324	0.00E+00	5.95E+03	1.15E+04		
Other Radionuclides					6.05E+03	1.17E+04		

Thermal Power	
Normal Output (Watts)	Bounding Heat Output (Watts)
7.40E+01	1.43E+02
Total	Total

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-ALX	U	
BOL Enrichment %:	93.07350223	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		4,418.982	
Bounding:		8,547.324	

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:	1.56		
Bounding:	3.01		

Estimated EOL HM/Given EOL HM: 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: ASTRA (AUSTRIA)
 SNF ID #: 712
 Fuel Units & Descr: 39 - 19 FLAT PLATES
 Heavy Metal Mass: BOL=72.24kg ; EOL=66.18kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1985
 Estimates as of: 2030
 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"
 1.08

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	5,732.119	11,464.238	0.00E+00	1.15E-05	2.30E-05	Avg. MeV	
Am-241	2.5251E-03	5,732.119	11,464.238	0.00E+00	1.45E+01	2.89E+01	0.0150	8.443E+14
Am-242m	3.9624E-07	5,732.119	11,464.238	0.00E+00	2.27E-03	4.54E-03	0.0250	1.753E+14
Am-243	1.4880E-06	5,732.119	11,464.238	0.00E+00	8.53E-03	1.71E-02	0.0375	1.524E+14
C-14	5.7053E-09	5,732.119	11,464.238	0.00E+00	3.27E-05	6.54E-05	0.0575	1.640E+14
Cl-36	1.3124E-32	5,732.119	11,464.238	0.00E+00	7.52E-29	1.50E-28	0.0850	9.884E+13
Cm-243	1.1419E-07	5,732.119	11,464.238	0.00E+00	6.55E-04	1.31E-03	0.1250	6.528E+13
Cm-244	1.6522E-05	5,732.119	11,464.238	0.00E+00	9.47E-02	1.89E-01	0.2250	8.533E+13
Co-60	7.4047E-07	5,732.119	11,464.238	0.00E+00	4.24E-03	8.49E-03	0.3750	3.712E+13
Cs-134	2.0455E-05	5,732.119	11,464.238	0.00E+00	1.17E-01	2.34E-01	0.5750	6.135E+14
Cs-135	3.4477E-06	5,732.119	11,464.238	0.00E+00	1.98E-02	3.95E-02	0.8500	7.494E+12
Cs-137	1.4365E+00	5,732.119	11,464.238	0.00E+00	8.23E+03	1.65E+04	1.2500	3.625E+12
Eu-154	7.3230E-03	5,732.119	11,464.238	0.00E+00	4.20E+01	8.40E+01	1.7500	2.040E+11
Eu-155	5.9259E-04	5,732.119	11,464.238	0.00E+00	3.40E+00	6.79E+00	2.2500	1.706E+07
Fe-55	2.2791E-06	5,732.119	11,464.238	0.00E+00	1.31E-02	2.61E-02	2.7500	1.628E+07
H-3	1.9698E-03	5,732.119	11,464.238	0.00E+00	1.13E+01	2.26E+01	3.5000	9.533E+03
I-129	7.5300E-07	5,732.119	11,464.238	0.00E+00	4.32E-03	8.63E-03	5.0000	3.897E+03
Kr-85	4.1176E-02	5,732.119	11,464.238	0.00E+00	2.36E+02	4.72E+02	7.0000	4.268E+02
Np-237	9.5752E-06	5,732.119	11,464.238	0.00E+00	5.49E-02	1.10E-01	11.0000	4.760E+01
Pa-231	3.9379E-09	5,732.119	11,464.238	0.00E+00	2.26E-05	4.51E-05		
Pb-210	3.3115E-10	5,732.119	11,464.238	0.00E+00	1.90E-06	3.80E-06		
Pm-147	9.2402E-04	5,732.119	11,464.238	0.00E+00	5.30E+00	1.06E+01		
Pu-238	1.6217E-02	5,732.119	11,464.238	0.00E+00	9.30E+01	1.86E+02		
Pu-239	4.2810E-04	5,732.119	11,464.238	0.00E+00	2.45E+00	4.91E+00		
Pu-240	2.4333E-04	5,732.119	11,464.238	0.00E+00	1.39E+00	2.79E+00		
Pu-241	1.6242E-02	5,732.119	11,464.238	0.00E+00	9.31E+01	1.86E+02		
Pu-242	3.6329E-07	5,732.119	11,464.238	0.00E+00	2.08E-03	4.16E-03		
Ra-226	9.0114E-10	5,732.119	11,464.238	0.00E+00	5.17E-06	1.03E-05		
Ra-228	3.1019E-14	5,732.119	11,464.238	0.00E+00	1.78E-10	3.56E-10		
Ru-106	2.1225E-10	5,732.119	11,464.238	0.00E+00	1.22E-06	2.43E-06		
Se-79	1.2930E-05	5,732.119	11,464.238	0.00E+00	7.41E-02	1.48E-01		
Sn-126	1.1571E-05	5,732.119	11,464.238	0.00E+00	6.63E-02	1.33E-01		
Sr-90	1.3472E+00	5,732.119	11,464.238	0.00E+00	7.72E+03	1.54E+04		
Tc-99	4.2239E-04	5,732.119	11,464.238	0.00E+00	2.42E+00	4.84E+00		
Th-229	1.2407E-11	5,732.119	11,464.238	0.00E+00	7.11E-08	1.42E-07		
Th-230	8.3497E-08	5,732.119	11,464.238	0.00E+00	4.79E-04	9.57E-04		
Th-232	3.8371E-14	5,732.119	11,464.238	0.00E+00	2.20E-10	4.40E-10		
Tl-208	4.0414E-08	5,732.119	11,464.238	0.00E+00	2.32E-04	4.63E-04		
U-232	1.0948E-07	5,732.119	11,464.238	0.00E+00	6.28E-04	1.26E-03		
U-233	3.6275E-09	5,732.119	11,464.238	0.00E+00	2.08E-05	4.16E-05		
U-234	1.8562E-04	5,732.119	11,464.238	0.00E+00	1.06E+00	2.13E+00		
U-235	-2.7235E-06	5,732.119	0.000	3.10E-02	1.54E-02	3.10E-02		
U-236	1.5493E-05	5,732.119	11,464.238	0.00E+00	8.88E-02	1.78E-01		
U-238	-4.2851E-09	5,732.119	0.000	1.95E-02	1.94E-02	1.95E-02		
Y-90	1.3475E+00	5,732.119	11,464.238	0.00E+00	7.72E+03	1.54E+04		
Other Radionuclides					7.84E+03	1.57E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.59E+01	1.92E+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	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 %:	U3Si2	U	
	19.83800556	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		5,732.119	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
		11,464.238	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Bounding:	0.25		1.01
	0.50		

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: ASTRA (AUSTRIA)
 SNF ID #: 1058
 Fuel Units & Descr: 3 - 19 FLAT PLATES
 Heavy Metal Mass: BOL=5.38kg ; EOL=4.82kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1985
 Estimates as of: 2030
 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"
 0.08

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	2.0068E-09	530.994	1,061.988	0.00E+00	1.07E-06	2.13E-06		
Am-241	2.5251E-03	530.994	1,061.988	0.00E+00	1.34E+00	2.68E+00	0.0150	7.822E+13
Am-242m	3.9624E-07	530.994	1,061.988	0.00E+00	2.10E-04	4.21E-04	0.0250	1.624E+13
Am-243	1.4880E-06	530.994	1,061.988	0.00E+00	7.90E-04	1.58E-03	0.0375	1.412E+13
C-14	5.7053E-09	530.994	1,061.988	0.00E+00	3.03E-06	6.06E-06	0.0575	1.520E+13
Cl-36	1.3124E-32	530.994	1,061.988	0.00E+00	6.97E-30	1.39E-29	0.0850	9.156E+12
Cm-243	1.1419E-07	530.994	1,061.988	0.00E+00	6.06E-05	1.21E-04	0.1250	6.047E+12
Cm-244	1.6522E-05	530.994	1,061.988	0.00E+00	8.77E-03	1.75E-02	0.2250	7.904E+12
Co-60	7.4047E-07	530.994	1,061.988	0.00E+00	3.93E-04	7.86E-04	0.3750	3.438E+12
Cs-134	2.0455E-05	530.994	1,061.988	0.00E+00	1.09E-02	2.17E-02	0.5750	5.693E+13
Cs-135	3.4477E-06	530.994	1,061.988	0.00E+00	1.83E-03	3.66E-03	0.8500	6.942E+11
Cs-137	1.4365E+00	530.994	1,061.988	0.00E+00	7.63E+02	1.53E+03	1.2500	3.358E+11
Eu-154	7.3230E-03	530.994	1,061.988	0.00E+00	3.89E+00	7.78E+00	1.7500	1.890E+10
Eu-155	5.9259E-04	530.994	1,061.988	0.00E+00	3.15E-01	6.29E-01	2.2500	1.581E+06
Fe-55	2.2791E-06	530.994	1,061.988	0.00E+00	1.21E-03	2.42E-03	2.7500	1.508E+06
H-3	1.9698E-03	530.994	1,061.988	0.00E+00	1.05E+00	2.09E+00	3.5000	8.812E+02
I-129	7.5300E-07	530.994	1,061.988	0.00E+00	4.00E-04	8.00E-04	5.0000	3.602E+02
Kr-85	4.1176E-02	530.994	1,061.988	0.00E+00	2.19E+01	4.37E+01	7.0000	3.944E+01
Np-237	9.5752E-06	530.994	1,061.988	0.00E+00	5.08E-03	1.02E-02	11.0000	4.399E+00
Pa-231	3.9379E-09	530.994	1,061.988	0.00E+00	2.09E-06	4.18E-06		
Pb-210	3.3115E-10	530.994	1,061.988	0.00E+00	1.76E-07	3.52E-07		
Pm-147	9.2402E-04	530.994	1,061.988	0.00E+00	4.91E-01	9.81E-01		
Pu-238	1.6217E-02	530.994	1,061.988	0.00E+00	8.61E+00	1.72E+01		
Pu-239	4.2810E-04	530.994	1,061.988	0.00E+00	2.27E-01	4.55E-01		
Pu-240	2.4333E-04	530.994	1,061.988	0.00E+00	1.29E-01	2.58E-01		
Pu-241	1.6242E-02	530.994	1,061.988	0.00E+00	8.62E+00	1.72E+01		
Pu-242	3.6329E-07	530.994	1,061.988	0.00E+00	1.93E-04	3.86E-04		
Ra-226	9.0114E-10	530.994	1,061.988	0.00E+00	4.79E-07	9.57E-07		
Ra-228	3.1019E-14	530.994	1,061.988	0.00E+00	1.65E-11	3.29E-11		
Ru-106	2.1225E-10	530.994	1,061.988	0.00E+00	1.13E-07	2.25E-07		
Se-79	1.2930E-05	530.994	1,061.988	0.00E+00	6.87E-03	1.37E-02		
Sn-126	1.1571E-05	530.994	1,061.988	0.00E+00	6.14E-03	1.23E-02		
Sr-90	1.3472E+00	530.994	1,061.988	0.00E+00	7.15E+02	1.43E+03		
Tc-99	4.2239E-04	530.994	1,061.988	0.00E+00	2.24E-01	4.49E-01		
Th-229	1.2407E-11	530.994	1,061.988	0.00E+00	6.59E-09	1.32E-08		
Th-230	8.3497E-08	530.994	1,061.988	0.00E+00	4.43E-05	8.87E-05		
Th-232	3.8371E-14	530.994	1,061.988	0.00E+00	2.04E-11	4.08E-11		
Tl-208	4.0414E-08	530.994	1,061.988	0.00E+00	2.15E-05	4.29E-05		
U-232	1.0948E-07	530.994	1,061.988	0.00E+00	5.81E-05	1.16E-04		
U-233	3.6275E-09	530.994	1,061.988	0.00E+00	1.93E-06	3.85E-06		
U-234	1.8562E-04	530.994	1,061.988	0.00E+00	9.86E-02	1.97E-01		
U-235	-2.7235E-06	530.994	0.000	2.27E-03	8.21E-04	2.27E-03		
U-236	1.5493E-05	530.994	1,061.988	0.00E+00	8.23E-03	1.65E-02		
U-238	-4.2851E-09	530.994	0.000	1.46E-03	1.45E-03	1.46E-03		
Y-90	1.3475E+00	530.994	1,061.988	0.00E+00	7.16E+02	1.43E+03		
Other Radionuclides					7.27E+02	1.45E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.89E+00	1.78E+01
Total	Total

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 %:	U3O8	U	
	19.50065847	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:		530.994	
Bounding:		1,061.988	

Checks			Estimated EOL HM/Given EOL HM 1.01
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.31		
Bounding:	0.63		

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)
 SNF ID #: 566
 Fuel Units & Descr: 5 - MTR TYPE
 Heavy Metal Mass: BOL=3.62kg ; EOL=2.77kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1985
 Estimates as of: 2030
 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"
 0.14

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	2.0068E-09	807.808	1,615.615	0.00E+00	1.62E-06	3.24E-06	0.0150	1.190E+14
Am-241	2.5251E-03	807.808	1,615.615	0.00E+00	2.04E+00	4.08E+00	0.0250	2.471E+13
Am-242m	3.9624E-07	807.808	1,615.615	0.00E+00	3.20E-04	6.40E-04	0.0375	2.148E+13
Am-243	1.4880E-06	807.808	1,615.615	0.00E+00	1.20E-03	2.40E-03	0.0575	2.312E+13
C-14	5.7053E-09	807.808	1,615.615	0.00E+00	4.61E-06	9.22E-06	0.0850	1.393E+13
Cl-36	1.3124E-32	807.808	1,615.615	0.00E+00	1.06E-29	2.12E-29	0.1250	9.200E+12
Cm-243	1.1419E-07	807.808	1,615.615	0.00E+00	9.22E-05	1.84E-04	0.2250	1.202E+13
Cm-244	1.6522E-05	807.808	1,615.615	0.00E+00	1.33E-02	2.67E-02	0.3750	5.231E+12
Co-60	7.4047E-07	807.808	1,615.615	0.00E+00	5.98E-04	1.20E-03	0.5750	8.646E+13
Cs-134	2.0455E-05	807.808	1,615.615	0.00E+00	1.65E-02	3.30E-02	0.8500	1.056E+12
Cs-135	3.4477E-06	807.808	1,615.615	0.00E+00	2.79E-03	5.57E-03	1.2500	5.108E+11
Cs-137	1.4365E+00	807.808	1,615.615	0.00E+00	1.16E+03	2.32E+03	1.7500	2.875E+10
Eu-154	7.3230E-03	807.808	1,615.615	0.00E+00	5.92E+00	1.18E+01	2.2500	2.404E+06
Eu-155	5.9259E-04	807.808	1,615.615	0.00E+00	4.79E-01	9.57E-01	2.7500	2.294E+06
Fe-55	2.2791E-06	807.808	1,615.615	0.00E+00	1.84E-03	3.68E-03	3.5000	1.332E+03
H-3	1.9698E-03	807.808	1,615.615	0.00E+00	1.59E+00	3.18E+00	5.0000	5.444E+02
I-129	7.5300E-07	807.808	1,615.615	0.00E+00	6.08E-04	1.22E-03	7.0000	5.960E+01
Kr-85	4.1176E-02	807.808	1,615.615	0.00E+00	3.33E+01	6.65E+01	11.0000	6.645E+00
Np-237	9.5752E-06	807.808	1,615.615	0.00E+00	7.73E-03	1.55E-02		
Pa-231	3.9379E-09	807.808	1,615.615	0.00E+00	3.18E-06	6.36E-06		
Pb-210	3.3115E-10	807.808	1,615.615	0.00E+00	2.68E-07	5.35E-07		
Pm-147	9.2402E-04	807.808	1,615.615	0.00E+00	7.46E-01	1.49E+00		
Pu-238	1.6217E-02	807.808	1,615.615	0.00E+00	1.31E+01	2.62E+01		
Pu-239	4.2810E-04	807.808	1,615.615	0.00E+00	3.46E-01	6.92E-01		
Pu-240	2.4333E-04	807.808	1,615.615	0.00E+00	1.97E-01	3.93E-01		
Pu-241	1.6242E-02	807.808	1,615.615	0.00E+00	1.31E+01	2.62E+01		
Pu-242	3.6329E-07	807.808	1,615.615	0.00E+00	2.93E-04	5.87E-04		
Ra-226	9.0114E-10	807.808	1,615.615	0.00E+00	7.28E-07	1.46E-06		
Ra-228	3.1019E-14	807.808	1,615.615	0.00E+00	2.51E-11	5.01E-11		
Ru-106	2.1225E-10	807.808	1,615.615	0.00E+00	1.71E-07	3.43E-07		
Se-79	1.2930E-05	807.808	1,615.615	0.00E+00	1.04E-02	2.09E-02		
Sn-126	1.1571E-05	807.808	1,615.615	0.00E+00	9.35E-03	1.87E-02		
Sr-90	1.3472E+00	807.808	1,615.615	0.00E+00	1.09E+03	2.18E+03		
Tc-99	4.2239E-04	807.808	1,615.615	0.00E+00	3.41E-01	6.82E-01		
Th-229	1.2407E-11	807.808	1,615.615	0.00E+00	1.00E-08	2.00E-08		
Th-230	8.3497E-08	807.808	1,615.615	0.00E+00	6.74E-05	1.35E-04		
Th-232	3.8371E-14	807.808	1,615.615	0.00E+00	3.10E-11	6.20E-11		
Tl-208	4.0414E-08	807.808	1,615.615	0.00E+00	3.26E-05	6.53E-05		
U-232	1.0948E-07	807.808	1,615.615	0.00E+00	8.84E-05	1.77E-04		
U-233	3.6275E-09	807.808	1,615.615	0.00E+00	2.93E-06	5.86E-06		
U-234	1.8562E-04	807.808	1,615.615	0.00E+00	1.50E-01	3.00E-01		
U-235	-2.7235E-06	807.808	0.000	3.48E-03	1.28E-03	3.48E-03		
U-236	1.5493E-05	807.808	1,615.615	0.00E+00	1.25E-02	2.50E-02		
U-238	-4.2851E-09	807.808	0.000	6.76E-04	6.72E-04	6.76E-04		
Y-90	1.3475E+00	807.808	1,615.615	0.00E+00	1.09E+03	2.18E+03		
Other Radionuclides					1.11E+03	2.21E+03		

Thermal Power	
Nominal Output (Watts)	Bounding Heat Output (Watts)
1.35E+01	2.70E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: LIGHT WATER	Used: 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-ALX	U	
BOL Enrichment %:	44.43904151	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD:	Estimated: 807.808	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		1,615.615	

Checks		
Nominal:	Burnup Multiplier: 0.71	Estimated Burnup/ Given Burnup: 1.02
Bounding:	1.42	

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: ATR
 SNF ID #: 15
 Fuel Units & Descr: 1760 - 19 CURVED PLATES
 Heavy Metal Mass: BOL=2031.04kg ; EOL=1477.70kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1985
 Estimates as of: 2030
 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"
 88.00

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	2.0068E-09	524,027.503	1,048,055.006	0.00E+00	1.05E-03	2.10E-03	Avg. MeV	
Am-241	2.5251E-03	524,027.503	1,048,055.006	0.00E+00	1.32E+03	2.65E+03	0.0150	7.719E+16
Am-242m	3.9624E-07	524,027.503	1,048,055.006	0.00E+00	2.08E-01	4.15E-01	0.0250	1.603E+16
Am-243	1.4880E-06	524,027.503	1,048,055.006	0.00E+00	7.80E-01	1.56E+00	0.0375	1.393E+16
C-14	5.7053E-09	524,027.503	1,048,055.006	0.00E+00	2.99E-03	5.98E-03	0.0575	1.500E+16
Cl-36	1.3124E-32	524,027.503	1,048,055.006	0.00E+00	6.88E-27	1.38E-26	0.0850	9.036E+15
Co-243	1.1419E-07	524,027.503	1,048,055.006	0.00E+00	5.98E-02	1.20E-01	0.1250	5.968E+15
Co-244	1.6522E-05	524,027.503	1,048,055.006	0.00E+00	8.66E+00	1.73E+01	0.2250	7.800E+15
Co-60	7.4047E-07	524,027.503	1,048,055.006	0.00E+00	3.88E-01	7.76E-01	0.3750	3.393E+15
Cs-134	2.0455E-05	524,027.503	1,048,055.006	0.00E+00	1.07E+01	2.14E+01	0.5750	5.609E+16
Cs-135	3.4477E-06	524,027.503	1,048,055.006	0.00E+00	1.81E+00	3.61E+00	0.8500	6.851E+14
Cs-137	1.4365E+00	524,027.503	1,048,055.006	0.00E+00	7.53E+05	1.51E+06	1.2500	3.314E+14
Eu-154	7.3230E-03	524,027.503	1,048,055.006	0.00E+00	3.84E+03	7.67E+03	1.7500	1.865E+13
Eu-155	5.9259E-04	524,027.503	1,048,055.006	0.00E+00	3.11E+02	6.21E+02	2.2500	1.560E+09
Fe-55	2.2791E-06	524,027.503	1,048,055.006	0.00E+00	1.19E+00	2.39E+00	2.7500	1.488E+09
H-3	1.9698E-03	524,027.503	1,048,055.006	0.00E+00	1.03E+03	2.06E+03	3.5000	8.623E+05
I-129	7.5300E-07	524,027.503	1,048,055.006	0.00E+00	3.95E-01	7.89E-01	5.0000	3.523E+05
Kr-85	4.1176E-02	524,027.503	1,048,055.006	0.00E+00	2.16E+04	4.32E+04	7.0000	3.856E+04
Np-237	9.5752E-06	524,027.503	1,048,055.006	0.00E+00	5.02E+00	1.00E+01	11.0000	4.299E+03
Pa-231	3.9379E-09	524,027.503	1,048,055.006	0.00E+00	2.06E-03	4.13E-03		
Pb-210	3.3115E-10	524,027.503	1,048,055.006	0.00E+00	1.74E-04	3.47E-04		
Pm-147	9.2402E-04	524,027.503	1,048,055.006	0.00E+00	4.84E+02	9.68E+02		
Pu-238	1.6217E-02	524,027.503	1,048,055.006	0.00E+00	8.50E+03	1.70E+04		
Pu-239	4.2810E-04	524,027.503	1,048,055.006	0.00E+00	2.24E+02	4.49E+02		
Pu-240	2.4333E-04	524,027.503	1,048,055.006	0.00E+00	1.28E+02	2.55E+02		
Pu-241	1.6242E-02	524,027.503	1,048,055.006	0.00E+00	8.51E+03	1.70E+04		
Pu-242	3.6329E-07	524,027.503	1,048,055.006	0.00E+00	1.90E-01	3.81E-01		
Ra-226	9.0114E-10	524,027.503	1,048,055.006	0.00E+00	4.72E-04	9.44E-04		
Ra-228	3.1019E-14	524,027.503	1,048,055.006	0.00E+00	1.63E-08	3.25E-08		
Ru-106	2.1225E-10	524,027.503	1,048,055.006	0.00E+00	1.11E-04	2.22E-04		
Se-79	1.2930E-05	524,027.503	1,048,055.006	0.00E+00	6.78E+00	1.36E+01		
Sn-126	1.1571E-05	524,027.503	1,048,055.006	0.00E+00	6.06E+00	1.21E+01		
Sr-90	1.3472E+00	524,027.503	1,048,055.006	0.00E+00	7.06E+05	1.41E+06		
Tc-99	4.2239E-04	524,027.503	1,048,055.006	0.00E+00	2.21E+02	4.43E+02		
Th-229	1.2407E-11	524,027.503	1,048,055.006	0.00E+00	6.50E-06	1.30E-05		
Th-230	8.3497E-08	524,027.503	1,048,055.006	0.00E+00	4.38E-02	8.75E-02		
Th-232	3.8371E-14	524,027.503	1,048,055.006	0.00E+00	2.01E-08	4.02E-08		
Ti-208	4.0414E-08	524,027.503	1,048,055.006	0.00E+00	2.12E-02	4.24E-02		
U-232	1.0948E-07	524,027.503	1,048,055.006	0.00E+00	5.74E-02	1.15E-01		
U-233	3.6275E-09	524,027.503	1,048,055.006	0.00E+00	1.90E-03	3.80E-03		
U-234	1.8562E-04	524,027.503	1,048,055.006	0.00E+00	9.73E+01	1.95E+02		
U-235	-2.7235E-06	524,027.503	0.000	4.09E+00	2.66E+00	4.09E+00		
U-236	1.5493E-05	524,027.503	1,048,055.006	0.00E+00	8.12E+00	1.62E+01		
U-238	-4.2851E-09	524,027.503	0.000	4.67E-02	4.45E-02	4.67E-02	8.77E+03	1.75E+04
Y-90	1.3475E+00	524,027.503	1,048,055.006	0.00E+00	7.06E+05	1.41E+06	Total	Total
Other Radionuclides					7.17E+05	1.43E+06		

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 (6061-T6)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	93.1542461	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	510,485.656	524,027.503	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	868,779.391	1,048,055.006	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.82	1.03	1.02
Bounding:	1.64	1.21	

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: ATR
 SNF ID #: 16
 Fuel Units & Descr: 3948 - 19 CURVED PLATES
 Heavy Metal Mass: BOL=4555.99kg ; EOL=3489.64kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2035
 Estimates as of: 2030
 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"
 197.40

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
								Avg. MeV
Ac-227	1.4545E-10	1,145,112.141	2,019,717.366	0.00E+00	1.67E-04	2.94E-04		0.0150
Am-241	1.1190E-03	1,145,112.141	2,019,717.366	0.00E+00	1.28E+03	2.26E+03		3.897E+17
Am-242m	4.5425E-07	1,145,112.141	2,019,717.366	0.00E+00	5.20E-01	9.17E-01		0.0250
Am-243	1.4921E-06	1,145,112.141	2,019,717.366	0.00E+00	1.71E+00	3.01E+00		0.0375
C-14	5.7244E-09	1,145,112.141	2,019,717.366	0.00E+00	6.56E-03	1.16E-02		0.0575
Cl-36	1.3124E-32	1,145,112.141	2,019,717.366	0.00E+00	1.50E-26	2.65E-26		0.0850
Cm-243	2.3676E-07	1,145,112.141	2,019,717.366	0.00E+00	2.71E-01	4.78E-01		0.1250
Cm-244	5.2042E-05	1,145,112.141	2,019,717.366	0.00E+00	5.96E+01	1.05E+02		0.2250
Co-60	3.8208E-05	1,145,112.141	2,019,717.366	0.00E+00	4.38E+01	7.72E+01		0.3750
Cs-134	4.8693E-01	1,145,112.141	2,019,717.366	0.00E+00	5.58E+05	9.83E+05		0.5750
Cs-135	3.4477E-06	1,145,112.141	2,019,717.366	0.00E+00	3.95E+00	6.96E+00		0.8500
Cs-137	2.8731E+00	1,145,112.141	2,019,717.366	0.00E+00	3.29E+06	5.80E+06		1.2500
Eu-154	8.2053E-02	1,145,112.141	2,019,717.366	0.00E+00	9.40E+04	1.66E+05		1.7500
Eu-155	3.9134E-02	1,145,112.141	2,019,717.366	0.00E+00	4.48E+04	7.90E+04		2.2500
Fe-55	6.7429E-03	1,145,112.141	2,019,717.366	0.00E+00	7.72E+03	1.36E+04		2.7500
H-3	1.0599E-02	1,145,112.141	2,019,717.366	0.00E+00	1.21E+04	2.14E+04		3.5000
I-129	7.5300E-07	1,145,112.141	2,019,717.366	0.00E+00	8.62E-01	1.52E+00		5.0000
Kr-85	2.8595E-01	1,145,112.141	2,019,717.366	0.00E+00	3.27E+05	5.78E+05		7.0000
Np-237	9.5479E-06	1,145,112.141	2,019,717.366	0.00E+00	1.09E+01	1.93E+01		11.0000
Pa-231	8.9297E-10	1,145,112.141	2,019,717.366	0.00E+00	1.02E-03	1.80E-03		
Pb-210	3.7609E-12	1,145,112.141	2,019,717.366	0.00E+00	4.31E-06	7.60E-06		
Pm-147	2.5452E+00	1,145,112.141	2,019,717.366	0.00E+00	2.91E+06	5.14E+06		
Pu-238	2.0550E-02	1,145,112.141	2,019,717.366	0.00E+00	2.35E+04	4.15E+04		
Pu-239	4.2838E-04	1,145,112.141	2,019,717.366	0.00E+00	4.91E+02	8.65E+02		
Pu-240	2.4401E-04	1,145,112.141	2,019,717.366	0.00E+00	2.79E+02	4.93E+02		
Pu-241	6.8764E-02	1,145,112.141	2,019,717.366	0.00E+00	7.87E+04	1.39E+05		
Pu-242	3.6329E-07	1,145,112.141	2,019,717.366	0.00E+00	4.16E-01	7.34E-01		
Ra-226	3.8045E-11	1,145,112.141	2,019,717.366	0.00E+00	4.36E-05	7.68E-05		
Ra-228	2.9902E-15	1,145,112.141	2,019,717.366	0.00E+00	3.42E-09	6.04E-09		
Ru-106	1.9055E-01	1,145,112.141	2,019,717.366	0.00E+00	2.18E+05	3.85E+05		
Se-79	1.2936E-05	1,145,112.141	2,019,717.366	0.00E+00	1.48E+01	2.61E+01		
Sn-126	1.1574E-05	1,145,112.141	2,019,717.366	0.00E+00	1.33E+01	2.34E+01		
Sr-90	2.7505E+00	1,145,112.141	2,019,717.366	0.00E+00	3.15E+06	5.56E+06		
Tc-99	4.2239E-04	1,145,112.141	2,019,717.366	0.00E+00	4.84E+02	8.53E+02		
Th-229	1.8848E-12	1,145,112.141	2,019,717.366	0.00E+00	2.16E-06	3.81E-06		
Th-230	1.7042E-08	1,145,112.141	2,019,717.366	0.00E+00	1.95E-02	3.44E-02		
Th-232	7.8132E-15	1,145,112.141	2,019,717.366	0.00E+00	8.95E-09	1.58E-08		
Tl-208	4.4063E-08	1,145,112.141	2,019,717.366	0.00E+00	5.05E-02	8.90E-02		
U-232	1.3151E-07	1,145,112.141	2,019,717.366	0.00E+00	1.51E-01	2.66E-01		
U-233	1.9564E-09	1,145,112.141	2,019,717.366	0.00E+00	2.24E-03	3.95E-03		
U-234	1.8371E-04	1,145,112.141	2,019,717.366	0.00E+00	2.10E+02	3.71E+02		
U-235	-2.7235E-06	1,145,112.141	0.000	9.17E+00	6.05E+00	9.17E+00		
U-236	1.5493E-05	1,145,112.141	2,019,717.366	0.00E+00	1.77E+01	3.13E+01		
U-238	-4.2851E-09	1,145,112.141	0.000	1.05E-01	9.99E-02	1.05E-01		
Y-90	2.7505E+00	1,145,112.141	2,019,717.366	0.00E+00	3.15E+06	5.56E+06		
Other Radionuclides					5.89E+06	1.04E+07		

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 (6061-T6)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	93.1542461	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	1,145,112.141	1,009,858.683	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.
Bounding:	1,948,830.134	2,019,717.366	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.80	0.88	
Bounding:	1.41	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: ATR
 SNF ID #: 843
 Fuel Units & Descr: 128 - 19 CURVED PLATES
 Heavy Metal Mass: BOL=147.71kg ; EOL=99.39kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1985
 Estimates as of: 2030
 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"
 6.40

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	45,759.977	91,519.955	0.00E+00	9.18E-05	1.84E-04	Avg. MeV	
Am-241	2.5251E-03	45,759.977	91,519.955	0.00E+00	1.16E+02	2.31E+02	0.0150	6.741E+15
Am-242m	3.9624E-07	45,759.977	91,519.955	0.00E+00	1.81E-02	3.63E-02	0.0250	1.400E+15
Am-243	1.4880E-06	45,759.977	91,519.955	0.00E+00	6.81E-02	1.36E-01	0.0375	1.217E+15
C-14	5.7053E-09	45,759.977	91,519.955	0.00E+00	2.61E-04	5.22E-04	0.0575	1.310E+15
Cl-36	1.3124E-32	45,759.977	91,519.955	0.00E+00	6.01E-28	1.20E-27	0.0850	7.890E+14
Cr-243	1.1419E-07	45,759.977	91,519.955	0.00E+00	5.23E-03	1.05E-02	0.1250	5.211E+14
Cr-244	1.6522E-05	45,759.977	91,519.955	0.00E+00	7.56E-01	1.51E+00	0.2250	6.812E+14
Co-60	7.4047E-07	45,759.977	91,519.955	0.00E+00	3.39E-02	6.78E-02	0.3750	2.963E+14
Cs-134	2.0455E-05	45,759.977	91,519.955	0.00E+00	9.36E-01	1.87E+00	0.5750	4.898E+15
Cs-135	3.4477E-06	45,759.977	91,519.955	0.00E+00	1.58E-01	3.16E-01	0.8500	5.982E+13
Cs-137	1.4365E+00	45,759.977	91,519.955	0.00E+00	6.57E+04	1.31E+05	1.2500	2.894E+13
Eu-154	7.3230E-03	45,759.977	91,519.955	0.00E+00	3.35E+02	6.70E+02	1.7500	1.629E+12
Eu-155	5.9259E-04	45,759.977	91,519.955	0.00E+00	2.71E+01	5.42E+01	2.2500	1.362E+08
Fe-55	2.2791E-06	45,759.977	91,519.955	0.00E+00	1.04E-01	2.09E-01	2.7500	1.299E+08
H-3	1.9698E-03	45,759.977	91,519.955	0.00E+00	9.01E+01	1.80E+02	3.5000	7.529E+04
I-129	7.5300E-07	45,759.977	91,519.955	0.00E+00	3.45E-02	6.89E-02	5.0000	3.076E+04
Kr-85	4.1176E-02	45,759.977	91,519.955	0.00E+00	1.88E+03	3.77E+03	7.0000	3.367E+03
Np-237	9.5752E-06	45,759.977	91,519.955	0.00E+00	4.38E-01	8.76E-01	11.0000	3.754E+02
Pa-231	3.9379E-09	45,759.977	91,519.955	0.00E+00	1.80E-04	3.60E-04		
Pb-210	3.3115E-10	45,759.977	91,519.955	0.00E+00	1.52E-05	3.03E-05		
Pm-147	9.2402E-04	45,759.977	91,519.955	0.00E+00	4.23E+01	8.46E+01		
Pu-238	1.6217E-02	45,759.977	91,519.955	0.00E+00	7.42E+02	1.48E+03		
Pu-239	4.2810E-04	45,759.977	91,519.955	0.00E+00	1.96E+01	3.92E+01		
Pu-240	2.4333E-04	45,759.977	91,519.955	0.00E+00	1.11E+01	2.23E+01		
Pu-241	1.6242E-02	45,759.977	91,519.955	0.00E+00	7.43E+02	1.49E+03		
Pu-242	3.6329E-07	45,759.977	91,519.955	0.00E+00	1.66E-02	3.32E-02		
Ra-226	9.0114E-10	45,759.977	91,519.955	0.00E+00	4.12E-05	8.25E-05		
Ra-228	3.1019E-14	45,759.977	91,519.955	0.00E+00	1.42E-09	2.84E-09		
Ru-106	2.1225E-10	45,759.977	91,519.955	0.00E+00	9.71E-06	1.94E-05		
Se-79	1.2930E-05	45,759.977	91,519.955	0.00E+00	5.92E-01	1.18E+00		
Sn-126	1.1571E-05	45,759.977	91,519.955	0.00E+00	5.30E-01	1.06E+00		
Sr-90	1.3472E+00	45,759.977	91,519.955	0.00E+00	6.16E+04	1.23E+05		
Tc-99	4.2239E-04	45,759.977	91,519.955	0.00E+00	1.93E+01	3.87E+01		
Th-229	1.2407E-11	45,759.977	91,519.955	0.00E+00	5.68E-07	1.14E-06		
Th-230	8.3497E-08	45,759.977	91,519.955	0.00E+00	3.82E-03	7.64E-03		
Th-232	3.8371E-14	45,759.977	91,519.955	0.00E+00	1.76E-09	3.51E-09		
Tl-208	4.0414E-08	45,759.977	91,519.955	0.00E+00	1.85E-03	3.70E-03		
U-232	1.0948E-07	45,759.977	91,519.955	0.00E+00	5.01E-03	1.00E-02		
U-233	3.6275E-09	45,759.977	91,519.955	0.00E+00	1.66E-04	3.32E-04		
U-234	1.8562E-04	45,759.977	91,519.955	0.00E+00	8.49E+00	1.70E+01		
U-235	-2.7235E-06	45,759.977	0.000	2.97E-01	1.73E-01	2.97E-01		
U-236	1.5493E-05	45,759.977	91,519.955	0.00E+00	7.09E-01	1.42E+00		
U-238	-4.2851E-09	45,759.977	0.000	3.40E-03	3.20E-03	3.40E-03		
Y-90	1.3475E+00	45,759.977	91,519.955	0.00E+00	6.17E+04	1.23E+05		
Other Radionuclides					6.26E+04	1.25E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.66E+02	1.53E+03
Total	Total

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 (6061-T6)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	93.1542461	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	37,126.230	45,759.977	
Bounding:	63,183.956	91,519.955	

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:	0.98	1.23	
Bounding:	1.97	1.45	

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: ATSR
 SNF ID #: 17
 Fuel Units & Descr: 20 - 19 FLAT PLATES
 Heavy Metal Mass: BOL= : EOL=3.21kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1988
 Estimates as of: 2030
 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: 35 years

Estimated
 Canister usage:
 18"x10"
 0.56

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	2.0068E-09	3,039.932	3,039.932	0.00E+00	6.10E-06	6.10E-06	Avg. MeV	
Am-241	2.5251E-03	3,039.932	3,039.932	0.00E+00	7.68E+00	7.68E+00	0.0150	2.239E+14
Am-242m	3.9624E-07	3,039.932	3,039.932	0.00E+00	1.20E-03	1.20E-03	0.0250	4.649E+13
Am-243	1.4880E-06	3,039.932	3,039.932	0.00E+00	4.52E-03	4.52E-03	0.0375	4.041E+13
C-14	5.7053E-09	3,039.932	3,039.932	0.00E+00	1.73E-05	1.73E-05	0.0575	4.350E+13
Cl-36	1.3124E-32	3,039.932	3,039.932	0.00E+00	3.99E-29	3.99E-29	0.0850	2.621E+13
Cm-243	1.1419E-07	3,039.932	3,039.932	0.00E+00	3.47E-04	3.47E-04	0.1250	1.731E+13
Cm-244	1.6522E-05	3,039.932	3,039.932	0.00E+00	5.02E-02	5.02E-02	0.2250	2.263E+13
Co-60	7.4047E-07	3,039.932	3,039.932	0.00E+00	2.25E-03	2.25E-03	0.3750	9.842E+12
Cs-134	2.0455E-05	3,039.932	3,039.932	0.00E+00	6.22E-02	6.22E-02	0.5750	1.627E+14
Cs-135	3.4477E-06	3,039.932	3,039.932	0.00E+00	1.05E-02	1.05E-02	0.8500	1.987E+12
Cs-137	1.4365E-03	3,039.932	3,039.932	0.00E+00	4.37E-03	4.37E-03	1.2500	9.611E+11
Eu-154	7.3230E-03	3,039.932	3,039.932	0.00E+00	2.23E+01	2.23E+01	1.7500	5.410E+10
Eu-155	5.9259E-04	3,039.932	3,039.932	0.00E+00	1.80E+00	1.80E+00	2.2500	4.524E+06
Fe-55	2.2791E-06	3,039.932	3,039.932	0.00E+00	6.93E-03	6.93E-03	2.7500	4.316E+06
H-3	1.9698E-03	3,039.932	3,039.932	0.00E+00	5.99E+00	5.99E+00	3.5000	2.501E+03
I-129	7.5300E-07	3,039.932	3,039.932	0.00E+00	2.29E-03	2.29E-03	5.0000	1.022E+03
Kr-85	4.1176E-02	3,039.932	3,039.932	0.00E+00	1.25E+02	1.25E+02	7.0000	1.118E+02
Np-237	9.5752E-06	3,039.932	3,039.932	0.00E+00	2.91E-02	2.91E-02	11.0000	1.247E+01
Pa-231	3.9379E-09	3,039.932	3,039.932	0.00E+00	1.20E-05	1.20E-05		
Pb-210	3.3115E-10	3,039.932	3,039.932	0.00E+00	1.01E-06	1.01E-06		
Pm-147	9.2402E-04	3,039.932	3,039.932	0.00E+00	2.81E+00	2.81E+00		
Pu-238	1.6217E-02	3,039.932	3,039.932	0.00E+00	4.93E+01	4.93E+01		
Pu-239	4.2810E-04	3,039.932	3,039.932	0.00E+00	1.30E+00	1.30E+00		
Pu-240	2.4333E-04	3,039.932	3,039.932	0.00E+00	7.40E-01	7.40E-01		
Pu-241	1.6242E-02	3,039.932	3,039.932	0.00E+00	4.94E+01	4.94E+01		
Pu-242	3.6329E-07	3,039.932	3,039.932	0.00E+00	1.10E-03	1.10E-03		
Ra-226	9.0114E-10	3,039.932	3,039.932	0.00E+00	2.74E-06	2.74E-06		
Ra-228	3.1019E-14	3,039.932	3,039.932	0.00E+00	9.43E-11	9.43E-11		
Ru-106	2.1225E-10	3,039.932	3,039.932	0.00E+00	6.45E-07	6.45E-07		
Se-79	1.2930E-05	3,039.932	3,039.932	0.00E+00	3.93E-02	3.93E-02		
Sn-126	1.1571E-05	3,039.932	3,039.932	0.00E+00	3.52E-02	3.52E-02		
Sr-90	1.3472E+00	3,039.932	3,039.932	0.00E+00	4.10E+03	4.10E+03		
Tc-99	4.2239E-04	3,039.932	3,039.932	0.00E+00	1.28E+00	1.28E+00		
Th-229	1.2407E-11	3,039.932	3,039.932	0.00E+00	3.77E-08	3.77E-08		
Th-230	8.3497E-08	3,039.932	3,039.932	0.00E+00	2.54E-04	2.54E-04		
Th-232	3.8371E-14	3,039.932	3,039.932	0.00E+00	1.17E-10	1.17E-10		
Tl-208	4.0414E-08	3,039.932	3,039.932	0.00E+00	1.23E-04	1.23E-04		
U-232	1.0948E-07	3,039.932	3,039.932	0.00E+00	3.33E-04	3.33E-04		
U-233	3.6275E-09	3,039.932	3,039.932	0.00E+00	1.10E-05	1.10E-05		
U-234	1.8562E-04	3,039.932	3,039.932	0.00E+00	5.64E-01	5.64E-01		
U-235	-2.7235E-06	3,039.932	0.000	1.28E-02	4.50E-03	1.28E-02		
U-236	1.5493E-05	3,039.932	3,039.932	0.00E+00	4.71E-02	4.71E-02		
U-238	-4.2851E-09	3,039.932	0.000	1.29E-04	1.16E-04	1.29E-04		
Y-90	1.3475E+00	3,039.932	3,039.932	0.00E+00	4.10E+03	4.10E+03		
Other Radionuclides					4.16E+03	4.16E+03		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							5.09E+01	5.09E+01
							Total	Total

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 (unknown).
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		3,039.932	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		3,039.932	

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.50	
Bounding:	1.50	
		Estimated EOL HM/ Given EOL HM
		1.02

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: BABCOCK & WILCOX SCRAP
 SNF ID #: 18
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL= ; EOL=.07kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1969
 Estimates as of: 2030
 Template: (Worst Case)
²Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 50 years

Estimated
 Canister usage:
 HIC
 1.00

Radionuclide	II. Estimates		b				Gamma Sources	
	m	x _n	x _b	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.5200E-06	66.525	66.525	0.00E+00	1.68E-04	1.68E-04	Avg. MeV	
Am-241	8.6432E+00	66.525	66.525	0.00E+00	5.75E+02	5.75E+02	0.0150	5.639E+13
Am-242m	1.5728E-02	66.525	66.525	0.00E+00	1.05E+00	1.05E+00	0.0250	1.114E+13
Am-243	1.6288E-02	66.525	66.525	0.00E+00	1.08E+00	1.08E+00	0.0375	9.415E+12
C-14	1.2068E-01	66.525	66.525	0.00E+00	8.03E+00	8.03E+00	0.0575	1.778E+13
Cl-36	2.2849E-03	66.525	66.525	0.00E+00	1.52E-01	1.52E-01	0.0850	5.961E+12
Cm-243	6.0144E-04	66.525	66.525	0.00E+00	4.00E-02	4.00E-02	0.1250	4.218E+12
Cm-244	9.4880E-02	66.525	66.525	0.00E+00	6.31E+00	6.31E+00	0.2250	5.159E+12
Co-60	3.9052E+00	66.525	66.525	0.00E+00	2.60E+02	2.60E+02	0.3750	2.239E+12
Cs-134	2.2139E-06	66.525	66.525	0.00E+00	1.47E-04	1.47E-04	0.5750	3.695E+13
Cs-135	4.3976E-04	66.525	66.525	0.00E+00	2.93E-02	2.93E-02	0.8500	8.093E+11
Cs-137	1.4887E+01	66.525	66.525	0.00E+00	9.90E+02	9.90E+02	1.2500	1.984E+13
Eu-154	3.7342E-01	66.525	66.525	0.00E+00	2.48E+01	2.48E+01	1.7500	2.385E+10
Eu-155	8.4893E-03	66.525	66.525	0.00E+00	5.65E-01	5.65E-01	2.2500	1.031E+08
Fe-55	5.3750E-03	66.525	66.525	0.00E+00	3.58E-01	3.58E-01	2.7500	1.775E+08
H-3	1.0472E-01	66.525	66.525	0.00E+00	6.97E+00	6.97E+00	3.5000	9.664E+04
I-129	1.0618E-05	66.525	66.525	0.00E+00	7.06E-04	7.06E-04	5.0000	4.083E+04
Kr-85	2.2717E-01	66.525	66.525	0.00E+00	1.51E+01	1.51E+01	7.0000	4.651E+03
Np-237	1.6400E-04	66.525	66.525	0.00E+00	1.09E-02	1.09E-02	11.0000	5.305E+02
Pa-231	2.8688E-06	66.525	66.525	0.00E+00	1.91E-04	1.91E-04		
Pb-210	4.7312E-08	66.525	66.525	0.00E+00	3.15E-06	3.15E-06		
Pm-147	3.2198E-04	66.525	66.525	0.00E+00	2.14E-02	2.14E-02		
Pu-238	-1.1924E+00	66.525	0.000	1.80E+01	0.00E+00	1.80E+01		
Pu-239	-4.8600E-02	66.525	0.000	2.18E+00	0.00E+00	2.18E+00		
Pu-240	-3.0127E-01	66.525	0.000	2.78E+00	0.00E+00	2.78E+00		
Pu-241	-1.2917E+02	66.525	0.000	7.16E+02	0.00E+00	7.16E+02		
Pu-242	-1.1381E-04	66.525	0.000	1.20E-02	4.46E-03	1.20E-02		
Ra-226	1.0760E-07	66.525	66.525	0.00E+00	7.16E-06	7.16E-06		
Ra-228	6.0160E-07	66.525	66.525	0.00E+00	4.00E-05	4.00E-05		
Ru-106	1.3388E-13	66.525	66.525	0.00E+00	8.91E-12	8.91E-12		
Se-79	1.9179E-04	66.525	66.525	0.00E+00	1.28E-02	1.28E-02		
Sn-126	1.6669E-04	66.525	66.525	0.00E+00	1.11E-02	1.11E-02		
Sr-90	1.3859E+01	66.525	66.525	0.00E+00	9.22E+02	9.22E+02		
Tc-99	6.7678E-03	66.525	66.525	0.00E+00	4.50E-01	4.50E-01		
Th-229	2.2592E-06	66.525	66.525	0.00E+00	1.50E-04	1.50E-04		
Th-230	7.5955E-06	66.525	66.525	0.00E+00	5.05E-04	5.05E-04		
Th-232	6.0208E-07	66.525	66.525	0.00E+00	4.01E-05	4.01E-05		
Tl-208	7.5795E-05	66.525	66.525	0.00E+00	5.04E-03	5.04E-03		
U-232	2.0521E-04	66.525	66.525	0.00E+00	1.37E-02	1.37E-02		
U-233	3.6128E-04	66.525	66.525	0.00E+00	2.40E-02	2.40E-02		
U-234	1.2788E-02	66.525	66.525	0.00E+00	8.51E-01	8.51E-01		
U-235	5.7486E-04	66.525	66.525	6.02E-05	3.83E-02	3.83E-02		
U-236	2.3485E-04	66.525	66.525	0.00E+00	1.56E-02	1.56E-02		
U-238	1.1581E-04	66.525	66.525	7.49E-06	7.71E-03	7.71E-03		
Y-90	1.3861E+01	66.525	66.525	0.00E+00	9.22E+02	9.22E+02		
Other Radionuclides					3.42E+03	3.42E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.57E+01	3.65E+01
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 Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
BOL HM Constituents:	SST	SST/Inconel	
BOL Enrichment %:	PuO2-UO2	U, Th, & Pu	
		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		66.525	Nominal burnup set equal to bounding burnup.
Bounding:		66.525	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		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: BCD B-17 (TURKEY POINT 3)
 SNF ID #: 19
 Fuel Units & Descr: 1 - 15 X 15 ROD ARRAY
 Heavy Metal Mass: BOL=458.98kg ; EOL=411.81kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1975
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 PWR
 1.00

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	1.0733E-09	44,857.390	89,714.780	0.00E+00	4.81E-05	9.63E-05	0.0150	3.414E+15
Am-241	1.4751E-01	44,857.390	89,714.780	0.00E+00	6.62E+03	1.32E+04	0.0250	6.841E+14
Am-242m	2.6809E-04	44,857.390	89,714.780	0.00E+00	1.20E+01	2.41E+01	0.0375	6.447E+14
Am-243	6.2484E-04	44,857.390	89,714.780	0.00E+00	2.80E+01	5.61E+01	0.0575	8.066E+14
C-14	4.7820E-05	44,857.390	89,714.780	0.00E+00	2.15E+00	4.29E+00	0.0850	3.769E+14
Cl-36	8.0297E-07	44,857.390	89,714.780	0.00E+00	3.60E-02	7.20E-02	0.1250	2.507E+14
Cm-243	1.7426E-04	44,857.390	89,714.780	0.00E+00	7.82E+00	1.56E+01	0.2250	3.218E+14
Cm-244	2.7616E-02	44,857.390	89,714.780	0.00E+00	1.24E+03	2.48E+03	0.3750	1.390E+14
Co-60	3.5610E-04	44,857.390	89,714.780	0.00E+00	1.60E+01	3.19E+01	0.5750	3.273E+15
Cs-134	2.6260E-07	44,857.390	89,714.780	0.00E+00	1.18E-02	2.36E-02	0.8500	3.195E+13
Cs-135	1.4433E-05	44,857.390	89,714.780	0.00E+00	6.47E-01	1.29E+00	1.2500	2.034E+13
Cs-137	9.8870E-01	44,857.390	89,714.780	0.00E+00	4.44E+04	8.87E+04	1.7500	8.942E+11
Eu-154	6.0320E-03	44,857.390	89,714.780	0.00E+00	2.71E+02	5.41E+02	2.2500	1.470E+08
Eu-155	2.1770E-04	44,857.390	89,714.780	0.00E+00	9.77E+00	1.95E+01	2.7500	5.179E+08
Fe-55	7.9296E-07	44,857.390	89,714.780	0.00E+00	3.56E-02	7.11E-02	3.5000	3.696E+07
H-3	8.9486E-03	44,857.390	89,714.780	0.00E+00	4.01E+02	8.03E+02	5.0000	1.579E+07
I-129	9.8288E-07	44,857.390	89,714.780	0.00E+00	4.41E-02	8.82E-02	7.0000	1.819E+06
Kr-85	1.0707E-02	44,857.390	89,714.780	0.00E+00	4.80E+02	9.61E+02	11.0000	2.089E+05
Np-237	1.1927E-05	44,857.390	89,714.780	0.00E+00	5.35E-01	1.07E+00		
Pa-231	1.4703E-09	44,857.390	89,714.780	0.00E+00	6.60E-05	1.32E-04		
Pb-210	1.6828E-10	44,857.390	89,714.780	0.00E+00	7.55E-06	1.51E-05		
Pm-147	6.9606E-06	44,857.390	89,714.780	0.00E+00	3.12E-01	6.24E-01		
Pu-238	6.6263E-02	44,857.390	89,714.780	0.00E+00	2.97E+03	5.94E+03		
Pu-239	1.1618E-02	44,857.390	89,714.780	0.00E+00	5.21E+02	1.04E+03		
Pu-240	1.5142E-02	44,857.390	89,714.780	0.00E+00	6.79E+02	1.36E+03		
Pu-241	4.3766E-01	44,857.390	89,714.780	0.00E+00	1.96E+04	3.93E+04		
Pu-242	6.4260E-05	44,857.390	89,714.780	0.00E+00	2.88E+00	5.77E+00		
Ra-226	3.8501E-10	44,857.390	89,714.780	0.00E+00	1.73E-05	3.45E-05		
Ra-228	5.2955E-12	44,857.390	89,714.780	0.00E+00	2.38E-07	4.75E-07		
Ru-106	2.0413E-14	44,857.390	89,714.780	0.00E+00	9.16E-10	1.83E-09		
Se-79	1.2376E-05	44,857.390	89,714.780	0.00E+00	5.55E-01	1.11E+00		
Sn-126	2.5210E-05	44,857.390	89,714.780	0.00E+00	1.13E+00	2.26E+00		
Sr-90	6.4163E-01	44,857.390	89,714.780	0.00E+00	2.88E+04	5.76E+04		
Tc-99	3.9357E-04	44,857.390	89,714.780	0.00E+00	1.77E+01	3.53E+01		
Th-229	1.5644E-10	44,857.390	89,714.780	0.00E+00	7.02E-06	1.40E-05		
Th-230	2.7972E-08	44,857.390	89,714.780	0.00E+00	1.25E-03	2.51E-03		
Th-232	5.3036E-12	44,857.390	89,714.780	0.00E+00	2.38E-07	4.76E-07		
Tl-208	1.5136E-07	44,857.390	89,714.780	0.00E+00	6.79E-03	1.36E-02		
U-232	4.1005E-07	44,857.390	89,714.780	0.00E+00	1.84E-02	3.68E-02		
U-233	2.5856E-08	44,857.390	89,714.780	0.00E+00	1.16E-03	2.32E-03		
U-234	5.2665E-05	44,857.390	89,714.780	0.00E+00	2.36E+00	4.72E+00		
U-235	-1.4487E-06	44,857.390	0.000	2.54E-02	0.00E+00	2.54E-02		
U-236	7.5888E-06	44,857.390	89,714.780	0.00E+00	3.40E-01	6.81E-01		
U-238	-2.6129E-07	44,857.390	0.000	1.50E-01	1.39E-01	1.50E-01		
Y-90	6.4180E-01	44,857.390	89,714.780	0.00E+00	2.88E+04	5.76E+04		
Other Radionuclides					4.27E+04	8.55E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.11E+02	1.62E+03
Total	Total

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-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	2.56002614	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	11,779.722	44,857.390	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		89,714.780	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	2.79	3.81	1.05
Bounding:	5.58		

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) (GERMANY)
 SNF ID #: 758
 Fuel Units & Descr: 112 - 17 FLAT PLATES
 Heavy Metal Mass: BOL=20.65kg ; EOL=12.07kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1996
 Estimates as of: 2030
 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"
 4.67

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	1.1465E-09	8,124.669	16,249.338	0.00E+00	9.32E-06	1.86E-05	Avg. MeV	
Am-241	2.3056E-03	8,124.669	16,249.338	0.00E+00	1.87E+01	3.75E+01	0.0150	1.520E+15
Am-242m	4.1476E-07	8,124.669	16,249.338	0.00E+00	3.37E-03	6.74E-03	0.0250	3.159E+14
Am-243	1.4894E-06	8,124.669	16,249.338	0.00E+00	1.21E-02	2.42E-02	0.0375	2.751E+14
C-14	5.7108E-09	8,124.669	16,249.338	0.00E+00	4.64E-05	9.28E-05	0.0575	2.954E+14
Cl-36	1.3124E-32	8,124.669	16,249.338	0.00E+00	1.07E-28	2.13E-28	0.0850	1.782E+14
Cm-243	1.4562E-07	8,124.669	16,249.338	0.00E+00	1.18E-03	2.37E-03	0.1250	1.194E+14
Cm-244	2.4221E-05	8,124.669	16,249.338	0.00E+00	1.97E-01	3.94E-01	0.2250	1.539E+14
Co-60	2.7560E-06	8,124.669	16,249.338	0.00E+00	2.24E-02	4.48E-02	0.3750	6.690E+13
Cs-134	5.8851E-04	8,124.669	16,249.338	0.00E+00	4.78E+00	9.56E+00	0.5750	1.097E+15
Cs-135	3.4477E-06	8,124.669	16,249.338	0.00E+00	2.80E-02	5.60E-02	0.8500	1.580E+13
Cs-137	1.8099E+00	8,124.669	16,249.338	0.00E+00	1.47E+04	2.94E+04	1.2500	8.790E+12
Eu-154	1.6386E-02	8,124.669	16,249.338	0.00E+00	1.33E+02	2.66E+02	1.7500	4.343E+11
Eu-155	2.3957E-03	8,124.669	16,249.338	0.00E+00	1.95E+01	3.89E+01	2.2500	3.096E+07
Fe-55	3.2707E-05	8,124.669	16,249.338	0.00E+00	2.66E-01	5.31E-01	2.7500	2.534E+07
H-3	3.4504E-03	8,124.669	16,249.338	0.00E+00	2.80E+01	5.61E+01	3.5000	1.912E+04
I-129	7.5300E-07	8,124.669	16,249.338	0.00E+00	6.12E-03	1.22E-02	5.0000	6.431E+03
Kr-85	7.8540E-02	8,124.669	16,249.338	0.00E+00	6.38E+02	1.28E+03	7.0000	7.077E+02
Np-237	9.5615E-06	8,124.669	16,249.338	0.00E+00	7.77E-02	1.55E-01	11.0000	7.916E+01
Pa-231	2.7968E-09	8,124.669	16,249.338	0.00E+00	2.27E-05	4.54E-05		
Pb-210	1.2612E-10	8,124.669	16,249.338	0.00E+00	1.02E-06	2.05E-06		
Pm-147	1.2952E-02	8,124.669	16,249.338	0.00E+00	1.05E+02	2.10E+02		
Pu-238	1.7549E-02	8,124.669	16,249.338	0.00E+00	1.43E+02	2.85E+02		
Pu-239	4.2810E-04	8,124.669	16,249.338	0.00E+00	3.48E+00	6.96E+00		
Pu-240	2.4357E-04	8,124.669	16,249.338	0.00E+00	1.98E+00	3.96E+00		
Pu-241	2.6277E-02	8,124.669	16,249.338	0.00E+00	2.13E+02	4.27E+02		
Pu-242	3.6329E-07	8,124.669	16,249.338	0.00E+00	2.95E-03	5.90E-03		
Ra-226	4.4444E-10	8,124.669	16,249.338	0.00E+00	3.61E-06	7.22E-06		
Ra-228	1.9714E-14	8,124.669	16,249.338	0.00E+00	1.60E-10	3.20E-10		
Ru-106	2.0477E-07	8,124.669	16,249.338	0.00E+00	1.66E-03	3.33E-03		
Se-79	1.2933E-05	8,124.669	16,249.338	0.00E+00	1.05E-01	2.10E-01		
Sn-126	1.1574E-05	8,124.669	16,249.338	0.00E+00	9.40E-02	1.88E-01		
Sr-90	1.7092E+00	8,124.669	16,249.338	0.00E+00	1.39E+04	2.78E+04		
Tc-99	4.2239E-04	8,124.669	16,249.338	0.00E+00	3.43E+00	6.86E+00		
Th-229	7.7260E-12	8,124.669	16,249.338	0.00E+00	6.28E-08	1.26E-07		
Th-230	5.8497E-08	8,124.669	16,249.338	0.00E+00	4.75E-04	9.51E-04		
Th-232	2.6906E-14	8,124.669	16,249.338	0.00E+00	2.19E-10	4.37E-10		
Tl-208	4.4336E-08	8,124.669	16,249.338	0.00E+00	3.60E-04	7.20E-04		
U-232	1.2037E-07	8,124.669	16,249.338	0.00E+00	9.78E-04	1.96E-03		
U-233	3.0011E-09	8,124.669	16,249.338	0.00E+00	2.44E-05	4.88E-05		
U-234	1.8497E-04	8,124.669	16,249.338	0.00E+00	1.50E+00	3.01E+00		
U-235	-2.7235E-06	8,124.669	0.000	4.15E-02	1.94E-02	4.15E-02		
U-236	1.5493E-05	8,124.669	16,249.338	0.00E+00	1.26E-01	2.52E-01		
U-238	-4.2851E-09	8,124.669	0.000	4.84E-04	4.49E-04	4.84E-04		
Y-90	1.7094E+00	8,124.669	16,249.338	0.00E+00	1.39E+04	2.78E+04		
Other Radionuclides					1.40E+04	2.80E+04		

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.72E+02	3.44E+02
Total	Total

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-ALX	U	
BOL Enrichment %:	93.03245367	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		8,124.669	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		16,249.338	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	1.25		1.04
Bounding:	2.50		

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: BER-II TRIGA (GERMANY) ¹Fuel decay start date: 1982
 SNF ID #: 236 Estimates as of: 2030
 Fuel Units & Descr: 21 - 4 X 4 ROD ARRAY Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass: BOL=9.20kg ; EOL=9.19kg ²Template Burnup(MWd): 6.65
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x10"
 2.63

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	6.7038E-09	22.401	9.407	0.00E+00	1.50E-07	6.31E-08	0.0150	6.568E+11
Am-241	3.9068E-03	22.401	9.407	0.00E+00	8.75E-02	3.68E-02	0.0250	1.364E+11
Am-242m	1.2325E-06	22.401	9.407	0.00E+00	2.76E-05	1.16E-05	0.0375	1.185E+11
Am-243	1.4732E-07	22.401	9.407	0.00E+00	3.30E-06	1.39E-06	0.0575	1.277E+11
C-14	1.2824E-04	22.401	9.407	0.00E+00	2.87E-03	1.21E-03	0.0850	7.687E+10
Cl-36	2.8120E-06	22.401	9.407	0.00E+00	6.30E-05	2.65E-05	0.1250	5.006E+10
Cm-243	8.6556E-08	22.401	9.407	0.00E+00	1.94E-06	8.14E-07	0.2250	6.637E+10
Cm-244	5.3835E-07	22.401	9.407	0.00E+00	1.21E-05	5.06E-06	0.3750	2.887E+10
Co-60	2.4887E-02	22.401	9.407	0.00E+00	5.58E-01	2.34E-01	0.5750	4.828E+11
Cs-134	3.8030E-06	22.401	9.407	0.00E+00	8.52E-05	3.58E-05	0.8500	4.941E+09
Cs-135	3.2195E-05	22.401	9.407	0.00E+00	7.21E-04	3.03E-04	1.2500	1.917E+10
Cs-137	1.3788E+00	22.401	9.407	0.00E+00	3.09E+01	1.30E+01	1.7500	1.283E+08
Eu-154	1.3711E-03	22.401	9.407	0.00E+00	3.07E-02	1.29E-02	2.2500	1.051E+05
Eu-155	4.4361E-04	22.401	9.407	0.00E+00	9.94E-03	4.17E-03	2.7500	4.841E+03
Fe-55	2.6075E-04	22.401	9.407	0.00E+00	5.84E-03	2.45E-03	3.5000	2.105E+01
H-3	2.0647E-03	22.401	9.407	0.00E+00	4.63E-02	1.94E-02	5.0000	8.938E+00
I-129	7.3684E-07	22.401	9.407	0.00E+00	1.65E-05	6.93E-06	7.0000	1.017E+00
Kr-85	3.6346E-02	22.401	9.407	0.00E+00	8.14E-01	3.42E-01	11.0000	1.162E-01
Np-237	1.2844E-06	22.401	9.407	0.00E+00	2.88E-05	1.21E-05		
Pa-231	1.2352E-08	22.401	9.407	0.00E+00	2.77E-07	1.16E-07		
Pb-210	3.5338E-13	22.401	9.407	0.00E+00	7.92E-12	3.32E-12		
Pm-147	7.6346E-04	22.401	9.407	0.00E+00	1.71E-02	7.18E-03		
Pu-238	8.1970E-04	22.401	9.407	0.00E+00	1.84E-02	7.71E-03		
Pu-239	5.5248E-03	22.401	9.407	0.00E+00	1.24E-01	5.20E-02		
Pu-240	2.1203E-03	22.401	9.407	0.00E+00	4.75E-02	1.99E-02		
Pu-241	2.4075E-02	22.401	9.407	0.00E+00	5.39E-01	2.26E-01		
Pu-242	2.3128E-07	22.401	9.407	0.00E+00	5.18E-06	2.18E-06		
Ra-226	9.6481E-13	22.401	9.407	0.00E+00	2.16E-11	9.08E-12		
Ra-228	2.5188E-10	22.401	9.407	0.00E+00	5.64E-09	2.37E-09		
Ru-106	1.0214E-10	22.401	9.407	0.00E+00	2.29E-09	9.61E-10		
Se-79	1.3014E-05	22.401	9.407	0.00E+00	2.92E-04	1.22E-04		
Sn-126	1.2164E-05	22.401	9.407	0.00E+00	2.72E-04	1.14E-04		
Sr-90	1.2762E+00	22.401	9.407	0.00E+00	2.86E+01	1.20E+01		
Tc-99	4.4241E-04	22.401	9.407	0.00E+00	9.91E-03	4.16E-03		
Th-229	5.9684E-10	22.401	9.407	0.00E+00	1.34E-08	5.61E-09		
Th-230	9.3880E-11	22.401	9.407	0.00E+00	2.10E-09	8.83E-10		
Th-232	2.5278E-10	22.401	9.407	0.00E+00	5.66E-09	2.38E-09		
Ti-208	1.3723E-08	22.401	9.407	0.00E+00	3.07E-07	1.29E-07		
U-232	3.6932E-08	22.401	9.407	0.00E+00	8.27E-07	3.47E-07		
U-233	1.2224E-07	22.401	9.407	0.00E+00	2.74E-06	1.15E-06		
U-234	2.5714E-07	22.401	9.407	0.00E+00	5.76E-06	2.42E-06		
U-235	-2.6194E-06	22.401	0.000	8.75E-03	8.69E-03	8.75E-03		
U-236	1.2695E-05	22.401	9.407	0.00E+00	2.84E-04	1.19E-04		
U-238	-3.6331E-08	22.401	0.000	1.73E-03	1.73E-03	1.73E-03		
Y-90	1.2765E+00	22.401	9.407	0.00E+00	2.86E+01	1.20E+01		
Other Radionuclides					3.08E+01	1.29E+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	This Template was used for the following reasons: This fuel matches on all parameters except enrichment.
Fuel Cladding:	SST (347)	SST	
BOL HM Constituents:	U-ZrHX-Er	U	
BOL Enrichment %:	44.02590702	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	22.401	4.009	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup taken directly from SFD (converted to MWd).
Bounding:	9.407	8.019	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.07	0.18	1.00
Bounding:	0.03	0.85	

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: BMI (CPI-24)
 SNF ID #: 774
 Fuel Units & Descr: 2 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL= : EOL=56kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1961
 Estimates as of: 2030
 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: 65 years

Estimated
 Canister usage:
 18"x10"
 0.15

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	4.5940E-08	528.247	528.247	0.00E+00	2.43E-05	2.43E-05		0.0150
Am-241	1.1471E-04	528.247	528.247	0.00E+00	6.06E-02	6.06E-02		1.928E+13
Am-242m	7.4210E-09	528.247	528.247	0.00E+00	3.92E-06	3.92E-06		0.0250
Am-243	9.8236E-10	528.247	528.247	0.00E+00	5.19E-07	5.19E-07		0.0375
C-14	2.2928E-04	528.247	528.247	0.00E+00	1.21E-01	1.21E-01		0.0575
Cl-36	1.2260E-06	528.247	528.247	0.00E+00	6.48E-04	6.48E-04		0.0850
Cm-243	1.2000E-10	528.247	528.247	0.00E+00	6.34E-08	6.34E-08		0.1250
Cm-244	7.3577E-10	528.247	528.247	0.00E+00	3.89E-07	3.89E-07		0.2250
Co-60	1.3732E-03	528.247	528.247	0.00E+00	7.25E-01	7.25E-01		0.3750
Cs-134	1.2709E-10	528.247	528.247	0.00E+00	6.71E-08	6.71E-08		0.5750
Cs-135	3.0316E-05	528.247	528.247	0.00E+00	1.60E-02	1.60E-02		0.8500
Cs-137	7.2579E-01	528.247	528.247	0.00E+00	3.83E+02	3.83E+02		1.2500
Eu-154	5.9750E-05	528.247	528.247	0.00E+00	3.16E-02	3.16E-02		1.7500
Eu-155	1.0577E-05	528.247	528.247	0.00E+00	5.59E-03	5.59E-03		2.2500
Fe-55	4.1631E-07	528.247	528.247	0.00E+00	2.20E-04	2.20E-04		2.7500
H-3	4.6722E-04	528.247	528.247	0.00E+00	2.47E-01	2.47E-01		3.5000
I-129	7.3195E-07	528.247	528.247	0.00E+00	3.87E-04	3.87E-04		5.0000
Kr-85	5.9418E-03	528.247	528.247	0.00E+00	3.14E+00	3.14E+00		7.0000
Np-237	1.1499E-06	528.247	528.247	0.00E+00	6.07E-04	6.07E-04		11.0000
Pa-231	7.0899E-08	528.247	528.247	0.00E+00	3.75E-05	3.75E-05		
Pb-210	2.2363E-12	528.247	528.247	0.00E+00	1.18E-09	1.18E-09		
Pm-147	4.2296E-07	528.247	528.247	0.00E+00	2.23E-04	2.23E-04		
Pu-238	2.3295E-04	528.247	528.247	0.00E+00	1.23E-01	1.23E-01		
Pu-239	6.6722E-04	528.247	528.247	0.00E+00	3.52E-01	3.52E-01		
Pu-240	8.6556E-05	528.247	528.247	0.00E+00	4.57E-02	4.57E-02		
Pu-241	1.6889E-04	528.247	528.247	0.00E+00	8.92E-02	8.92E-02		
Pu-242	1.9717E-09	528.247	528.247	0.00E+00	1.04E-06	1.04E-06		
Ra-226	4.5740E-12	528.247	528.247	0.00E+00	2.42E-09	2.42E-09		
Ra-228	8.3511E-12	528.247	528.247	0.00E+00	4.41E-09	4.41E-09		
Ru-106	2.0516E-19	528.247	528.247	0.00E+00	1.08E-16	1.08E-16		
Se-79	1.3220E-05	528.247	528.247	0.00E+00	6.98E-03	6.98E-03		
Sn-126	1.1489E-05	528.247	528.247	0.00E+00	6.07E-03	6.07E-03		
Sr-90	6.6872E-01	528.247	528.247	0.00E+00	3.53E+02	3.53E+02		
Tc-99	4.6639E-04	528.247	528.247	0.00E+00	2.46E-01	2.46E-01		
Th-229	2.3727E-11	528.247	528.247	0.00E+00	1.25E-08	1.25E-08		
Th-230	2.7354E-10	528.247	528.247	0.00E+00	1.44E-07	1.44E-07		
Th-232	8.3594E-12	528.247	528.247	0.00E+00	4.42E-09	4.42E-09		
Ti-208	1.6228E-08	528.247	528.247	0.00E+00	8.57E-06	8.57E-06		
U-232	4.3960E-08	528.247	528.247	0.00E+00	2.32E-05	2.32E-05		
U-233	3.3344E-09	528.247	528.247	0.00E+00	1.76E-06	1.76E-06		
U-234	4.0749E-07	528.247	528.247	0.00E+00	2.15E-04	2.15E-04		
U-235	-2.7761E-06	528.247	0.00	2.26E-03	7.92E-04	2.26E-03		
U-236	1.6190E-05	528.247	528.247	0.00E+00	8.55E-03	8.55E-03		
U-238	-2.8547E-09	528.247	0.00	2.44E-05	2.29E-05	2.44E-05		
Y-90	6.6889E-01	528.247	528.247	0.00E+00	3.53E+02	3.53E+02		
Other Radionuclides					4.80E+02	4.80E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.30E+00	4.30E+00
Total	Total

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 (unknown).
Fuel Cladding:	SST	SST	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		528.247	Nominal burnup set equal to bounding burnup.
Bounding:		528.247	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:	10.12		1.02
Bounding:	10.12		

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: BMI (CPI-38)
 SNF ID #: 20
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL= ; EOL=1.29kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1961
 Estimates as of: 2030
 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: 65 years

Estimated
 Canister usage:
 18"x10"
 0.08

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	4.5940E-08	1,215.100	1,215.100	0.00E+00	5.58E-05	5.58E-05		
Am-241	1.1471E-04	1,215.100	1,215.100	0.00E+00	1.39E-01	1.39E-01	0.0150	4.435E+13
Am-242m	7.4210E-09	1,215.100	1,215.100	0.00E+00	9.02E-06	9.02E-06	0.0250	9.215E+12
Am-243	9.8236E-10	1,215.100	1,215.100	0.00E+00	1.19E-06	1.19E-06	0.0375	8.008E+12
C-14	2.2928E-04	1,215.100	1,215.100	0.00E+00	2.79E-01	2.79E-01	0.0575	8.593E+12
Ci-36	1.2260E-06	1,215.100	1,215.100	0.00E+00	1.49E-03	1.49E-03	0.0850	5.190E+12
Cm-243	1.2000E-10	1,215.100	1,215.100	0.00E+00	1.46E-07	1.46E-07	0.1250	3.365E+12
Cm-244	7.3577E-10	1,215.100	1,215.100	0.00E+00	8.94E-07	8.94E-07	0.2250	4.473E+12
Co-60	1.3732E-03	1,215.100	1,215.100	0.00E+00	1.67E+00	1.67E+00	0.3750	1.951E+12
Cs-134	1.2709E-10	1,215.100	1,215.100	0.00E+00	1.54E-07	1.54E-07	0.5750	3.282E+13
Cs-135	3.0316E-05	1,215.100	1,215.100	0.00E+00	3.68E-02	3.68E-02	0.8500	3.188E+11
Cs-137	7.2579E-01	1,215.100	1,215.100	0.00E+00	8.82E+02	8.82E+02	1.2500	2.307E+11
Eu-154	5.9750E-05	1,215.100	1,215.100	0.00E+00	7.26E-02	7.26E-02	1.7500	8.202E+09
Eu-155	1.0577E-05	1,215.100	1,215.100	0.00E+00	1.29E-02	1.29E-02	2.2500	1.551E+09
Fe-55	4.1631E-07	1,215.100	1,215.100	0.00E+00	5.06E-04	5.06E-04	2.7500	6.944E+05
H-3	4.6722E-04	1,215.100	1,215.100	0.00E+00	5.68E-01	5.68E-01	3.5000	7.018E+01
I-129	7.3195E-07	1,215.100	1,215.100	0.00E+00	8.89E-04	8.89E-04	5.0000	2.898E+01
Kr-85	5.9418E-03	1,215.100	1,215.100	0.00E+00	7.22E+00	7.22E+00	7.0000	3.203E+00
Np-237	1.1499E-06	1,215.100	1,215.100	0.00E+00	1.40E-03	1.40E-03	11.0000	3.596E-01
Pa-231	7.0899E-08	1,215.100	1,215.100	0.00E+00	8.61E-05	8.61E-05		
Pb-210	2.2363E-12	1,215.100	1,215.100	0.00E+00	2.72E-09	2.72E-09		
Pm-147	4.2296E-07	1,215.100	1,215.100	0.00E+00	5.14E-04	5.14E-04		
Pu-238	2.3295E-04	1,215.100	1,215.100	0.00E+00	2.83E-01	2.83E-01		
Pu-239	6.6722E-04	1,215.100	1,215.100	0.00E+00	8.11E-01	8.11E-01		
Pu-240	8.6556E-05	1,215.100	1,215.100	0.00E+00	1.05E-01	1.05E-01		
Pu-241	1.6889E-04	1,215.100	1,215.100	0.00E+00	2.05E-01	2.05E-01		
Pu-242	1.9717E-09	1,215.100	1,215.100	0.00E+00	2.40E-06	2.40E-06		
Ra-226	4.5740E-12	1,215.100	1,215.100	0.00E+00	5.56E-09	5.56E-09		
Ra-228	8.3511E-12	1,215.100	1,215.100	0.00E+00	1.01E-08	1.01E-08		
Ru-106	2.0516E-19	1,215.100	1,215.100	0.00E+00	2.49E-16	2.49E-16		
Se-79	1.3220E-05	1,215.100	1,215.100	0.00E+00	1.61E-02	1.61E-02		
Sn-126	1.1489E-05	1,215.100	1,215.100	0.00E+00	1.40E-02	1.40E-02		
Sr-90	6.6872E-01	1,215.100	1,215.100	0.00E+00	8.13E+02	8.13E+02		
Tc-99	4.6639E-04	1,215.100	1,215.100	0.00E+00	5.67E-01	5.67E-01		
Th-229	2.3727E-11	1,215.100	1,215.100	0.00E+00	2.88E-08	2.88E-08		
Th-230	2.7354E-10	1,215.100	1,215.100	0.00E+00	3.32E-07	3.32E-07		
Th-232	8.3594E-12	1,215.100	1,215.100	0.00E+00	1.02E-08	1.02E-08		
Th-208	1.6228E-08	1,215.100	1,215.100	0.00E+00	1.97E-05	1.97E-05		
U-232	4.3960E-08	1,215.100	1,215.100	0.00E+00	5.34E-05	5.34E-05		
U-233	3.3344E-09	1,215.100	1,215.100	0.00E+00	4.05E-06	4.05E-06		
U-234	4.0749E-07	1,215.100	1,215.100	0.00E+00	4.95E-04	4.95E-04		
U-235	-2.7761E-06	1,215.100	0.000	5.20E-03	1.82E-03	5.20E-03		
U-236	1.6190E-05	1,215.100	1,215.100	0.00E+00	1.97E-02	1.97E-02		
U-238	-2.8547E-09	1,215.100	0.000	5.62E-05	5.27E-05	5.62E-05		
Y-90	6.6889E-01	1,215.100	1,215.100	0.00E+00	8.13E+02	8.13E+02		
Other Radionuclides					1.10E+03	1.10E+03		

Thermal Power	
Nominal Output (Watts)	Bounding Heat Output (Watts)
9.89E+00	9.89E+00
Total	Total

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 (SST is conservative) and enrichment (unknown).
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	HASTELLOY	SST	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		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:		1,215.100	
Bounding:		1,215.100	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	10.12		1.02
Bounding:	10.12		

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: BNL MEDICAL RX (BMRR)
 SNF ID #: 21
 Fuel Units & Descr: 40 - CYLINDRICAL SECTIONS
 Heavy Metal Mass: BOL=6.19kg ; EOL=5.12kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1989
 Estimates as of: 2030
 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"
 1.11

II. Estimates	m	x _n	x _b	b			y _n	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)
Ac-227	2.0068E-09	1,007.629	2,015.257	0.00E+00	2.02E-06	4.04E-06			Avg. MeV	
Am-241	2.5251E-03	1,007.629	2,015.257	0.00E+00	2.54E+00	5.09E+00	0.0150	1.484E+14		
Am-242m	3.9624E-07	1,007.629	2,015.257	0.00E+00	3.99E-04	7.99E-04	0.0250	3.082E+13		
Am-243	1.4880E-06	1,007.629	2,015.257	0.00E+00	1.50E-03	3.00E-03	0.0375	2.679E+13		
C-14	5.7053E-09	1,007.629	2,015.257	0.00E+00	5.75E-06	1.15E-05	0.0575	2.884E+13		
Cl-36	1.3124E-32	1,007.629	2,015.257	0.00E+00	1.32E-29	2.64E-29	0.0850	1.737E+13		
Cm-243	1.1419E-07	1,007.629	2,015.257	0.00E+00	1.15E-04	2.30E-04	0.1250	1.148E+13		
Cm-244	1.6522E-05	1,007.629	2,015.257	0.00E+00	1.66E-02	3.33E-02	0.2250	1.500E+13		
Co-60	7.4047E-07	1,007.629	2,015.257	0.00E+00	7.46E-04	1.49E-03	0.3750	6.525E+12		
Cs-134	2.0455E-05	1,007.629	2,015.257	0.00E+00	2.06E-02	4.12E-02	0.5750	1.078E+14		
Cs-135	3.4477E-06	1,007.629	2,015.257	0.00E+00	3.47E-03	6.95E-03	0.8500	1.317E+12		
Cs-137	1.4365E+00	1,007.629	2,015.257	0.00E+00	1.45E+03	2.90E+03	1.2500	6.372E+11		
Eu-154	7.3230E-03	1,007.629	2,015.257	0.00E+00	7.38E+00	1.48E+01	1.7500	3.587E+10		
Eu-155	5.9259E-04	1,007.629	2,015.257	0.00E+00	5.97E-01	1.19E+00	2.2500	2.999E+06		
Fe-55	2.2791E-06	1,007.629	2,015.257	0.00E+00	2.30E-03	4.59E-03	2.7500	2.861E+06		
H-3	1.9698E-03	1,007.629	2,015.257	0.00E+00	1.98E+00	3.97E+00	3.5000	1.659E+03		
I-129	7.5300E-07	1,007.629	2,015.257	0.00E+00	7.59E-04	1.52E-03	5.0000	6.776E+02		
Kr-85	4.1176E-02	1,007.629	2,015.257	0.00E+00	4.15E+01	8.30E+01	7.0000	7.417E+01		
Np-237	9.5752E-06	1,007.629	2,015.257	0.00E+00	9.65E-03	1.93E-02	11.0000	8.269E+00		
Pa-231	3.9379E-09	1,007.629	2,015.257	0.00E+00	3.97E-06	7.94E-06				
Pb-210	3.3115E-10	1,007.629	2,015.257	0.00E+00	3.34E-07	6.67E-07				
Pm-147	9.2402E-04	1,007.629	2,015.257	0.00E+00	9.31E-01	1.86E+00				
Pu-238	1.6217E-02	1,007.629	2,015.257	0.00E+00	1.63E+01	3.27E+01				
Pu-239	4.2810E-04	1,007.629	2,015.257	0.00E+00	4.31E-01	8.63E-01				
Pu-240	2.4333E-04	1,007.629	2,015.257	0.00E+00	2.45E-01	4.90E-01				
Pu-241	1.6242E-02	1,007.629	2,015.257	0.00E+00	1.64E+01	3.27E+01				
Pu-242	3.6329E-07	1,007.629	2,015.257	0.00E+00	3.66E-04	7.32E-04				
Ra-226	9.0114E-10	1,007.629	2,015.257	0.00E+00	9.08E-07	1.82E-06				
Ra-228	3.1019E-14	1,007.629	2,015.257	0.00E+00	3.13E-11	6.25E-11				
Ru-106	2.1225E-10	1,007.629	2,015.257	0.00E+00	2.14E-07	4.28E-07				
Se-79	1.2930E-05	1,007.629	2,015.257	0.00E+00	1.30E-02	2.61E-02				
Sn-126	1.1571E-05	1,007.629	2,015.257	0.00E+00	1.17E-02	2.33E-02				
Sr-90	1.3472E+00	1,007.629	2,015.257	0.00E+00	1.36E+03	2.71E+03				
Tc-99	4.2239E-04	1,007.629	2,015.257	0.00E+00	4.26E-01	8.51E-01				
Th-229	1.2407E-11	1,007.629	2,015.257	0.00E+00	1.25E-08	2.50E-08				
Th-230	8.3497E-08	1,007.629	2,015.257	0.00E+00	8.41E-05	1.68E-04				
Th-232	3.8371E-14	1,007.629	2,015.257	0.00E+00	3.87E-11	7.73E-11				
Th-208	4.0414E-08	1,007.629	2,015.257	0.00E+00	4.07E-05	8.14E-05				
U-232	1.0948E-07	1,007.629	2,015.257	0.00E+00	1.10E-04	2.21E-04				
U-233	3.6275E-09	1,007.629	2,015.257	0.00E+00	3.66E-06	7.31E-06				
U-234	1.8562E-04	1,007.629	2,015.257	0.00E+00	1.87E-01	3.74E-01				
U-235	-2.7235E-06	1,007.629	0.000	1.24E-02	9.65E-03	1.24E-02				
U-236	1.5493E-05	1,007.629	2,015.257	0.00E+00	1.56E-02	3.12E-02				
U-238	-4.2851E-09	1,007.629	0.000	1.53E-04	1.49E-04	1.53E-04				
Y-90	1.3475E+00	1,007.629	2,015.257	0.00E+00	1.36E+03	2.72E+03				
Other Radionuclides					1.38E+03	2.76E+03				

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.69E+01	3.37E+01
Total	Total

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 (1100)	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	92.65152255	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		1,007.629	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		2,015.257	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.52		1.01
Bounding:	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: BORAX V (SUPERHEATER) ¹Fuel decay start date: 1964
 SNF ID #: 22 Estimates as of: 2030
 Fuel Units & Descr: 36 - 20 FLAT PLATES Template: Pathfinder (Light Water, SST, 60 to 100%, U)
 Heavy Metal Mass: BOL=22.02kg ; EOL=20.83kg ²Template Burnup(MWd): 6.01
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.00012882
 Template Decay Time: 65 years

Estimated
 Canister usage:
 18"x10"
 2.00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							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	4.5940E-08	1,122.241	2,244.483	0.00E+00	5.16E-05	1.03E-04	0.0150	8.192E+13
Am-241	1.1471E-04	1,122.241	2,244.483	0.00E+00	1.29E-01	2.57E-01	0.0250	1.702E+13
Am-242m	7.4210E-09	1,122.241	2,244.483	0.00E+00	8.33E-06	1.67E-05	0.0375	1.479E+13
Am-243	9.8236E-10	1,122.241	2,244.483	0.00E+00	1.10E-06	2.20E-06	0.0575	1.587E+13
C-14	2.2928E-04	1,122.241	2,244.483	0.00E+00	2.57E-01	5.15E-01	0.0850	9.587E+12
Cl-36	1.2260E-06	1,122.241	2,244.483	0.00E+00	1.38E-03	2.75E-03	0.1250	6.216E+12
Cm-243	1.2000E-10	1,122.241	2,244.483	0.00E+00	1.35E-07	2.69E-07	0.2250	8.263E+12
Cm-244	7.3577E-10	1,122.241	2,244.483	0.00E+00	8.26E-07	1.65E-06	0.3750	3.604E+12
Co-60	1.3732E-03	1,122.241	2,244.483	0.00E+00	1.54E+00	3.08E+00	0.5750	6.063E+13
Co-134	1.2709E-10	1,122.241	2,244.483	0.00E+00	1.43E-07	2.85E-07	0.8500	5.888E+11
Cs-135	3.0316E-05	1,122.241	2,244.483	0.00E+00	3.40E-02	6.80E-02	1.2500	4.262E+11
Cs-137	7.2579E-01	1,122.241	2,244.483	0.00E+00	8.15E+02	1.63E+03	1.7500	1.515E+10
Eu-154	5.9750E-05	1,122.241	2,244.483	0.00E+00	6.71E-02	1.34E-01	2.2500	2.865E+06
Eu-155	1.0577E-05	1,122.241	2,244.483	0.00E+00	1.19E-02	2.37E-02	2.7500	1.283E+06
Fe-55	4.1631E-07	1,122.241	2,244.483	0.00E+00	4.67E-04	9.34E-04	3.5000	1.330E+02
H-3	4.6722E-04	1,122.241	2,244.483	0.00E+00	5.24E-01	1.05E+00	5.0000	5.493E+01
I-129	7.3195E-07	1,122.241	2,244.483	0.00E+00	8.21E-04	1.64E-03	7.0000	6.074E+00
Kr-85	5.9418E-03	1,122.241	2,244.483	0.00E+00	6.67E+00	1.33E+01	11.0000	6.822E-01
Np-237	1.1499E-06	1,122.241	2,244.483	0.00E+00	1.29E-03	2.58E-03		
Pa-231	7.0899E-08	1,122.241	2,244.483	0.00E+00	7.96E-05	1.59E-04		
Pb-210	2.2363E-12	1,122.241	2,244.483	0.00E+00	2.51E-09	5.02E-09		
Pm-147	4.2296E-07	1,122.241	2,244.483	0.00E+00	4.75E-04	9.49E-04		
Pu-238	2.3295E-04	1,122.241	2,244.483	0.00E+00	2.61E-01	5.23E-01		
Pu-239	6.6722E-04	1,122.241	2,244.483	0.00E+00	7.49E-01	1.50E+00		
Pu-240	8.6556E-05	1,122.241	2,244.483	0.00E+00	9.71E-02	1.94E-01		
Pu-241	1.6889E-04	1,122.241	2,244.483	0.00E+00	1.90E-01	3.79E-01		
Pu-242	1.9717E-09	1,122.241	2,244.483	0.00E+00	2.21E-06	4.43E-06		
Ra-226	4.5740E-12	1,122.241	2,244.483	0.00E+00	5.13E-09	1.03E-08		
Ra-228	8.3511E-12	1,122.241	2,244.483	0.00E+00	5.37E-09	1.87E-08		
Ru-106	2.0516E-19	1,122.241	2,244.483	0.00E+00	2.30E-16	4.60E-16		
Se-79	1.3220E-05	1,122.241	2,244.483	0.00E+00	1.48E-02	2.97E-02		
Sn-126	1.1489E-05	1,122.241	2,244.483	0.00E+00	1.29E-02	2.58E-02		
Sr-90	6.6872E-01	1,122.241	2,244.483	0.00E+00	7.50E+02	1.50E+03		
Tc-99	4.6639E-04	1,122.241	2,244.483	0.00E+00	5.23E-01	1.05E+00		
Th-229	2.3727E-11	1,122.241	2,244.483	0.00E+00	2.66E-08	5.33E-08		
Th-230	2.7354E-10	1,122.241	2,244.483	0.00E+00	3.07E-07	6.14E-07		
Th-232	8.3594E-12	1,122.241	2,244.483	0.00E+00	9.38E-09	1.88E-08		
Tl-208	1.6228E-08	1,122.241	2,244.483	0.00E+00	1.82E-05	3.64E-05		
U-232	4.3960E-08	1,122.241	2,244.483	0.00E+00	4.93E-05	9.87E-05		
U-233	3.3344E-09	1,122.241	2,244.483	0.00E+00	3.74E-06	7.48E-06		
U-234	4.0749E-07	1,122.241	2,244.483	0.00E+00	4.57E-04	9.15E-04		
U-235	-2.7761E-06	1,122.241	0.000	4.43E-02	4.12E-02	4.43E-02		
U-236	1.6190E-05	1,122.241	2,244.483	0.00E+00	1.82E-02	3.63E-02		
U-238	-2.8547E-09	1,122.241	0.000	5.07E-04	5.04E-04	5.07E-04		
Y-90	6.6889E-01	1,122.241	2,244.483	0.00E+00	7.51E+02	1.50E+03		
Other Radionuclides					1.02E+03	2.04E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.14E+00	1.83E+01
Total	Total

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:	SST (304L)	SST	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	93.14999492	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	5.858	1,122.241	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		2,244.483	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	1.09	191.59	
Bounding:	2.18		

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: BR-3
 SNF ID #: 927
 Fuel Units & Descr: 16 - ROD
 Heavy Metal Mass: BOL=5.60kg ; EOL=5.11kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1981
 Estimates as of: 2030
 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"x15"
 1.00

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	465.586	931.173	0.00E+00	4.09E-07	8.17E-07	0.0150	5.010E+13
Am-241	1.4352E-01	465.586	931.173	0.00E+00	6.68E+01	1.34E+02	0.0250	1.010E+13
Am-242m	2.8698E-04	465.586	931.173	0.00E+00	1.34E-01	2.67E-01	0.0375	9.636E+12
Am-243	6.2565E-04	465.586	931.173	0.00E+00	2.91E-01	5.83E-01	0.0575	1.113E+13
C-14	4.7901E-05	465.586	931.173	0.00E+00	2.23E-02	4.46E-02	0.0850	5.606E+12
Cl-36	8.0297E-07	465.586	931.173	0.00E+00	3.74E-04	7.48E-04	0.1250	3.890E+12
Cm-243	2.5081E-04	465.586	931.173	0.00E+00	1.17E-01	2.34E-01	0.2250	4.807E+12
Cm-244	4.9015E-02	465.586	931.173	0.00E+00	2.28E+01	4.56E+01	0.3750	2.067E+12
Co-60	2.5581E-03	465.586	931.173	0.00E+00	1.19E+00	2.38E+00	0.5750	4.808E+13
Cs-134	4.0536E-05	465.586	931.173	0.00E+00	1.89E-02	3.77E-02	0.8500	6.651E+11
Cs-135	1.4433E-05	465.586	931.173	0.00E+00	6.72E-03	1.34E-02	1.2500	6.534E+11
Cs-137	1.3979E+00	465.586	931.173	0.00E+00	6.51E+02	1.30E+03	1.7500	1.957E+10
Eu-154	2.0203E-02	465.586	931.173	0.00E+00	9.41E+00	1.88E+01	2.2500	3.151E+06
Eu-155	1.7684E-03	465.586	931.173	0.00E+00	8.23E-01	1.65E+00	2.7500	6.454E+06
Fe-55	4.3136E-05	465.586	931.173	0.00E+00	2.01E-02	4.02E-02	3.5000	6.647E+05
H-3	2.0769E-02	465.586	931.173	0.00E+00	9.67E+00	1.93E+01	5.0000	2.842E+05
I-129	9.8288E-07	465.586	931.173	0.00E+00	4.58E-04	9.15E-04	7.0000	3.275E+04
Kr-85	2.8214E-02	465.586	931.173	0.00E+00	1.31E+01	2.63E+01	11.0000	3.761E+03
Np-237	1.1218E-05	465.586	931.173	0.00E+00	5.22E-03	1.04E-02		
Pa-231	1.3036E-09	465.586	931.173	0.00E+00	6.07E-07	1.21E-06		
Pb-210	8.5078E-11	465.586	931.173	0.00E+00	3.96E-08	7.92E-08		
Pm-147	3.6531E-04	465.586	931.173	0.00E+00	1.70E-01	3.40E-01		
Pu-238	7.4564E-02	465.586	931.173	0.00E+00	3.47E+01	6.94E+01		
Pu-239	1.1623E-02	465.586	931.173	0.00E+00	5.41E+00	1.08E+01		
Pu-240	1.5132E-02	465.586	931.173	0.00E+00	7.05E+00	1.41E+01		
Pu-241	9.0036E-01	465.586	931.173	0.00E+00	4.19E+02	8.38E+02		
Pu-242	6.4260E-05	465.586	931.173	0.00E+00	2.99E-02	5.98E-02		
Ra-226	2.2804E-10	465.586	931.173	0.00E+00	1.06E-07	2.12E-07		
Ra-228	5.2713E-12	465.586	931.173	0.00E+00	2.45E-09	4.91E-09		
Ru-106	6.1160E-10	465.586	931.173	0.00E+00	2.85E-07	5.70E-07		
Se-79	1.2377E-05	465.586	931.173	0.00E+00	5.76E-03	1.15E-02		
Sn-126	2.5210E-05	465.586	931.173	0.00E+00	1.17E-02	2.35E-02		
Sr-90	9.1667E-01	465.586	931.173	0.00E+00	4.27E+02	8.54E+02		
Tc-99	3.9357E-04	465.586	931.173	0.00E+00	1.83E-01	3.66E-01		
Th-229	1.2057E-10	465.586	931.173	0.00E+00	5.61E-08	1.12E-07		
Th-230	2.1043E-08	465.586	931.173	0.00E+00	9.80E-06	1.96E-05		
Th-232	5.2972E-12	465.586	931.173	0.00E+00	2.47E-09	4.93E-09		
Tl-208	1.7474E-07	465.586	931.173	0.00E+00	8.14E-05	1.63E-04		
U-232	4.7368E-07	465.586	931.173	0.00E+00	2.21E-04	4.41E-04		
U-233	2.5097E-08	465.586	931.173	0.00E+00	1.17E-05	2.34E-05		
U-234	5.0000E-05	465.586	931.173	0.00E+00	2.33E-02	4.66E-02		
U-235	-1.4489E-06	465.586	0.000	3.46E-03	2.78E-03	3.46E-03		
U-236	7.5824E-06	465.586	931.173	0.00E+00	3.53E-03	7.06E-03		
U-238	-2.6129E-07	465.586	0.000	1.34E-03	1.22E-03	1.34E-03		
Y-90	9.1699E-01	465.586	931.173	0.00E+00	4.27E+02	8.54E+02		
Other Radionuclides					6.25E+02	1.25E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.07E+01	2.14E+01
Total	Total

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:	ZIRC-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	28.57142857	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		465.586	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		931.173	

Checks			
	Bumup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	2.38		
Bounding:	4.75		

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: BR-3 FUEL
 SNF ID #: 340
 Fuel Units & Descr: 16 - ROD
 Heavy Metal Mass: BOL=7.54kg : EOL=7.06kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1994
 Estimates as of: 2030
 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"
 0.12

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	8.7758E-10	448.850	897.699	0.00E+00	3.94E-07	7.88E-07	0.0150	4.830E+13
Am-241	1.4352E-01	448.850	897.699	0.00E+00	6.44E+01	1.29E+02	0.0250	9.740E+12
Am-242m	2.8698E-04	448.850	897.699	0.00E+00	1.29E-01	2.58E-01	0.0375	9.290E+12
Am-243	6.2565E-04	448.850	897.699	0.00E+00	2.81E-01	5.62E-01	0.0575	1.073E+13
C-14	4.7901E-05	448.850	897.699	0.00E+00	2.15E-02	4.30E-02	0.0850	5.405E+12
Cl-36	8.0297E-07	448.850	897.699	0.00E+00	3.60E-04	7.21E-04	0.1250	3.750E+12
Cr-243	2.5081E-04	448.850	897.699	0.00E+00	1.13E-01	2.25E-01	0.2250	4.634E+12
Cr-244	4.9015E-02	448.850	897.699	0.00E+00	2.20E+01	4.40E+01	0.3750	1.993E+12
Co-60	2.5581E-03	448.850	897.699	0.00E+00	1.15E+00	2.30E+00	0.5750	4.635E+13
Cs-134	4.0536E-05	448.850	897.699	0.00E+00	1.82E-02	3.64E-02	0.8500	6.412E+11
Cs-135	1.4433E-05	448.850	897.699	0.00E+00	6.48E-03	1.30E-02	1.2500	6.299E+11
Cs-137	1.3979E+00	448.850	897.699	0.00E+00	6.27E+02	1.25E+03	1.7500	1.886E+10
Ce-144	2.0203E-02	448.850	897.699	0.00E+00	9.07E+00	1.81E+01	2.2500	3.038E+06
Eu-155	1.7684E-03	448.850	897.699	0.00E+00	7.94E-01	1.59E+00	2.7500	6.222E+06
Fe-55	4.3136E-05	448.850	897.699	0.00E+00	1.94E-02	3.87E-02	3.5000	6.408E+05
H-3	2.0769E-02	448.850	897.699	0.00E+00	9.32E+00	1.86E+01	5.0000	2.739E+05
I-129	9.8288E-07	448.850	897.699	0.00E+00	4.41E-04	8.82E-04	7.0000	3.157E+04
Kr-85	2.8214E-02	448.850	897.699	0.00E+00	1.27E+01	2.53E+01	11.0000	3.626E+03
Np-237	1.1218E-05	448.850	897.699	0.00E+00	5.04E-03	1.01E-02		
Pa-231	1.3038E-09	448.850	897.699	0.00E+00	5.85E-07	1.17E-06		
Pb-210	8.5078E-11	448.850	897.699	0.00E+00	3.82E-08	7.64E-08		
Pm-147	3.6531E-04	448.850	897.699	0.00E+00	1.64E-01	3.28E-01		
Pu-238	7.4564E-02	448.850	897.699	0.00E+00	3.35E+01	6.69E+01		
Pu-239	1.1623E-02	448.850	897.699	0.00E+00	5.22E+00	1.04E+01		
Pu-240	1.5132E-02	448.850	897.699	0.00E+00	6.79E+00	1.36E+01		
Pu-241	9.0038E-01	448.850	897.699	0.00E+00	4.04E+02	8.08E+02		
Pu-242	6.4260E-05	448.850	897.699	0.00E+00	2.88E-02	5.77E-02		
Ra-226	2.2804E-10	448.850	897.699	0.00E+00	1.02E-07	2.05E-07		
Ra-228	5.2713E-12	448.850	897.699	0.00E+00	2.37E-09	4.73E-09		
Ru-106	6.1160E-10	448.850	897.699	0.00E+00	2.75E-07	5.49E-07		
Se-79	1.2377E-05	448.850	897.699	0.00E+00	5.56E-03	1.11E-02		
Sn-126	2.5210E-05	448.850	897.699	0.00E+00	1.13E-02	2.26E-02		
Sr-90	9.1667E-01	448.850	897.699	0.00E+00	4.11E+02	8.23E+02		
Tc-99	3.9357E-04	448.850	897.699	0.00E+00	1.77E-01	3.53E-01		
Th-229	1.2057E-10	448.850	897.699	0.00E+00	5.41E-08	1.08E-07		
Th-230	2.1043E-08	448.850	897.699	0.00E+00	9.45E-06	1.89E-05		
Th-232	5.2972E-12	448.850	897.699	0.00E+00	2.38E-09	4.76E-09		
Ti-208	1.7474E-07	448.850	897.699	0.00E+00	7.84E-05	1.57E-04		
U-232	4.7368E-07	448.850	897.699	0.00E+00	2.13E-04	4.25E-04		
U-233	2.5097E-08	448.850	897.699	0.00E+00	1.13E-05	2.25E-05		
U-234	5.0000E-05	448.850	897.699	0.00E+00	2.24E-02	4.49E-02		
U-235	-1.4489E-06	448.850	0.000	1.35E-03	6.98E-04	1.35E-03		
U-236	7.5824E-06	448.850	897.699	0.00E+00	3.40E-03	6.81E-03		
U-238	-2.6129E-07	448.850	0.000	2.32E-03	2.21E-03	2.32E-03		
Y-90	9.1699E-01	448.850	897.699	0.00E+00	4.12E+02	8.23E+02		
Other Radionuclides					6.03E+02	1.21E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.03E+01	2.06E+01
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	This Template was used for the following reasons:
Fuel Cladding:	ZIRC-4	ZIRC	This fuel matches PWR Template on all but one parameter (enrichment) making PWR a reasonable match.
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	8.280254777	0 to 5	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	293.904	448.850	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	316.512	897.699	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	1.70	1.53	1.00
Bounding:	3.40	2.84	

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: BRP-B
 SNF ID #: 23
 Fuel Units & Descr: 2 - 11 X 11 ROD ARRAY
 Heavy Metal Mass: BOL=262.68kg ; EOL=250.07kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1972
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 BWR
 1.00

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-09	11,990.372	23,980.745	0.00E+00	1.29E-05	2.57E-05	Avg. MeV	
Am-241	1.4751E-01	11,990.372	23,980.745	0.00E+00	1.77E+03	3.54E+03	0.0150	9.125E+14
Am-242m	2.6809E-04	11,990.372	23,980.745	0.00E+00	3.21E+00	6.43E+00	0.0250	1.829E+14
Am-243	6.2484E-04	11,990.372	23,980.745	0.00E+00	7.49E+00	1.50E+01	0.0375	1.723E+14
C-14	4.7820E-05	11,990.372	23,980.745	0.00E+00	5.73E-01	1.15E+00	0.0575	2.156E+14
Cl-36	8.0297E-07	11,990.372	23,980.745	0.00E+00	9.63E-03	1.93E-02	0.0850	1.007E+14
Cm-243	1.7426E-04	11,990.372	23,980.745	0.00E+00	2.09E+00	4.18E+00	0.1250	6.702E+13
Cm-244	2.7616E-02	11,990.372	23,980.745	0.00E+00	3.31E+02	6.62E+02	0.2250	8.601E+13
Co-60	3.5610E-04	11,990.372	23,980.745	0.00E+00	4.27E+00	8.54E+00	0.3750	3.715E+13
Cs-134	2.6260E-07	11,990.372	23,980.745	0.00E+00	3.15E-03	6.30E-03	0.5750	8.748E+14
Cs-135	1.4433E-05	11,990.372	23,980.745	0.00E+00	1.73E-01	3.46E-01	0.8500	8.542E+12
Cs-137	9.8870E-01	11,990.372	23,980.745	0.00E+00	1.19E+04	2.37E+04	1.2500	5.436E+12
Eu-154	6.0320E-03	11,990.372	23,980.745	0.00E+00	7.23E+01	1.45E+02	1.7500	2.390E+11
Eu-155	2.1770E-04	11,990.372	23,980.745	0.00E+00	2.61E+00	5.22E+00	2.2500	3.928E+07
Fe-55	7.9296E-07	11,990.372	23,980.745	0.00E+00	9.51E-03	1.90E-02	2.7500	1.384E+08
H-3	8.9486E-03	11,990.372	23,980.745	0.00E+00	1.07E+02	2.15E+02	3.5000	9.879E+06
I-129	9.8288E-07	11,990.372	23,980.745	0.00E+00	1.18E-02	2.36E-02	5.0000	4.221E+06
Kr-85	1.0707E-02	11,990.372	23,980.745	0.00E+00	1.28E+02	2.57E+02	7.0000	4.863E+05
Np-237	1.1927E-05	11,990.372	23,980.745	0.00E+00	1.43E-01	2.86E-01	11.0000	5.583E+04
Pa-231	1.4703E-09	11,990.372	23,980.745	0.00E+00	1.76E-05	3.53E-05		
Pb-210	1.6828E-10	11,990.372	23,980.745	0.00E+00	2.02E-06	4.04E-06		
Pm-147	6.9606E-06	11,990.372	23,980.745	0.00E+00	8.35E-02	1.67E-01		
Pu-238	6.6263E-02	11,990.372	23,980.745	0.00E+00	7.95E+02	1.59E+03		
Pu-239	1.1618E-02	11,990.372	23,980.745	0.00E+00	1.39E+02	2.79E+02		
Pu-240	1.5142E-02	11,990.372	23,980.745	0.00E+00	1.82E+02	3.63E+02		
Pu-241	4.3766E-01	11,990.372	23,980.745	0.00E+00	5.25E+03	1.05E+04		
Pu-242	6.4260E-05	11,990.372	23,980.745	0.00E+00	7.71E-01	1.54E+00		
Ra-226	3.8501E-10	11,990.372	23,980.745	0.00E+00	4.62E-06	9.23E-06		
Ra-228	5.2955E-12	11,990.372	23,980.745	0.00E+00	6.35E-08	1.27E-07		
Ru-106	2.0413E-14	11,990.372	23,980.745	0.00E+00	2.45E-10	4.90E-10		
Se-79	1.2376E-05	11,990.372	23,980.745	0.00E+00	1.48E-01	2.97E-01		
Sn-126	2.5210E-05	11,990.372	23,980.745	0.00E+00	3.02E-01	6.05E-01		
Sr-90	6.4163E-01	11,990.372	23,980.745	0.00E+00	7.69E+03	1.54E+04		
Tc-99	3.9357E-04	11,990.372	23,980.745	0.00E+00	4.72E+00	9.44E+00		
Th-229	1.5644E-10	11,990.372	23,980.745	0.00E+00	1.88E-06	3.75E-06		
Th-230	2.7972E-08	11,990.372	23,980.745	0.00E+00	3.35E-04	6.71E-04		
Th-232	5.3036E-12	11,990.372	23,980.745	0.00E+00	6.36E-08	1.27E-07		
Tl-208	1.5136E-07	11,990.372	23,980.745	0.00E+00	1.81E-03	3.63E-03		
U-232	4.1005E-07	11,990.372	23,980.745	0.00E+00	4.92E-03	9.83E-03		
U-233	2.5856E-08	11,990.372	23,980.745	0.00E+00	3.10E-04	6.20E-04		
U-234	5.2665E-05	11,990.372	23,980.745	0.00E+00	6.31E-01	1.26E+00		
U-235	-1.4487E-06	11,990.372	0.000	1.69E-02	0.00E+00	1.69E-02		
U-236	7.5888E-06	11,990.372	23,980.745	0.00E+00	9.10E-02	1.82E-01		
U-238	-2.6129E-07	11,990.372	0.000	8.57E-02	8.25E-02	8.57E-02		
Y-90	6.4180E-01	11,990.372	23,980.745	0.00E+00	7.70E+03	1.54E+04		
Other Radionuclides					1.14E+04	2.29E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.17E+02	4.34E+02
Total	Total

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-2	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	2.982065336	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	5,310.893	11,990.372	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	5,318.510	23,980.745	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.30	2.26	1.00
Bounding:	2.61	4.51	

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: BRP-C
 SNF ID #: 24
 Fuel Units & Descr: 4 - 11 X 11 ROD ARRAY
 Heavy Metal Mass: BOL=468.95kg ; EOL=459.84kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1968
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 BWR
 1.00

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	1.0733E-09	11,298.833	17,314.186	0.00E+00	1.21E-05	1.86E-05	Avg. MeV	
Am-241	1.4751E-01	11,298.833	17,314.186	0.00E+00	1.67E+03	2.55E+03	0.0150	6.588E+14
Am-242m	2.6809E-04	11,298.833	17,314.186	0.00E+00	3.03E+00	4.64E+00	0.0250	1.320E+14
Am-243	6.2484E-04	11,298.833	17,314.186	0.00E+00	7.06E+00	1.08E+01	0.0375	1.244E+14
C-14	4.7820E-05	11,298.833	17,314.186	0.00E+00	5.40E-01	8.28E-01	0.0575	1.557E+14
Cl-36	8.0297E-07	11,298.833	17,314.186	0.00E+00	9.07E-03	1.39E-02	0.0850	7.274E+13
Cm-243	1.7426E-04	11,298.833	17,314.186	0.00E+00	1.97E+00	3.02E+00	0.1250	4.839E+13
Cm-244	2.7616E-02	11,298.833	17,314.186	0.00E+00	3.12E+02	4.78E+02	0.2250	6.210E+13
Co-60	3.5610E-04	11,298.833	17,314.186	0.00E+00	4.02E+00	6.17E+00	0.3750	2.682E+13
Cs-134	2.6260E-07	11,298.833	17,314.186	0.00E+00	2.97E-03	4.55E-03	0.5750	6.316E+13
Cs-135	1.4433E-05	11,298.833	17,314.186	0.00E+00	1.63E-01	2.50E-01	0.8500	6.167E+12
Cs-137	9.8870E-01	11,298.833	17,314.186	0.00E+00	1.12E+04	1.71E+04	1.2500	3.925E+12
Eu-154	6.0320E-03	11,298.833	17,314.186	0.00E+00	6.82E+01	1.04E+02	1.7500	1.726E+11
Eu-155	2.1770E-04	11,298.833	17,314.186	0.00E+00	2.46E+00	3.77E+00	2.2500	2.836E+07
Fe-55	7.9296E-07	11,298.833	17,314.186	0.00E+00	8.96E-03	1.37E-02	2.7500	9.994E+07
H-3	8.9486E-03	11,298.833	17,314.186	0.00E+00	1.01E+02	1.55E+02	3.5000	7.133E+06
I-129	9.8288E-07	11,298.833	17,314.186	0.00E+00	1.11E-02	1.70E-02	5.0000	3.048E+06
Kr-85	1.0707E-02	11,298.833	17,314.186	0.00E+00	1.21E+02	1.85E+02	7.0000	3.511E+05
Np-237	1.1927E-05	11,298.833	17,314.186	0.00E+00	1.35E-01	2.07E-01	11.0000	4.032E+04
Pa-231	1.4703E-09	11,298.833	17,314.186	0.00E+00	1.66E-05	2.55E-05		
Pb-210	1.6828E-10	11,298.833	17,314.186	0.00E+00	1.90E-06	2.91E-06		
Pm-147	6.9606E-06	11,298.833	17,314.186	0.00E+00	7.86E-02	1.21E-01		
Pu-238	6.6263E-02	11,298.833	17,314.186	0.00E+00	7.49E+02	1.15E+03		
Pu-239	1.1618E-02	11,298.833	17,314.186	0.00E+00	1.31E+02	2.01E+02		
Pu-240	1.5142E-02	11,298.833	17,314.186	0.00E+00	1.71E+02	2.62E+02		
Pu-241	4.3766E-01	11,298.833	17,314.186	0.00E+00	4.95E+03	7.58E+03		
Pu-242	6.4260E-05	11,298.833	17,314.186	0.00E+00	7.26E-01	1.11E+00		
Ra-226	3.8501E-10	11,298.833	17,314.186	0.00E+00	4.35E-06	6.67E-06		
Ra-228	5.2955E-12	11,298.833	17,314.186	0.00E+00	5.98E-08	9.17E-08		
Ru-106	2.0413E-14	11,298.833	17,314.186	0.00E+00	2.31E-10	3.53E-10		
Se-79	1.2376E-05	11,298.833	17,314.186	0.00E+00	1.40E-01	2.14E-01		
Sn-126	2.5210E-05	11,298.833	17,314.186	0.00E+00	2.85E-01	4.36E-01		
Sr-90	6.4163E-01	11,298.833	17,314.186	0.00E+00	7.25E+03	1.11E+04		
Tc-99	3.9357E-04	11,298.833	17,314.186	0.00E+00	4.45E+00	6.81E+00		
Th-229	1.5644E-10	11,298.833	17,314.186	0.00E+00	1.77E-06	2.71E-06		
Th-230	2.7972E-08	11,298.833	17,314.186	0.00E+00	3.16E-04	4.84E-04		
Th-232	5.3036E-12	11,298.833	17,314.186	0.00E+00	5.99E-08	9.18E-08		
Ti-208	1.5136E-07	11,298.833	17,314.186	0.00E+00	1.71E-03	2.62E-03		
U-232	4.1005E-07	11,298.833	17,314.186	0.00E+00	4.63E-03	7.10E-03		
U-233	2.5856E-08	11,298.833	17,314.186	0.00E+00	2.92E-04	4.48E-04		
U-234	5.2665E-05	11,298.833	17,314.186	0.00E+00	5.95E-01	9.12E-01		
U-235	-1.4487E-06	11,298.833	0.000	3.67E-02	2.04E-02	3.67E-02		
U-236	7.5888E-06	11,298.833	17,314.186	0.00E+00	8.57E-02	1.31E-01		
U-238	-2.6129E-07	11,298.833	0.000	1.52E-01	1.49E-01	1.52E-01		
Y-90	6.4180E-01	11,298.833	17,314.186	0.00E+00	7.25E+03	1.11E+04		
Other Radionuclides					1.08E+04	1.65E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.04E+02	3.13E+02
Total	Total

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-2	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	3.626092666	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	11,298.833	8,657.093	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	11,722.293	17,314.186	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.69	0.77	
Bounding:	1.05	1.48	

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: BRP-D1
 SNF ID #: 25
 Fuel Units & Descr: 4 - 9 X 9 ROD ARRAY
 Heavy Metal Mass: BOL=548.28kg ; EOL=508.34kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1968
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 BWR
 1.00

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-09	37,986.376	75,972.752	0.00E+00	4.08E-05	8.15E-05	Avg. MeV	
Am-241	1.4751E-01	37,986.376	75,972.752	0.00E+00	5.60E+03	1.12E+04	0.0150	2.891E+15
Am-242m	2.6809E-04	37,986.376	75,972.752	0.00E+00	1.02E+01	2.04E+01	0.0250	5.793E+14
Am-243	6.2484E-04	37,986.376	75,972.752	0.00E+00	2.37E+01	4.75E+01	0.0375	5.459E+14
C-14	4.7820E-05	37,986.376	75,972.752	0.00E+00	1.82E+00	3.63E+00	0.0575	6.830E+14
Cl-36	8.0297E-07	37,986.376	75,972.752	0.00E+00	3.05E-02	6.10E-02	0.0850	3.192E+14
Cm-243	1.7426E-04	37,986.376	75,972.752	0.00E+00	6.62E+00	1.32E+01	0.1250	2.123E+14
Cm-244	2.7616E-02	37,986.376	75,972.752	0.00E+00	1.05E+03	2.10E+03	0.2250	2.725E+14
Co-60	3.5610E-04	37,986.376	75,972.752	0.00E+00	1.35E+01	2.71E+01	0.3750	1.177E+14
Cs-134	2.6260E-07	37,986.376	75,972.752	0.00E+00	9.98E-03	2.00E-02	0.5750	2.771E+15
Cs-135	1.4433E-05	37,986.376	75,972.752	0.00E+00	5.48E-01	1.10E+00	0.8500	2.706E+13
Cs-137	9.8870E-01	37,986.376	75,972.752	0.00E+00	3.76E+04	7.51E+04	1.2500	1.722E+13
Eu-154	6.0320E-03	37,986.376	75,972.752	0.00E+00	2.29E+02	4.58E+02	1.7500	7.572E+11
Eu-155	2.1770E-04	37,986.376	75,972.752	0.00E+00	8.27E+00	1.65E+01	2.2500	1.244E+08
Fe-55	7.9296E-07	37,986.376	75,972.752	0.00E+00	3.01E-02	6.02E-02	2.7500	4.385E+08
H-3	8.9486E-03	37,986.376	75,972.752	0.00E+00	3.40E+02	6.80E+02	3.5000	3.130E+07
I-129	9.8288E-07	37,986.376	75,972.752	0.00E+00	3.73E-02	7.47E-02	5.0000	1.337E+07
Kr-85	1.0707E-02	37,986.376	75,972.752	0.00E+00	4.07E+02	8.13E+02	7.0000	1.541E+06
Np-237	1.1927E-05	37,986.376	75,972.752	0.00E+00	4.53E-01	9.06E-01	11.0000	1.769E+05
Pa-231	1.4703E-09	37,986.376	75,972.752	0.00E+00	5.59E-05	1.12E-04		
Pb-210	1.6828E-10	37,986.376	75,972.752	0.00E+00	6.39E-06	1.28E-05		
Pm-147	6.9606E-06	37,986.376	75,972.752	0.00E+00	2.64E-01	5.29E-01		
Pu-238	6.6263E-02	37,986.376	75,972.752	0.00E+00	2.52E+03	5.03E+03		
Pu-239	1.1618E-02	37,986.376	75,972.752	0.00E+00	4.41E+02	8.83E+02		
Pu-240	1.5142E-02	37,986.376	75,972.752	0.00E+00	5.75E+02	1.15E+03		
Pu-241	4.3766E-01	37,986.376	75,972.752	0.00E+00	1.66E+04	3.33E+04		
Pu-242	6.4260E-05	37,986.376	75,972.752	0.00E+00	2.44E+00	4.88E+00		
Ra-226	3.8501E-10	37,986.376	75,972.752	0.00E+00	1.46E-05	2.93E-05		
Ra-228	5.2955E-12	37,986.376	75,972.752	0.00E+00	2.01E-07	4.02E-07		
Ru-106	2.0413E-14	37,986.376	75,972.752	0.00E+00	7.75E-10	1.55E-09		
Se-79	1.2376E-05	37,986.376	75,972.752	0.00E+00	4.70E-01	9.40E-01		
Sn-126	2.5210E-05	37,986.376	75,972.752	0.00E+00	9.58E-01	1.92E+00		
Sr-90	6.4163E-01	37,986.376	75,972.752	0.00E+00	2.44E+04	4.87E+04		
Tc-99	3.9357E-04	37,986.376	75,972.752	0.00E+00	1.50E+01	2.99E+01		
Th-229	1.5644E-10	37,986.376	75,972.752	0.00E+00	5.94E-06	1.19E-05		
Th-230	2.7972E-08	37,986.376	75,972.752	0.00E+00	1.06E-03	2.13E-03		
Th-232	5.3036E-12	37,986.376	75,972.752	0.00E+00	2.01E-07	4.03E-07		
Tl-208	1.5136E-07	37,986.376	75,972.752	0.00E+00	5.75E-03	1.15E-02		
U-232	4.1005E-07	37,986.376	75,972.752	0.00E+00	1.56E-02	3.12E-02		
U-233	2.5856E-08	37,986.376	75,972.752	0.00E+00	9.82E-04	1.96E-03		
U-234	5.2665E-05	37,986.376	75,972.752	0.00E+00	2.00E+00	4.00E+00		
U-235	-1.4487E-06	37,986.376	0.000	3.40E-02	0.00E+00	3.40E-02		
U-236	7.5888E-06	37,986.376	75,972.752	0.00E+00	2.88E-01	5.77E-01		
U-238	-2.6129E-07	37,986.376	0.000	1.79E-01	1.69E-01	1.79E-01		
Y-90	6.4180E-01	37,986.376	75,972.752	0.00E+00	2.44E+04	4.88E+04		
Other Radionuclides					3.62E+04	7.24E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.87E+02	1.37E+03
Total	Total

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-2	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	2.873465935	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	900.827	37,986.376	
Bounding:	926.596	75,972.752	

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:	1.98	42.17		1.02
Bounding:	3.96	81.99		

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: BRP-D2 ¹Fuel decay start date: 1968
 SNF ID #: 26 Estimates as of: 2030
 Fuel Units & Descr: 2 - 7 X 7 ROD ARRAY Template: PWR (Light Water, Zirc, 0 to 5%, U)
 Heavy Metal Mass: BOL=233.59kg ; EOL=217.10kg ²Template Burnup(MWd): 61.92
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 50 years

Estimated
 Canister usage:
 BWR
 1.00

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	1.0733E-09	15,685.204	31,370.408	0.00E+00	1.68E-05	3.37E-05		
Am-241	1.4751E-01	15,685.204	31,370.408	0.00E+00	2.31E+03	4.63E+03	0.0150	1.194E+15
Am-242m	2.6809E-04	15,685.204	31,370.408	0.00E+00	4.21E+00	8.41E+00	0.0250	2.392E+14
Am-243	6.2484E-04	15,685.204	31,370.408	0.00E+00	9.80E+00	1.96E+01	0.0375	2.254E+14
C-14	4.7820E-05	15,685.204	31,370.408	0.00E+00	7.50E-01	1.50E+00	0.0575	2.820E+14
Cl-36	8.0297E-07	15,685.204	31,370.408	0.00E+00	1.26E-02	2.52E-02	0.0850	1.318E+14
Cm-243	1.7426E-04	15,685.204	31,370.408	0.00E+00	2.73E+00	5.47E+00	0.1250	8.768E+13
Cm-244	2.7616E-02	15,685.204	31,370.408	0.00E+00	4.33E+02	8.66E+02	0.2250	1.125E+14
Co-60	3.5610E-04	15,685.204	31,370.408	0.00E+00	5.59E+00	1.12E+01	0.3750	4.859E+13
Cs-134	2.6260E-07	15,685.204	31,370.408	0.00E+00	4.12E-03	8.24E-03	0.5750	1.144E+15
Cs-135	1.4433E-05	15,685.204	31,370.408	0.00E+00	2.26E-01	4.53E-01	0.8500	1.117E+13
Cs-137	9.8870E-01	15,685.204	31,370.408	0.00E+00	1.55E+04	3.10E+04	1.2500	7.111E+12
Eu-154	6.0320E-03	15,685.204	31,370.408	0.00E+00	9.46E+01	1.89E+02	1.7500	3.127E+11
Eu-155	2.1770E-04	15,685.204	31,370.408	0.00E+00	3.41E+00	6.83E+00	2.2500	5.139E+07
Fe-55	7.9296E-07	15,685.204	31,370.408	0.00E+00	1.24E-02	2.49E-02	2.7500	1.811E+08
H-3	8.9486E-03	15,685.204	31,370.408	0.00E+00	1.40E+02	2.81E+02	3.5000	1.292E+07
I-129	9.8288E-07	15,685.204	31,370.408	0.00E+00	1.54E-02	3.08E-02	5.0000	5.522E+06
Kr-85	1.0707E-02	15,685.204	31,370.408	0.00E+00	1.68E+02	3.36E+02	7.0000	6.361E+05
Np-237	1.1927E-05	15,685.204	31,370.408	0.00E+00	1.87E-01	3.74E-01	11.0000	7.304E+04
Pa-231	1.4703E-09	15,685.204	31,370.408	0.00E+00	2.31E-05	4.61E-05		
Pb-210	1.6828E-10	15,685.204	31,370.408	0.00E+00	2.64E-06	5.28E-06		
Pm-147	6.9606E-06	15,685.204	31,370.408	0.00E+00	1.09E-01	2.18E-01		
Pu-238	6.6263E-02	15,685.204	31,370.408	0.00E+00	1.04E+03	2.08E+03		
Pu-239	1.1618E-02	15,685.204	31,370.408	0.00E+00	1.82E+02	3.64E+02		
Pu-240	1.5142E-02	15,685.204	31,370.408	0.00E+00	2.38E+02	4.75E+02		
Pu-241	4.3766E-01	15,685.204	31,370.408	0.00E+00	6.86E+03	1.37E+04		
Pu-242	6.4260E-05	15,685.204	31,370.408	0.00E+00	1.01E+00	2.02E+00		
Ra-226	3.8501E-10	15,685.204	31,370.408	0.00E+00	6.04E-06	1.21E-05		
Ra-228	5.2955E-12	15,685.204	31,370.408	0.00E+00	8.31E-08	1.66E-07		
Ru-106	2.0413E-14	15,685.204	31,370.408	0.00E+00	3.20E-10	6.40E-10		
Se-79	1.2376E-05	15,685.204	31,370.408	0.00E+00	1.94E-01	3.88E-01		
Sn-126	2.5210E-05	15,685.204	31,370.408	0.00E+00	3.95E-01	7.91E-01		
Sr-90	6.4163E-04	15,685.204	31,370.408	0.00E+00	1.01E+04	2.01E+04		
Tc-99	3.9357E-01	15,685.204	31,370.408	0.00E+00	6.17E+00	1.23E+01		
Th-229	1.5644E-10	15,685.204	31,370.408	0.00E+00	2.45E-06	4.91E-06		
Th-230	2.7972E-08	15,685.204	31,370.408	0.00E+00	4.39E-04	8.77E-04		
Th-232	5.3036E-12	15,685.204	31,370.408	0.00E+00	8.32E-08	1.66E-07		
Th-208	1.5136E-07	15,685.204	31,370.408	0.00E+00	2.37E-03	4.75E-03		
U-232	4.1005E-07	15,685.204	31,370.408	0.00E+00	6.43E-03	1.29E-02		
U-233	2.5856E-08	15,685.204	31,370.408	0.00E+00	4.06E-04	8.11E-04		
U-234	5.2665E-05	15,685.204	31,370.408	0.00E+00	8.26E-01	1.65E+00		
U-235	-1.4487E-06	15,685.204	0.000	1.42E-02	0.00E+00	1.42E-02		
U-236	7.5888E-06	15,685.204	31,370.408	0.00E+00	1.19E-01	2.38E-01		
U-238	-2.6129E-07	15,685.204	0.000	7.63E-02	7.22E-02	7.63E-02		
Y-90	6.4180E-01	15,685.204	31,370.408	0.00E+00	1.01E+04	2.01E+04		
Other Radionuclides					1.49E+04	2.99E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.84E+02	5.67E+02
Total	Total

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-2	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	2.810841528	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	1,061.912	15,685.204	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	1,641.455	31,370.408	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.92	14.77	1.02
Bounding:	3.84	19.11	

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: BRP-E
 SNF ID #: 27
 Fuel Units & Descr: 18 - 9 X 9 ROD ARRAY
 Heavy Metal Mass: BOL=2443.47kg ; EOL=2420.59kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1972
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 BWR
 1.00

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	1.0733E-09	29,160.321	43,511.792	0.00E+00	3.13E-05	4.67E-05		
Am-241	1.4751E-01	29,160.321	43,511.792	0.00E+00	4.30E+03	6.42E+03	0.0150	1.656E+15
Am-242m	2.6809E-04	29,160.321	43,511.792	0.00E+00	7.82E+00	1.17E+01	0.0250	3.318E+14
Am-243	6.2484E-04	29,160.321	43,511.792	0.00E+00	1.82E+01	2.72E+01	0.0375	3.127E+14
C-14	4.7820E-05	29,160.321	43,511.792	0.00E+00	1.39E+00	2.08E+00	0.0575	3.912E+14
Cl-36	8.0297E-07	29,160.321	43,511.792	0.00E+00	2.34E-02	3.49E-02	0.0850	1.828E+14
Cm-243	1.7426E-04	29,160.321	43,511.792	0.00E+00	5.08E+00	7.58E+00	0.1250	1.216E+14
Cm-244	2.7616E-02	29,160.321	43,511.792	0.00E+00	8.05E+02	1.20E+03	0.2250	1.561E+14
Co-60	3.5610E-04	29,160.321	43,511.792	0.00E+00	1.04E+01	1.55E+01	0.3750	6.740E+13
Cs-134	2.6260E-07	29,160.321	43,511.792	0.00E+00	7.66E-03	1.14E-02	0.5750	1.587E+15
Cs-135	1.4433E-05	29,160.321	43,511.792	0.00E+00	4.21E-01	6.28E-01	0.8500	1.550E+13
Cs-137	9.8870E-01	29,160.321	43,511.792	0.00E+00	2.88E+04	4.30E+04	1.2500	9.863E+12
Eu-154	6.0320E-03	29,160.321	43,511.792	0.00E+00	1.76E+02	2.62E+02	1.7500	4.337E+11
Eu-155	2.1770E-04	29,160.321	43,511.792	0.00E+00	6.35E+00	9.47E+00	2.2500	7.128E+07
Fe-55	7.9296E-07	29,160.321	43,511.792	0.00E+00	2.31E-02	3.45E-02	2.7500	2.512E+08
H-3	8.9486E-03	29,160.321	43,511.792	0.00E+00	2.61E+02	3.89E+02	3.5000	1.793E+07
I-129	9.8288E-07	29,160.321	43,511.792	0.00E+00	2.87E-02	4.28E-02	5.0000	7.660E+06
Kr-85	1.0707E-02	29,160.321	43,511.792	0.00E+00	3.12E+02	4.66E+02	7.0000	8.825E+05
Np-237	1.1927E-05	29,160.321	43,511.792	0.00E+00	3.48E-01	5.19E-01	11.0000	1.013E+05
Pa-231	1.4703E-09	29,160.321	43,511.792	0.00E+00	4.29E-05	6.40E-05		
Pb-210	1.6828E-10	29,160.321	43,511.792	0.00E+00	4.91E-06	7.32E-06		
Pm-147	6.9606E-06	29,160.321	43,511.792	0.00E+00	2.03E-01	3.03E-01		
Pu-238	6.6263E-02	29,160.321	43,511.792	0.00E+00	1.93E+03	2.88E+03		
Pu-239	1.1618E-02	29,160.321	43,511.792	0.00E+00	3.39E+02	5.06E+02		
Pu-240	1.5142E-02	29,160.321	43,511.792	0.00E+00	4.42E+02	6.59E+02		
Pu-241	4.3766E-01	29,160.321	43,511.792	0.00E+00	1.28E+04	1.90E+04		
Pu-242	6.4260E-05	29,160.321	43,511.792	0.00E+00	1.87E+00	2.80E+00		
Ra-226	3.8501E-10	29,160.321	43,511.792	0.00E+00	1.12E-05	1.68E-05		
Ra-228	5.2955E-12	29,160.321	43,511.792	0.00E+00	1.54E-07	2.30E-07		
Ru-106	2.0413E-14	29,160.321	43,511.792	0.00E+00	5.95E-10	8.88E-10		
Se-79	1.2376E-05	29,160.321	43,511.792	0.00E+00	3.61E-01	5.38E-01		
Sn-126	2.5210E-05	29,160.321	43,511.792	0.00E+00	7.35E-01	1.10E+00		
Sr-90	6.4163E-01	29,160.321	43,511.792	0.00E+00	1.87E+04	2.79E+04		
Tc-99	3.9357E-04	29,160.321	43,511.792	0.00E+00	1.15E+01	1.71E+01		
Th-229	1.5644E-10	29,160.321	43,511.792	0.00E+00	4.56E-06	6.81E-06		
Th-230	2.7972E-08	29,160.321	43,511.792	0.00E+00	8.16E-04	1.22E-03		
Th-232	5.3036E-12	29,160.321	43,511.792	0.00E+00	1.55E-07	2.31E-07		
Ti-208	1.5136E-07	29,160.321	43,511.792	0.00E+00	4.41E-03	6.59E-03		
U-232	4.1005E-07	29,160.321	43,511.792	0.00E+00	1.20E-02	1.78E-02		
U-233	2.5856E-08	29,160.321	43,511.792	0.00E+00	7.54E-04	1.13E-03		
U-234	5.2665E-05	29,160.321	43,511.792	0.00E+00	1.54E+00	2.29E+00		
U-235	-1.4487E-06	29,160.321	0.000	1.58E-01	1.16E-01	1.58E-01		
U-236	7.5888E-06	29,160.321	43,511.792	0.00E+00	2.21E-01	3.30E-01		
U-238	-2.6129E-07	29,160.321	0.000	7.97E-01	7.89E-01	7.97E-01		
Y-90	6.4180E-01	29,160.321	43,511.792	0.00E+00	1.87E+04	2.79E+04		
Other Radionuclides					2.78E+04	4.15E+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:	ZIRC-2	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	2.995467825	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	29,160.321	21,755.896	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.
Bounding:	33,700.280	43,511.792	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.34	0.75	1.00
Bounding:	0.51	1.29	

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: BRP-EG
 SNF ID #: 28
 Fuel Units & Desc.: 33 - 9 X 9 ROD ARRAY
 Heavy Metal Mass: BOL=4566.96kg ; EOL=4419.28kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1973
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 BWR
 1.00

Radionuclide	II. Estimates		Gamma Sources					
	m	x _n	x _b	b	y _n	y _b		
	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	1.0733E-09	140,435.078	280,870.156	0.00E+00	1.51E-04	3.01E-04	Avg. MeV	
Am-241	1.4751E-01	140,435.078	280,870.156	0.00E+00	2.07E+04	4.14E+04	0.0150	1.069E+16
Am-242m	2.6809E-04	140,435.078	280,870.156	0.00E+00	3.76E+01	7.53E+01	0.0250	2.142E+15
Am-243	6.2484E-04	140,435.078	280,870.156	0.00E+00	8.77E+01	1.75E+02	0.0375	2.018E+15
C-14	4.7820E-05	140,435.078	280,870.156	0.00E+00	6.72E+00	1.34E+01	0.0575	2.525E+15
Cl-36	8.0297E-07	140,435.078	280,870.156	0.00E+00	1.13E-01	2.26E-01	0.0850	1.180E+15
Cr-243	1.7426E-04	140,435.078	280,870.156	0.00E+00	2.45E+01	4.89E+01	0.1250	7.850E+14
Cr-244	2.7616E-02	140,435.078	280,870.156	0.00E+00	3.88E+03	7.76E+03	0.2250	1.007E+15
Co-60	3.5610E-04	140,435.078	280,870.156	0.00E+00	5.00E+01	1.00E+02	0.3750	4.351E+14
Cs-134	2.6260E-07	140,435.078	280,870.156	0.00E+00	3.69E-02	7.38E-02	0.5750	1.025E+16
Cs-135	1.4433E-05	140,435.078	280,870.156	0.00E+00	2.03E+00	4.05E+00	0.8500	1.000E+14
Cs-137	9.8870E-01	140,435.078	280,870.156	0.00E+00	1.39E+05	2.78E+05	1.2500	6.366E+13
Eu-154	6.0320E-03	140,435.078	280,870.156	0.00E+00	8.47E+02	1.69E+03	1.7500	2.799E+12
Eu-155	2.1770E-04	140,435.078	280,870.156	0.00E+00	3.06E+01	6.11E+01	2.2500	4.601E+08
Fe-55	7.9296E-07	140,435.078	280,870.156	0.00E+00	1.11E-01	2.23E-01	2.7500	1.621E+09
H-3	8.9486E-03	140,435.078	280,870.156	0.00E+00	1.26E+03	2.51E+03	3.5000	1.157E+08
I-129	9.8288E-07	140,435.078	280,870.156	0.00E+00	1.38E-01	2.76E-01	5.0000	4.944E+07
Kr-85	1.0707E-02	140,435.078	280,870.156	0.00E+00	1.50E+03	3.01E+03	7.0000	5.695E+06
Np-237	1.1927E-05	140,435.078	280,870.156	0.00E+00	1.67E+00	3.35E+00	11.0000	6.540E+05
Pa-231	1.4703E-09	140,435.078	280,870.156	0.00E+00	2.06E-04	4.13E-04		
Pb-210	1.6828E-10	140,435.078	280,870.156	0.00E+00	2.36E-05	4.73E-05		
Pm-147	6.9606E-06	140,435.078	280,870.156	0.00E+00	9.78E-01	1.96E+00		
Pu-238	6.6263E-02	140,435.078	280,870.156	0.00E+00	9.31E+03	1.86E+04		
Pu-239	1.1618E-02	140,435.078	280,870.156	0.00E+00	1.63E+03	3.26E+03		
Pu-240	1.5142E-02	140,435.078	280,870.156	0.00E+00	2.13E+03	4.25E+03		
Pu-241	4.3766E-01	140,435.078	280,870.156	0.00E+00	6.15E+04	1.23E+05		
Pu-242	6.4260E-05	140,435.078	280,870.156	0.00E+00	9.02E+00	1.80E+01		
Ra-226	3.8501E-10	140,435.078	280,870.156	0.00E+00	5.41E-05	1.08E-04		
Ra-228	5.2955E-12	140,435.078	280,870.156	0.00E+00	7.44E-07	1.49E-06		
Ru-106	2.0413E-14	140,435.078	280,870.156	0.00E+00	2.87E-09	5.73E-09		
Se-79	1.2376E-05	140,435.078	280,870.156	0.00E+00	1.74E+00	3.48E+00		
Sn-126	2.5210E-05	140,435.078	280,870.156	0.00E+00	3.54E+00	7.08E+00		
Sr-90	6.4163E-01	140,435.078	280,870.156	0.00E+00	9.01E+04	1.80E+05		
Tc-99	3.9357E-04	140,435.078	280,870.156	0.00E+00	5.53E+01	1.11E+02		
Th-229	1.5644E-10	140,435.078	280,870.156	0.00E+00	2.20E-05	4.39E-05		
Th-230	2.7972E-08	140,435.078	280,870.156	0.00E+00	3.93E-03	7.86E-03		
Th-232	5.3036E-12	140,435.078	280,870.156	0.00E+00	7.45E-07	1.49E-06		
Tl-208	1.5136E-07	140,435.078	280,870.156	0.00E+00	2.13E-02	4.25E-02		
U-232	4.1005E-07	140,435.078	280,870.156	0.00E+00	5.76E-02	1.15E-01		
U-233	2.2856E-08	140,435.078	280,870.156	0.00E+00	3.63E-03	7.26E-03		
U-234	5.2665E-05	140,435.078	280,870.156	0.00E+00	7.40E+00	1.48E+01		
U-235	-1.4487E-06	140,435.078	0.000	3.47E-01	1.43E-01	3.47E-01		
U-236	7.5888E-06	140,435.078	280,870.156	0.00E+00	1.07E+00	2.13E+00		
U-238	-2.6129E-07	140,435.078	0.000	1.48E+00	1.44E+00	1.48E+00		
Y-90	6.4180E-01	140,435.078	280,870.156	0.00E+00	9.01E+04	1.80E+05		
Other Radionuclides					1.34E+05	2.68E+05		

Thermal Power	
Nominal Output (Watts)	Bounding Heat Output (Watts)
2.54E+03	5.08E+03
Total	Total

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-2	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	3.513472006	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	60,840.985	140,435.078	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	83,858.442	280,870.156	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.88	2.31	1.00
Bounding:	1.76	3.35	

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: BRP-EG/F
 SNF ID #: 1081
 Fuel Units & Descr: 4 - 9 X 9 ROD ARRAY
 Heavy Metal Mass: BOL=553.69kg ; EOL=541.11kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1973
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 BWR
 1.00

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-09	11,962.224	23,924.448	0.00E+00	1.28E-05	2.57E-05	Avg. MeV	
Am-241	1.4751E-01	11,962.224	23,924.448	0.00E+00	1.76E+03	3.53E+03	0.0150	9.103E+14
Am-242m	2.6809E-04	11,962.224	23,924.448	0.00E+00	3.21E+00	6.41E+00	0.0250	1.824E+14
Am-243	6.2484E-04	11,962.224	23,924.448	0.00E+00	7.47E+00	1.49E+01	0.0375	1.719E+14
C-14	4.7820E-05	11,962.224	23,924.448	0.00E+00	5.72E-01	1.14E+00	0.0575	2.151E+14
Cl-36	8.0297E-07	11,962.224	23,924.448	0.00E+00	9.61E-03	1.92E-02	0.0850	1.005E+14
Cm-243	1.7426E-04	11,962.224	23,924.448	0.00E+00	2.08E+00	4.17E+00	0.1250	6.687E+13
Cm-244	2.7616E-02	11,962.224	23,924.448	0.00E+00	3.30E+02	6.61E+02	0.2250	8.581E+13
Co-60	3.5610E-04	11,962.224	23,924.448	0.00E+00	4.26E+00	8.52E+00	0.3750	3.706E+13
Cs-134	2.6260E-07	11,962.224	23,924.448	0.00E+00	3.14E-03	6.28E-03	0.5750	8.727E+14
Cs-135	1.4433E-05	11,962.224	23,924.448	0.00E+00	1.73E-01	3.45E-01	0.8500	8.521E+12
Cs-137	9.8870E-01	11,962.224	23,924.448	0.00E+00	1.18E+04	2.37E+04	1.2500	5.423E+12
Eu-154	6.0320E-03	11,962.224	23,924.448	0.00E+00	7.22E+01	1.44E+02	1.7500	2.385E+11
Eu-155	2.1770E-04	11,962.224	23,924.448	0.00E+00	2.60E+00	5.21E+00	2.2500	3.919E+07
Fe-55	7.9296E-07	11,962.224	23,924.448	0.00E+00	9.49E-03	1.90E-02	2.7500	1.381E+08
H-3	8.9486E-03	11,962.224	23,924.448	0.00E+00	1.07E+02	2.14E+02	3.5000	9.856E+06
I-129	9.8288E-07	11,962.224	23,924.448	0.00E+00	1.18E-02	2.35E-02	5.0000	4.211E+06
Kr-85	1.0707E-02	11,962.224	23,924.448	0.00E+00	1.28E+02	2.56E+02	7.0000	4.851E+05
Np-237	1.1927E-05	11,962.224	23,924.448	0.00E+00	1.43E-01	2.85E-01	11.0000	5.571E+04
Pa-231	1.4703E-09	11,962.224	23,924.448	0.00E+00	1.76E-05	3.52E-05		
Pb-210	1.6828E-10	11,962.224	23,924.448	0.00E+00	2.01E-06	4.03E-06		
Pm-147	6.9606E-06	11,962.224	23,924.448	0.00E+00	8.33E-02	1.67E-01		
Pu-238	6.6263E-02	11,962.224	23,924.448	0.00E+00	7.93E+02	1.59E+03		
Pu-239	1.1618E-02	11,962.224	23,924.448	0.00E+00	1.39E+02	2.78E+02		
Pu-240	1.5142E-02	11,962.224	23,924.448	0.00E+00	1.81E+02	3.62E+02		
Pu-241	4.3766E-01	11,962.224	23,924.448	0.00E+00	5.24E+03	1.05E+04		
Pu-242	6.4260E-05	11,962.224	23,924.448	0.00E+00	7.69E-01	1.54E+00		
Ra-226	3.8501E-10	11,962.224	23,924.448	0.00E+00	4.61E-06	9.21E-06		
Ra-228	5.2955E-12	11,962.224	23,924.448	0.00E+00	6.33E-08	1.27E-07		
Ru-106	2.0413E-14	11,962.224	23,924.448	0.00E+00	2.44E-10	4.88E-10		
Se-79	1.2376E-05	11,962.224	23,924.448	0.00E+00	1.48E-01	2.96E-01		
Sn-126	2.5210E-05	11,962.224	23,924.448	0.00E+00	3.02E-01	6.03E-01		
Sr-90	6.4163E-01	11,962.224	23,924.448	0.00E+00	7.68E+03	1.54E+04		
Tc-99	3.9357E-04	11,962.224	23,924.448	0.00E+00	4.71E+00	9.42E+00		
Th-229	1.5644E-10	11,962.224	23,924.448	0.00E+00	1.87E-06	3.74E-06		
Th-230	2.7972E-08	11,962.224	23,924.448	0.00E+00	3.35E-04	6.69E-04		
Th-232	5.3036E-12	11,962.224	23,924.448	0.00E+00	6.34E-08	1.27E-07		
Tl-208	1.5136E-07	11,962.224	23,924.448	0.00E+00	1.81E-03	3.62E-03		
U-232	4.1005E-07	11,962.224	23,924.448	0.00E+00	4.91E-03	9.81E-03		
U-233	2.5856E-08	11,962.224	23,924.448	0.00E+00	3.09E-04	6.19E-04		
U-234	5.2665E-05	11,962.224	23,924.448	0.00E+00	6.30E-01	1.26E+00		
U-235	-1.4487E-06	11,962.224	0.000	4.16E-02	2.43E-02	4.16E-02		
U-236	7.5888E-06	11,962.224	23,924.448	0.00E+00	9.08E-02	1.82E-01		
U-238	-2.6129E-07	11,962.224	0.000	1.80E-01	1.76E-01	1.80E-01		
Y-90	6.4180E-01	11,962.224	23,924.448	0.00E+00	7.68E+03	1.54E+04		
Other Radionuclides					1.14E+04	2.28E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.16E+02	4.33E+02
Total	Total

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-2	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	3.477706364	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	8,552.788	11,962.224	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	8,583.240	23,924.448	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.62	1.40	1.00
Bounding:	1.23	2.79	

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: BRP-EP
 SNF ID #: 29
 Fuel Units & Descr: 3 - 9 X 9 ROD ARRAY
 Heavy Metal Mass: BOL=369.99kg ; EOL=351.85kg
 ROD Storage Site: INZEL

¹Fuel decay start date: 1974
 Estimates as of: 2030
 Template: (Worst Case)
²Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 50 years

Estimated
 Canister usage:
 BWR
 1.00

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	2.5200E-06	17,236.638	34,473.277	0.00E+00	4.34E-02	8.69E-02		
Am-241	8.6432E+00	17,236.638	34,473.277	0.00E+00	1.49E+05	2.98E+05	0.0150	2.953E+16
Am-242m	1.5728E-02	17,236.638	34,473.277	0.00E+00	2.71E+02	5.42E+02	0.0250	5.771E+15
Am-243	1.6288E-02	17,236.638	34,473.277	0.00E+00	2.81E+02	5.62E+02	0.0375	4.879E+15
C-14	1.2068E-01	17,236.638	34,473.277	0.00E+00	2.08E+03	4.16E+03	0.0575	9.215E+15
Cl-36	2.2849E-03	17,236.638	34,473.277	0.00E+00	3.94E+01	7.88E+01	0.0850	3.089E+15
Cm-243	6.0144E-04	17,236.638	34,473.277	0.00E+00	1.04E+01	2.07E+01	0.1250	2.186E+15
Cm-244	9.4880E-02	17,236.638	34,473.277	0.00E+00	1.64E+03	3.27E+03	0.2250	2.674E+15
Co-60	3.9052E+00	17,236.638	34,473.277	0.00E+00	6.73E+04	1.35E+05	0.3750	1.157E+15
Cs-134	2.2139E-06	17,236.638	34,473.277	0.00E+00	3.82E-02	7.63E-02	0.5750	1.915E+16
Cs-135	4.3976E-04	17,236.638	34,473.277	0.00E+00	7.58E+00	1.52E+01	0.8500	4.194E+14
Cs-137	1.4887E+01	17,236.638	34,473.277	0.00E+00	2.57E+05	5.13E+05	1.2500	1.028E+16
Eu-154	3.7342E-01	17,236.638	34,473.277	0.00E+00	6.44E+03	1.29E+04	1.7500	1.236E+13
Eu-155	8.4893E-03	17,236.638	34,473.277	0.00E+00	1.46E+02	2.93E+02	2.2500	5.344E+10
Fe-55	5.3750E-03	17,236.638	34,473.277	0.00E+00	9.26E+01	1.85E+02	2.7500	9.197E+10
H-3	1.0472E-01	17,236.638	34,473.277	0.00E+00	1.80E+03	3.61E+03	3.5000	5.570E+07
I-129	1.0618E-05	17,236.638	34,473.277	0.00E+00	1.83E-01	3.66E-01	5.0000	2.353E+07
Kr-85	2.2717E-01	17,236.638	34,473.277	0.00E+00	3.92E+03	7.83E+03	7.0000	2.678E+06
Np-237	1.6400E-04	17,236.638	34,473.277	0.00E+00	2.83E+00	5.65E+00	11.0000	3.055E+05
Pa-231	2.8688E-06	17,236.638	34,473.277	0.00E+00	4.94E-02	9.89E-02		
Pb-210	4.7312E-08	17,236.638	34,473.277	0.00E+00	8.16E-04	1.63E-03		
Pm-147	3.2198E-04	17,236.638	34,473.277	0.00E+00	5.55E+00	1.11E+01		
Pu-238	-1.1924E+00	17,236.638	0.000	4.75E+04	2.70E+04	4.75E+04		
Pu-239	-4.8600E-02	17,236.638	0.000	5.75E+03	4.92E+03	5.75E+03		
Pu-240	-3.0127E-01	17,236.638	0.000	7.35E+03	2.15E+03	7.35E+03		
Pu-241	-1.2917E+02	17,236.638	0.000	1.89E+06	0.00E+00	1.89E+06		
Pu-242	-1.1381E-04	17,236.638	0.000	3.18E+01	2.98E+01	3.18E+01		
Ra-226	1.0760E-07	17,236.638	34,473.277	0.00E+00	1.85E-03	3.71E-03		
Ra-228	6.0160E-07	17,236.638	34,473.277	0.00E+00	1.04E-02	2.07E-02		
Ru-106	1.3388E-13	17,236.638	34,473.277	0.00E+00	2.31E-09	4.62E-09		
Se-79	1.9179E-04	17,236.638	34,473.277	0.00E+00	3.31E+00	6.61E+00		
Sn-126	1.6669E-04	17,236.638	34,473.277	0.00E+00	2.87E+00	5.75E+00		
Sr-90	1.3859E+01	17,236.638	34,473.277	0.00E+00	2.39E+05	4.78E+05		
Tc-99	6.7678E-03	17,236.638	34,473.277	0.00E+00	1.17E+02	2.33E+02		
Th-229	2.2592E-06	17,236.638	34,473.277	0.00E+00	3.89E-02	7.79E-02		
Th-230	7.5955E-06	17,236.638	34,473.277	0.00E+00	1.31E-01	2.62E-01		
Th-232	6.0208E-07	17,236.638	34,473.277	0.00E+00	1.04E-02	2.08E-02		
Ti-208	7.5795E-05	17,236.638	34,473.277	0.00E+00	1.31E+00	2.61E+00		
U-232	2.0521E-04	17,236.638	34,473.277	0.00E+00	3.54E+00	7.07E+00		
U-233	3.6128E-04	17,236.638	34,473.277	0.00E+00	6.23E+00	1.25E+01		
U-234	1.2788E-02	17,236.638	34,473.277	0.00E+00	2.20E+02	4.41E+02		
U-235	5.7486E-04	17,236.638	34,473.277	1.59E-01	1.01E+01	2.00E+01		
U-236	2.3485E-04	17,236.638	34,473.277	0.00E+00	4.05E+00	8.10E+00		
U-238	1.1581E-04	17,236.638	34,473.277	1.98E-02	2.02E+00	4.01E+00		
Y-90	1.3861E+01	17,236.638	34,473.277	0.00E+00	2.39E+05	4.78E+05		
Other Radionuclides					8.86E+05	1.77E+06		

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 Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	ZIRC-2	SST/Inconel	
BOL HM Constituents:	PuO2-UO2	U, Th, & Pu	
BOL Enrichment %:	0.7	0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	6,607.651	17,236.638	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	7,131.557	34,473.277	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	1.39	2.61	31.12
Bounding:	2.79	4.83	

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: BRP-F	¹ Fuel decay start date: 1974
SNF ID #: 30	Estimates as of: 2030
Fuel Units & Descr: 13 - 9 X 9 ROD ARRAY	Template: PWR (Light Water, Zirc. 0 to 5%, U)
Heavy Metal Mass: BOL=1799.10kg ; EOL=1756.76kg	² Template Burnup(MWd): 61.92
ROD Storage Site: INEEL	Template BOL Heavy Metal Mass (MT): 0.00176911
	Template Decay Time: 50 years

Estimated
Canister usage:
BWR
1.00

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-09	40,267.997	80,535.994	0.00E+00	4.32E-05	8.64E-05	Avg. MeV	
Am-241	1.4751E-01	40,267.997	80,535.994	0.00E+00	5.94E+03	1.19E+04	0.0150	3.064E+15
Am-242m	2.6809E-04	40,267.997	80,535.994	0.00E+00	1.08E+01	2.16E+01	0.0250	6.141E+14
Am-243	6.2484E-04	40,267.997	80,535.994	0.00E+00	2.52E+01	5.03E+01	0.0375	5.787E+14
C-14	4.7820E-05	40,267.997	80,535.994	0.00E+00	1.93E+00	3.85E+00	0.0575	7.241E+14
Cl-36	8.0297E-07	40,267.997	80,535.994	0.00E+00	3.23E-02	6.47E-02	0.0850	3.383E+14
Cm-243	1.7426E-04	40,267.997	80,535.994	0.00E+00	7.02E+00	1.40E+01	0.1250	2.251E+14
Cm-244	2.7616E-02	40,267.997	80,535.994	0.00E+00	1.11E+03	2.22E+03	0.2250	2.889E+14
Co-60	3.5610E-04	40,267.997	80,535.994	0.00E+00	1.43E+01	2.87E+01	0.3750	1.247E+14
Cs-134	2.6260E-07	40,267.997	80,535.994	0.00E+00	1.06E-02	2.11E-02	0.5750	2.938E+15
Cs-135	1.4433E-05	40,267.997	80,535.994	0.00E+00	5.81E-01	1.16E+00	0.8500	2.869E+13
Cs-137	9.8870E-01	40,267.997	80,535.994	0.00E+00	3.98E+04	7.96E+04	1.2500	1.825E+14
Eu-154	6.0320E-03	40,267.997	80,535.994	0.00E+00	2.43E+02	4.86E+02	1.7500	8.027E+11
Eu-155	2.1770E-04	40,267.997	80,535.994	0.00E+00	8.77E+00	1.75E+01	2.2500	1.319E+08
Fe-55	7.9296E-07	40,267.997	80,535.994	0.00E+00	3.19E-02	6.39E-02	2.7500	4.649E+08
H-3	8.9486E-03	40,267.997	80,535.994	0.00E+00	3.60E+02	7.21E+02	3.5000	3.318E+07
I-129	9.8288E-07	40,267.997	80,535.994	0.00E+00	3.96E-02	7.92E-02	5.0000	1.418E+07
Kr-85	1.0707E-02	40,267.997	80,535.994	0.00E+00	4.31E+02	8.62E+02	7.0000	1.633E+06
Np-237	1.1927E-05	40,267.997	80,535.994	0.00E+00	4.80E-01	9.61E-01	11.0000	1.875E+05
Pa-231	1.4703E-09	40,267.997	80,535.994	0.00E+00	5.92E-05	1.18E-04		
Pb-210	1.6828E-10	40,267.997	80,535.994	0.00E+00	6.78E-06	1.36E-05		
Pm-147	6.9606E-06	40,267.997	80,535.994	0.00E+00	2.80E-01	5.61E-01		
Pu-238	6.6263E-02	40,267.997	80,535.994	0.00E+00	2.67E+03	5.34E+03		
Pu-239	1.1618E-02	40,267.997	80,535.994	0.00E+00	4.68E+02	9.36E+02		
Pu-240	1.5142E-02	40,267.997	80,535.994	0.00E+00	6.10E+02	1.22E+03		
Pu-241	4.3766E-01	40,267.997	80,535.994	0.00E+00	1.76E+04	3.52E+04		
Pu-242	6.4260E-05	40,267.997	80,535.994	0.00E+00	2.59E+00	5.18E+00		
Ra-226	3.8501E-10	40,267.997	80,535.994	0.00E+00	1.55E-05	3.10E-05		
Ra-228	5.2955E-12	40,267.997	80,535.994	0.00E+00	2.13E-07	4.26E-07		
Ru-106	2.0413E-14	40,267.997	80,535.994	0.00E+00	8.22E-10	1.64E-09		
Se-79	1.2376E-05	40,267.997	80,535.994	0.00E+00	4.98E-01	9.97E-01		
Sn-126	2.5210E-05	40,267.997	80,535.994	0.00E+00	1.02E+00	2.03E+00		
Sr-90	6.4163E-01	40,267.997	80,535.994	0.00E+00	2.58E+04	5.17E+04		
Tc-99	3.9357E-04	40,267.997	80,535.994	0.00E+00	1.58E+01	3.17E+01		
Th-229	1.5644E-10	40,267.997	80,535.994	0.00E+00	6.30E-06	1.26E-05		
Th-230	2.7972E-08	40,267.997	80,535.994	0.00E+00	1.13E-03	2.25E-03		
Th-232	5.3036E-12	40,267.997	80,535.994	0.00E+00	2.14E-07	4.27E-07		
Tl-208	1.5136E-07	40,267.997	80,535.994	0.00E+00	6.09E-03	1.22E-02		
U-232	4.1005E-07	40,267.997	80,535.994	0.00E+00	1.65E-02	3.30E-02		
U-233	2.5856E-08	40,267.997	80,535.994	0.00E+00	1.04E-03	2.08E-03		
U-234	5.2665E-05	40,267.997	80,535.994	0.00E+00	2.12E+00	4.24E+00		
U-235	-1.4487E-06	40,267.997	0.000	1.37E-01	7.83E-02	1.37E-01		
U-236	7.5888E-06	40,267.997	80,535.994	0.00E+00	3.06E-01	6.11E-01		
U-238	-2.6129E-07	40,267.997	0.000	5.83E-01	5.73E-01	5.83E-01		
Y-90	6.4180E-01	40,267.997	80,535.994	0.00E+00	2.58E+04	5.17E+04		
Other Radionuclides					3.84E+04	7.67E+04		

Thermal Power
Nominal Heat Output (Watts): 7.28E+02
Bounding Heat Output (Watts): 1.46E+03
Total

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-2	ZIRC
BOL HM Constituents:	UO2	U
BOL Enrichment %:	3.514682259	0 to 5

Burnup Summary (MWd) ²		Basis for burnup used in estimate:
From SFD	Estimated	
Nominal:	18,908.581	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	25,797.349	Bounding burnup assumed to be twice nominal burnup.

Checks		Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	
	0.64	2.13
Bounding:	1.28	3.12

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: BRP-F-PU
 SNF ID #: 1082
 Fuel Units & Descr: 2 - 9 X 9 ROD ARRAY
 Heavy Metal Mass: BOL=269.59kg ; EOL=263.82kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1974
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 BWR
 1.00

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	1.0733E-09	5,489.089	10,978.178	0.00E+00	5.89E-06	1.18E-05		
Am-241	1.4751E-01	5,489.089	10,978.178	0.00E+00	8.10E+02	1.62E+03	0.0150	4.177E+14
Am-242m	2.6809E-04	5,489.089	10,978.178	0.00E+00	1.47E+00	2.94E+00	0.0250	8.371E+13
Am-243	6.2484E-04	5,489.089	10,978.178	0.00E+00	3.43E+00	6.86E+00	0.0375	7.889E+13
C-14	4.7820E-05	5,489.089	10,978.178	0.00E+00	2.62E-01	5.25E-01	0.0575	9.870E+13
Cl-36	8.0297E-07	5,489.089	10,978.178	0.00E+00	4.41E-03	8.82E-03	0.0850	4.612E+13
Cm-243	1.7426E-04	5,489.089	10,978.178	0.00E+00	9.57E-01	1.91E+00	0.1250	3.068E+13
Cm-244	2.7616E-02	5,489.089	10,978.178	0.00E+00	1.52E+02	3.03E+02	0.2250	3.938E+13
Co-60	3.5610E-04	5,489.089	10,978.178	0.00E+00	1.95E+00	3.91E+00	0.3750	1.700E+13
Cs-134	2.6260E-07	5,489.089	10,978.178	0.00E+00	1.44E-03	2.88E-03	0.5750	4.005E+14
Cs-135	1.4433E-05	5,489.089	10,978.178	0.00E+00	7.92E-02	1.58E-01	0.8500	3.910E+12
Cs-137	9.8870E-01	5,489.089	10,978.178	0.00E+00	5.43E+03	1.09E+04	1.2500	2.488E+12
Eu-154	6.0320E-03	5,489.089	10,978.178	0.00E+00	3.31E+01	6.62E+01	1.7500	1.094E+11
Eu-155	2.1770E-04	5,489.089	10,978.178	0.00E+00	1.19E+00	2.39E+00	2.2500	1.788E+07
Fe-55	7.9296E-07	5,489.089	10,978.178	0.00E+00	4.35E-03	8.71E-03	2.7500	6.337E-07
H-3	8.9486E-03	5,489.089	10,978.178	0.00E+00	4.91E+01	9.82E+01	3.5000	4.523E+06
I-129	9.8288E-07	5,489.089	10,978.178	0.00E+00	5.40E-03	1.08E-02	5.0000	1.932E+06
Kr-85	1.0707E-02	5,489.089	10,978.178	0.00E+00	5.88E+01	1.18E+02	7.0000	2.226E+05
Np-237	1.1927E-05	5,489.089	10,978.178	0.00E+00	6.55E-02	1.31E-01	11.0000	2.556E+04
Pa-231	1.4703E-09	5,489.089	10,978.178	0.00E+00	8.07E-06	1.61E-05		
Pb-210	1.6828E-10	5,489.089	10,978.178	0.00E+00	9.24E-07	1.85E-06		
Pm-147	6.9606E-06	5,489.089	10,978.178	0.00E+00	3.82E-02	7.64E-02		
Pu-238	6.6263E-02	5,489.089	10,978.178	0.00E+00	3.64E+02	7.27E+02		
Pu-239	1.1618E-02	5,489.089	10,978.178	0.00E+00	6.38E+01	1.28E+02		
Pu-240	1.5142E-02	5,489.089	10,978.178	0.00E+00	8.31E+01	1.66E+02		
Pu-241	4.3766E-01	5,489.089	10,978.178	0.00E+00	2.40E+03	4.80E+03		
Pu-242	6.4260E-05	5,489.089	10,978.178	0.00E+00	3.53E-01	7.05E-01		
Ra-226	3.8501E-10	5,489.089	10,978.178	0.00E+00	2.11E-06	4.23E-06		
Ra-228	5.2955E-12	5,489.089	10,978.178	0.00E+00	2.91E-08	5.81E-08		
Ru-106	2.0413E-14	5,489.089	10,978.178	0.00E+00	1.12E-10	2.24E-10		
Se-79	1.2376E-05	5,489.089	10,978.178	0.00E+00	6.79E-02	1.36E-01		
Sn-126	2.5210E-05	5,489.089	10,978.178	0.00E+00	1.38E-01	2.77E-01		
Sr-90	6.4163E-01	5,489.089	10,978.178	0.00E+00	3.52E+03	7.04E+03		
Tc-99	3.9357E-04	5,489.089	10,978.178	0.00E+00	2.16E+00	4.32E+00		
Th-229	1.5644E-10	5,489.089	10,978.178	0.00E+00	8.59E-07	1.72E-06		
Th-230	2.7972E-08	5,489.089	10,978.178	0.00E+00	1.54E-04	3.07E-04		
Th-232	5.3036E-12	5,489.089	10,978.178	0.00E+00	2.91E-08	5.82E-08		
Th-208	1.5136E-07	5,489.089	10,978.178	0.00E+00	8.31E-04	1.66E-03		
U-232	4.1005E-07	5,489.089	10,978.178	0.00E+00	2.25E-03	4.50E-03		
U-233	2.5856E-08	5,489.089	10,978.178	0.00E+00	1.42E-04	2.84E-04		
U-234	5.2665E-05	5,489.089	10,978.178	0.00E+00	2.89E-01	5.78E-01		
U-235	-1.4487E-06	5,489.089	0.000	2.05E-02	1.26E-02	2.05E-02		
U-236	7.5888E-06	5,489.089	10,978.178	0.00E+00	4.17E-02	8.33E-02	9.93E+01	1.99E+02
U-238	-2.6129E-07	5,489.089	0.000	8.74E-02	8.60E-02	8.74E-02	Total	Total
Y-90	6.4180E-01	5,489.089	10,978.178	0.00E+00	3.52E+03	7.05E+03		
Other Radionuclides					5.23E+03	1.05E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.93E+01	1.99E+02
Total	Total

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-2	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	3.524667186	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	4,154.685	5,489.089	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	4,193.237	10,978.178	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.58	1.32	1.00
Bounding:	1.16	2.62	

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 ASS'Y
 Heavy Metal Mass: BOL=7.86kg ; EOL=6.94kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1991
 Estimates as of: 2030
 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"
 1.71

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	865.860	1,731.720	0.00E+00	1.74E-06	3.48E-06	Avg. MeV	
Am-241	2.5251E-03	865.860	1,731.720	0.00E+00	2.19E+00	4.37E+00	0.0150	1.275E+14
Am-242m	3.9624E-07	865.860	1,731.720	0.00E+00	3.43E-04	6.86E-04	0.0250	2.648E+13
Am-243	1.4880E-06	865.860	1,731.720	0.00E+00	1.29E-03	2.58E-03	0.0375	2.302E+13
C-14	5.7053E-09	865.860	1,731.720	0.00E+00	4.94E-06	9.88E-06	0.0575	2.478E+13
Ct-36	1.3124E-32	865.860	1,731.720	0.00E+00	1.14E-29	2.27E-29	0.0850	1.493E+13
Cm-243	1.1419E-07	865.860	1,731.720	0.00E+00	9.89E-05	1.98E-04	0.1250	9.861E+12
Cm-244	1.6522E-05	865.860	1,731.720	0.00E+00	1.43E-02	2.86E-02	0.2250	1.289E+13
Co-60	7.4047E-07	865.860	1,731.720	0.00E+00	6.41E-04	1.28E-03	0.3750	5.607E+12
Cs-134	2.0455E-05	865.860	1,731.720	0.00E+00	1.77E-02	3.54E-02	0.5750	9.267E+13
Cs-135	3.4477E-06	865.860	1,731.720	0.00E+00	2.99E-03	5.97E-03	0.8500	1.132E+12
Cs-137	1.4365E+00	865.860	1,731.720	0.00E+00	1.24E+03	2.49E+03	1.2500	5.475E+11
Eu-154	7.3230E-03	865.860	1,731.720	0.00E+00	6.34E+00	1.27E+01	1.7500	3.082E+10
Eu-155	5.9259E-04	865.860	1,731.720	0.00E+00	5.13E-01	1.03E+00	2.2500	2.577E+06
Fe-55	2.2791E-06	865.860	1,731.720	0.00E+00	1.97E-03	3.95E-03	2.7500	2.459E+06
H-3	1.9698E-03	865.860	1,731.720	0.00E+00	1.71E+00	3.41E+00	3.5000	1.426E+03
I-129	7.5300E-07	865.860	1,731.720	0.00E+00	6.52E-04	1.30E-03	5.0000	5.825E+02
Kr-85	4.1176E-02	865.860	1,731.720	0.00E+00	3.57E+01	7.13E+01	7.0000	6.375E+01
Np-237	9.5752E-06	865.860	1,731.720	0.00E+00	8.29E-03	1.66E-02	11.0000	7.108E+00
Pa-231	3.9379E-09	865.860	1,731.720	0.00E+00	3.41E-06	6.82E-06		
Pb-210	3.3115E-10	865.860	1,731.720	0.00E+00	2.87E-07	5.73E-07		
Pm-147	9.2402E-04	865.860	1,731.720	0.00E+00	8.00E-01	1.60E+00		
Pu-238	1.6217E-02	865.860	1,731.720	0.00E+00	1.40E+01	2.81E+01		
Pu-239	4.2810E-04	865.860	1,731.720	0.00E+00	3.71E-01	7.41E-01		
Pu-240	2.4333E-04	865.860	1,731.720	0.00E+00	2.11E-01	4.21E-01		
Pu-241	1.6242E-02	865.860	1,731.720	0.00E+00	1.41E+01	2.81E+01		
Pu-242	3.6329E-07	865.860	1,731.720	0.00E+00	3.15E-04	6.29E-04		
Ra-226	9.0114E-10	865.860	1,731.720	0.00E+00	7.80E-07	1.56E-06		
Ra-228	3.1019E-14	865.860	1,731.720	0.00E+00	2.69E-11	5.37E-11		
Ru-106	2.1225E-10	865.860	1,731.720	0.00E+00	1.84E-07	3.68E-07		
Se-79	1.2930E-05	865.860	1,731.720	0.00E+00	1.12E-02	2.24E-02		
Sn-126	1.1571E-05	865.860	1,731.720	0.00E+00	1.00E-02	2.00E-02		
Sr-90	1.3472E+00	865.860	1,731.720	0.00E+00	1.17E+03	2.33E+03		
Tc-99	4.2239E-04	865.860	1,731.720	0.00E+00	3.66E-01	7.31E-01		
Th-229	1.2407E-11	865.860	1,731.720	0.00E+00	1.07E-08	2.15E-08		
Th-230	8.3497E-08	865.860	1,731.720	0.00E+00	7.23E-05	1.45E-04		
Th-232	3.8371E-14	865.860	1,731.720	0.00E+00	3.32E-11	6.64E-11		
Tl-208	4.0414E-08	865.860	1,731.720	0.00E+00	3.50E-05	7.00E-05		
U-232	1.0948E-07	865.860	1,731.720	0.00E+00	9.48E-05	1.90E-04		
U-233	3.6275E-09	865.860	1,731.720	0.00E+00	3.14E-06	6.28E-06		
U-234	1.8562E-04	865.860	1,731.720	0.00E+00	1.61E-01	3.21E-01		
U-235	-2.7235E-06	865.860	0.000	1.58E-02	1.35E-02	1.58E-02		
U-236	1.5493E-05	865.860	1,731.720	0.00E+00	1.34E-02	2.68E-02		
U-238	-4.2851E-09	865.860	0.000	1.79E-04	1.75E-04	1.79E-04		
Y-90	1.3475E+00	865.860	1,731.720	0.00E+00	1.17E+03	2.33E+03		
Other Radionuclides					1.18E+03	2.37E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.45E+01	2.90E+01
Total	Total

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 (6061)	ALUM	
BOL HM Constituents:	U3O8	U	
BOL Enrichment %:	93.23369049	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		865.860	
Bounding:		1,731.720	

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: CALVERT CLIFFS 1
 SNF ID #: 307
 Fuel Units & Descr: 2 - 14 X 14 ROD ARRAY
 Heavy Metal Mass: BOL=772.00kg ; EOL=675.90kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1980
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 18"x15"
 1.00

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	1.0733E-09	91,386.554	182,773.109	0.00E+00	9.81E-05	1.96E-04	Avg. MeV	
Am-241	1.4751E-01	91,386.554	182,773.109	0.00E+00	1.35E+04	2.70E+04	0.0150	6.955E+15
Am-242m	2.6809E-04	91,386.554	182,773.109	0.00E+00	2.45E+01	4.90E+01	0.0250	1.394E+15
Am-243	6.2484E-04	91,386.554	182,773.109	0.00E+00	5.71E+01	1.14E+02	0.0375	1.313E+15
C-14	4.7820E-05	91,386.554	182,773.109	0.00E+00	4.37E+00	8.74E+00	0.0575	1.643E+15
Cl-36	8.0297E-07	91,386.554	182,773.109	0.00E+00	7.34E-02	1.47E-01	0.0850	7.679E+14
Cm-243	1.7426E-04	91,386.554	182,773.109	0.00E+00	1.59E+01	3.18E+01	0.1250	5.108E+14
Cm-244	2.7616E-02	91,386.554	182,773.109	0.00E+00	2.52E+03	5.05E+03	0.2250	6.556E+14
Co-60	3.5610E-04	91,386.554	182,773.109	0.00E+00	3.25E+01	6.51E+01	0.3750	2.831E+14
Cs-134	2.6260E-07	91,386.554	182,773.109	0.00E+00	2.40E-02	4.80E-02	0.5750	6.667E+15
Cs-135	1.4433E-05	91,386.554	182,773.109	0.00E+00	1.32E+00	2.64E+00	0.8500	6.510E+13
Cs-137	9.8870E-01	91,386.554	182,773.109	0.00E+00	9.04E+04	1.81E+05	1.2500	4.143E+13
Eu-154	6.0320E-03	91,386.554	182,773.109	0.00E+00	5.51E+02	1.10E+03	1.7500	1.822E+12
Eu-155	2.1770E-04	91,386.554	182,773.109	0.00E+00	1.99E+01	3.98E+01	2.2500	2.994E+08
Fe-55	7.9296E-07	91,386.554	182,773.109	0.00E+00	7.25E-02	1.45E-01	2.7500	1.055E+09
H-3	8.9486E-03	91,386.554	182,773.109	0.00E+00	8.18E+02	1.64E+03	3.5000	7.529E+07
I-129	9.8288E-07	91,386.554	182,773.109	0.00E+00	8.98E-02	1.80E-01	5.0000	3.217E+07
Kr-85	1.0707E-02	91,386.554	182,773.109	0.00E+00	9.79E+02	1.96E+03	7.0000	3.706E+06
Np-237	1.1927E-05	91,386.554	182,773.109	0.00E+00	1.09E+00	2.18E+00	11.0000	4.255E+05
Pa-231	1.4703E-09	91,386.554	182,773.109	0.00E+00	1.34E-04	2.69E-04		
Pb-210	1.6828E-10	91,386.554	182,773.109	0.00E+00	1.54E-05	3.08E-05		
Pm-147	6.9606E-06	91,386.554	182,773.109	0.00E+00	6.36E-01	1.27E+00		
Pu-238	6.6263E-02	91,386.554	182,773.109	0.00E+00	6.06E+03	1.21E+04		
Pu-239	1.1618E-02	91,386.554	182,773.109	0.00E+00	1.06E+03	2.12E+03		
Pu-240	1.5142E-02	91,386.554	182,773.109	0.00E+00	1.38E+03	2.77E+03		
Pu-241	4.3766E-01	91,386.554	182,773.109	0.00E+00	4.00E+04	8.00E+04		
Pu-242	6.4260E-05	91,386.554	182,773.109	0.00E+00	5.87E+00	1.17E+01		
Ra-226	3.8501E-10	91,386.554	182,773.109	0.00E+00	3.52E-05	7.04E-05		
Ra-228	5.2955E-12	91,386.554	182,773.109	0.00E+00	4.84E-07	9.68E-07		
Ru-106	2.0413E-14	91,386.554	182,773.109	0.00E+00	1.87E-09	3.73E-09		
Se-79	1.2376E-05	91,386.554	182,773.109	0.00E+00	1.13E+00	2.26E+00		
Sn-126	2.5210E-05	91,386.554	182,773.109	0.00E+00	2.30E+00	4.61E+00		
Sr-90	6.4163E-01	91,386.554	182,773.109	0.00E+00	5.86E+04	1.17E+05		
Tc-99	3.9357E-04	91,386.554	182,773.109	0.00E+00	3.60E+01	7.19E+01		
Th-229	1.5644E-10	91,386.554	182,773.109	0.00E+00	1.43E-05	2.86E-05		
Th-230	2.7972E-08	91,386.554	182,773.109	0.00E+00	2.56E-03	5.11E-03		
Th-232	5.3036E-12	91,386.554	182,773.109	0.00E+00	4.85E-07	9.69E-07		
Th-238	1.5136E-07	91,386.554	182,773.109	0.00E+00	1.38E-02	2.77E-02		
U-232	4.1005E-07	91,386.554	182,773.109	0.00E+00	3.75E-02	7.49E-02		
U-233	2.5856E-08	91,386.554	182,773.109	0.00E+00	2.36E-03	4.73E-03		
U-234	5.2665E-05	91,386.554	182,773.109	0.00E+00	4.81E+00	9.63E+00		
U-235	-1.4487E-06	91,386.554	0.000	5.00E-02	0.00E+00	5.00E-02		
U-236	7.5888E-06	91,386.554	182,773.109	0.00E+00	6.94E-01	1.39E+00		
U-238	-2.6129E-07	91,386.554	0.000	2.52E-01	2.28E-01	2.52E-01		
Y-90	6.4180E-01	91,386.554	182,773.109	0.00E+00	5.87E+04	1.17E+05		
Other Radionuclides					8.71E+04	1.74E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.65E+03	3.31E+03
Total	Total

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-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	2.99999974	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	32,848.600	91,386.554	
Bounding:	33,041.600	182,773.109	

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:	3.38	2.78
Bounding:	6.76	5.53

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: CANDU
 SNF ID #: 979
 Fuel Units & Descr: 4 - ROD
 Heavy Metal Mass: BOL= ; EOL=49.32kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1964
 Estimates as of: 2030
 Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
²Template Burnup(MWd): 5
 Template BOL Heavy Metal Mass (MT): 0.00034251
 Template Decay Time: 65 years

Estimated
 Canister usage:
 18"x15"
 0.14

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	7.7980E-09	47,275.849	47,275.849	0.00E+00	3.69E-04	3.69E-04	Avg. MeV	
Am-241	2.3560E-02	47,275.849	47,275.849	0.00E+00	1.11E+03	1.11E+03	0.0150	1.618E+15
Am-242m	3.0880E-06	47,275.849	47,275.849	0.00E+00	1.46E-01	1.46E-01	0.0250	3.342E+14
Am-243	2.0520E-06	47,275.849	47,275.849	0.00E+00	9.70E-02	9.70E-02	0.0375	2.942E+14
C-14	1.1222E-03	47,275.849	47,275.849	0.00E+00	5.31E+01	5.31E+01	0.0575	3.259E+14
Cl-36	8.3760E-11	47,275.849	47,275.849	0.00E+00	3.96E-06	3.96E-06	0.0850	1.875E+14
Cm-243	2.4260E-07	47,275.849	47,275.849	0.00E+00	1.15E-02	1.15E-02	0.1250	1.218E+14
Cm-244	3.3140E-06	47,275.849	47,275.849	0.00E+00	1.57E-01	1.57E-01	0.2250	1.614E+14
Co-60	1.2454E-03	47,275.849	47,275.849	0.00E+00	5.89E+01	5.89E+01	0.3750	7.027E+13
Cs-134	3.3040E-03	47,275.849	47,275.849	0.00E+00	1.56E-05	1.56E-05	0.5750	1.257E+15
Cs-135	7.9140E-06	47,275.849	47,275.849	0.00E+00	3.74E-01	3.74E-01	0.8500	1.201E+13
Cs-137	7.1580E-01	47,275.849	47,275.849	0.00E+00	3.38E+04	3.38E+04	1.2500	8.677E+12
Eu-154	6.0500E-04	47,275.849	47,275.849	0.00E+00	2.86E+01	2.86E+01	1.7500	3.103E+11
Eu-155	9.4860E-06	47,275.849	47,275.849	0.00E+00	4.48E-01	4.48E-01	2.2500	5.584E+07
Fe-55	1.9322E-08	47,275.849	47,275.849	0.00E+00	9.13E-04	9.13E-04	2.7500	5.800E+07
H-3	4.4180E-03	47,275.849	47,275.849	0.00E+00	2.09E+02	2.09E+02	3.5000	2.364E+05
I-129	7.5020E-07	47,275.849	47,275.849	0.00E+00	3.55E-02	3.55E-02	5.0000	9.918E+04
Kr-85	5.4940E-03	47,275.849	47,275.849	0.00E+00	2.60E+02	2.60E+02	7.0000	1.115E+04
Np-237	5.8040E-06	47,275.849	47,275.849	0.00E+00	2.74E-01	2.74E-01	11.0000	1.265E+03
Pa-231	1.1096E-08	47,275.849	47,275.849	0.00E+00	5.25E-04	5.25E-04		
Pb-210	1.4712E-08	47,275.849	47,275.849	0.00E+00	6.96E-04	6.96E-04		
Pm-147	3.5920E-07	47,275.849	47,275.849	0.00E+00	1.70E-02	1.70E-02		
Pu-238	5.0700E-03	47,275.849	47,275.849	0.00E+00	2.40E+02	2.40E+02		
Pu-239	1.8728E-02	47,275.849	47,275.849	0.00E+00	8.85E+02	8.85E+02		
Pu-240	8.3280E-03	47,275.849	47,275.849	0.00E+00	3.94E+02	3.94E+02		
Pu-241	3.4460E-02	47,275.849	47,275.849	0.00E+00	1.63E+03	1.63E+03		
Pu-242	2.0380E-06	47,275.849	47,275.849	0.00E+00	9.63E-02	9.63E-02		
Ra-226	2.9640E-08	47,275.849	47,275.849	0.00E+00	1.40E-03	1.40E-03		
Ra-228	1.1922E-09	47,275.849	47,275.849	0.00E+00	5.64E-05	5.64E-05		
Ru-106	3.5780E-19	47,275.849	47,275.849	0.00E+00	1.69E-14	1.69E-14		
Se-79	1.2520E-05	47,275.849	47,275.849	0.00E+00	5.92E-01	5.92E-01		
Sn-126	1.2050E-05	47,275.849	47,275.849	0.00E+00	5.70E-01	5.70E-01		
Sr-90	6.1880E-01	47,275.849	47,275.849	0.00E+00	2.93E+04	2.93E+04		
Tc-99	4.4120E-04	47,275.849	47,275.849	0.00E+00	2.09E+01	2.09E+01		
Th-229	6.9280E-09	47,275.849	47,275.849	0.00E+00	3.28E-04	3.28E-04		
Th-230	1.7084E-06	47,275.849	47,275.849	0.00E+00	8.08E-02	8.08E-02		
Th-232	1.1926E-09	47,275.849	47,275.849	0.00E+00	5.64E-05	5.64E-05		
Tl-208	3.4740E-08	47,275.849	47,275.849	0.00E+00	1.64E-03	1.64E-03		
U-232	9.2940E-08	47,275.849	47,275.849	0.00E+00	4.39E-03	4.39E-03		
U-233	9.1680E-07	47,275.849	47,275.849	0.00E+00	4.33E-02	4.33E-02		
U-234	2.3440E-03	47,275.849	47,275.849	0.00E+00	1.11E+02	1.11E+02		
U-235	2.3296E-06	47,275.849	0.000	1.07E-02	0.00E+00	1.07E-02		
U-236	2.6620E-05	47,275.849	47,275.849	0.00E+00	1.26E+00	1.26E+00		
U-238	-1.3291E-07	47,275.849	0.000	3.12E-02	2.49E-02	3.12E-02		
Y-90	6.1900E-01	47,275.849	47,275.849	0.00E+00	2.93E+04	2.93E+04		
Other Radionuclides					3.24E+04	3.24E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.49E+02	4.49E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: HEAVY WATER	Used: HEAVY WATER	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	ZIRC-2	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		47,275.849	

Checks		
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup
Bounding:	32.83	2.59

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: COMMERCIAL BWR & PWR SNF
 SNF ID #: 1089
 Fuel Units & Descr: 19 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL= ; EOL=38.38kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1983
 Estimates as of: 2030
 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:
 HIC
 1.00

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	2,457.879	4,915.758	0.00E+00	2.16E-06	4.31E-06	Avg. MeV	
Am-241	1.4352E-01	2,457.879	4,915.758	0.00E+00	3.53E+02	7.06E+02	0.0150	2.645E+14
Am-242m	2.8698E-04	2,457.879	4,915.758	0.00E+00	7.05E-01	1.41E+00	0.0250	5.334E+13
Am-243	6.2565E-04	2,457.879	4,915.758	0.00E+00	1.54E+00	3.08E+00	0.0375	5.087E+13
C-14	4.7901E-05	2,457.879	4,915.758	0.00E+00	1.18E-01	2.35E-01	0.0575	5.877E+13
Ci-36	8.0297E-07	2,457.879	4,915.758	0.00E+00	1.97E-03	3.95E-03	0.0850	2.960E+13
Cm-243	2.5081E-04	2,457.879	4,915.758	0.00E+00	6.16E-01	1.23E+00	0.1250	2.054E+13
Cm-244	4.9015E-02	2,457.879	4,915.758	0.00E+00	1.20E+02	2.41E+02	0.2250	2.538E+13
Co-60	2.5581E-03	2,457.879	4,915.758	0.00E+00	6.29E+00	1.26E+01	0.3750	1.091E+13
Cs-134	4.0536E-05	2,457.879	4,915.758	0.00E+00	9.96E-02	1.99E-01	0.5750	2.538E+14
Cs-135	1.4433E-05	2,457.879	4,915.758	0.00E+00	3.55E-02	7.09E-02	0.8500	3.511E+12
Cs-137	1.3979E+00	2,457.879	4,915.758	0.00E+00	3.44E+03	6.87E+03	1.2500	3.449E+12
Eu-154	2.0203E-02	2,457.879	4,915.758	0.00E+00	4.97E+01	9.93E+01	1.7500	1.033E+11
Eu-155	1.7684E-03	2,457.879	4,915.758	0.00E+00	4.35E+00	8.69E+00	2.2500	1.663E+07
Fe-55	4.3136E-05	2,457.879	4,915.758	0.00E+00	1.06E-01	2.12E-01	2.7500	3.407E+07
H-3	2.0769E-02	2,457.879	4,915.758	0.00E+00	5.10E+01	1.02E+02	3.5000	3.509E+06
I-129	9.8288E-07	2,457.879	4,915.758	0.00E+00	2.42E-03	4.83E-03	5.0000	1.500E+06
Kr-85	2.8214E-02	2,457.879	4,915.758	0.00E+00	6.93E+01	1.39E+02	7.0000	1.729E+05
Np-237	1.1218E-05	2,457.879	4,915.758	0.00E+00	2.76E-02	5.51E-02	11.0000	1.986E+04
Pa-231	1.3036E-09	2,457.879	4,915.758	0.00E+00	3.20E-06	6.41E-06		
Pb-210	8.5078E-11	2,457.879	4,915.758	0.00E+00	2.09E-07	4.18E-07		
Pm-147	3.6531E-04	2,457.879	4,915.758	0.00E+00	8.98E-01	1.80E+00		
Pu-238	7.4564E-02	2,457.879	4,915.758	0.00E+00	1.83E+02	3.67E+02		
Pu-239	1.1623E-02	2,457.879	4,915.758	0.00E+00	2.86E+01	5.71E+01		
Pu-240	1.5132E-02	2,457.879	4,915.758	0.00E+00	3.72E+01	7.44E+01		
Pu-241	9.0036E-01	2,457.879	4,915.758	0.00E+00	2.21E+03	4.43E+03		
Pu-242	6.4260E-05	2,457.879	4,915.758	0.00E+00	1.58E-01	3.16E-01		
Ra-226	2.2804E-10	2,457.879	4,915.758	0.00E+00	5.60E-07	1.12E-06		
Ra-228	5.2713E-12	2,457.879	4,915.758	0.00E+00	1.30E-08	2.59E-08		
Ru-106	6.1160E-10	2,457.879	4,915.758	0.00E+00	1.50E-06	3.01E-06		
Se-79	1.2377E-05	2,457.879	4,915.758	0.00E+00	3.04E-02	6.08E-02		
Sn-126	2.5210E-05	2,457.879	4,915.758	0.00E+00	6.20E-02	1.24E-01		
Sr-90	9.1667E-01	2,457.879	4,915.758	0.00E+00	2.25E+03	4.51E+03		
Tc-99	3.9357E-04	2,457.879	4,915.758	0.00E+00	9.67E-01	1.93E+00		
Th-229	1.2057E-10	2,457.879	4,915.758	0.00E+00	2.96E-07	5.93E-07		
Th-230	2.1043E-08	2,457.879	4,915.758	0.00E+00	5.17E-05	1.03E-04		
Th-232	5.2972E-12	2,457.879	4,915.758	0.00E+00	1.30E-08	2.60E-08		
Ti-208	1.7474E-07	2,457.879	4,915.758	0.00E+00	4.29E-04	8.59E-04		
U-232	4.7368E-07	2,457.879	4,915.758	0.00E+00	1.16E-03	2.33E-03		
U-233	2.5097E-08	2,457.879	4,915.758	0.00E+00	6.17E-05	1.23E-04		
U-234	5.0000E-05	2,457.879	4,915.758	0.00E+00	1.23E-01	2.46E-01		
U-235	-1.4489E-06	2,457.879	0.000	2.83E-03	0.00E+00	2.83E-03		
U-236	7.5824E-06	2,457.879	4,915.758	0.00E+00	1.86E-02	3.73E-02		
U-238	-2.6129E-07	2,457.879	0.000	1.33E-02	1.27E-02	1.33E-02		
Y-90	9.1699E-01	2,457.879	4,915.758	0.00E+00	2.25E+03	4.51E+03		
Other Radionuclides					3.30E+03	6.60E+03		

Thermal Power	
Nominal Heat	Bounding
Output (Watts)	Heat Output (Watts)
5.65E+01	1.13E+02
Total	Total

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 (unknown).
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		2,457.879	Nominal burnup taken from SFD and converted to MWd using BOL=40.965kg Bounding burnup assumed to be twice nominal burnup.
Bounding:		4,915.758	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.71		1.01
Bounding:	3.43		

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: CONNECTICUT YANKEE (S004)
 SNF ID #: 34
 Fuel Units & Descr: 1 - 15 X 15 ROD ARRAY
 Heavy Metal Mass: BOL=407.84kg ; EOL=393.77kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1975
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 PWR
 1.00

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	3.4276E-08	13,290.342	26,580.683	0.00E+00	4.56E-04	9.11E-04	0.0150	1.386E+15
Am-241	1.1458E-04	13,290.342	26,580.683	0.00E+00	1.52E+00	3.05E+00	0.0250	2.880E+14
Am-242m	7.9468E-09	13,290.342	26,580.683	0.00E+00	1.06E-04	2.11E-04	0.0375	2.497E+14
Am-243	9.8386E-10	13,290.342	26,580.683	0.00E+00	1.31E-05	2.62E-05	0.0575	2.686E+14
C-14	2.2978E-04	13,290.342	26,580.683	0.00E+00	3.05E+00	6.11E+00	0.0850	1.622E+14
Ci-96	1.2261E-06	13,290.342	26,580.683	0.00E+00	1.63E-02	3.26E-02	0.1250	1.532E+14
Cm-243	1.7271E-10	13,290.342	26,580.683	0.00E+00	2.30E-06	4.59E-06	0.2250	1.398E+14
Cm-244	1.3058E-09	13,290.342	26,580.683	0.00E+00	1.74E-05	3.47E-05	0.3750	6.099E+13
Co-60	9.8636E-03	13,290.342	26,580.683	0.00E+00	1.31E+02	2.62E+02	0.7500	1.015E+15
Cs-134	1.9617E-08	13,290.342	26,580.683	0.00E+00	2.61E-04	5.21E-04	0.8500	1.003E+13
Cs-135	3.0316E-05	13,290.342	26,580.683	0.00E+00	4.03E-01	8.06E-01	1.2500	2.283E+13
Cs-137	1.0283E+00	13,290.342	26,580.683	0.00E+00	1.36E+04	2.73E+04	1.7500	2.582E+11
Eu-154	2.0017E-04	13,290.342	26,580.683	0.00E+00	2.66E+00	5.32E+00	2.2500	1.308E+08
Eu-155	8.5957E-05	13,290.342	26,580.683	0.00E+00	1.14E+00	2.28E+00	2.7500	1.782E+07
Fe-55	2.2646E-05	13,290.342	26,580.683	0.00E+00	3.01E-01	6.02E-01	3.5000	2.250E+03
H-3	1.0835E-03	13,290.342	26,580.683	0.00E+00	1.44E+01	2.88E+01	5.0000	9.404E+02
I-129	7.3195E-07	13,290.342	26,580.683	0.00E+00	9.73E-03	1.95E-02	7.0000	1.053E+02
Kr-85	1.5661E-02	13,290.342	26,580.683	0.00E+00	2.08E+02	4.16E+02	11.0000	1.191E+01
Np-237	1.1494E-06	13,290.342	26,580.683	0.00E+00	1.53E-02	3.06E-02		
Pa-231	5.8070E-08	13,290.342	26,580.683	0.00E+00	7.72E-04	1.54E-03		
Pb-210	1.2985E-12	13,290.342	26,580.683	0.00E+00	1.73E-08	3.45E-08		
Pm-147	2.2196E-05	13,290.342	26,580.683	0.00E+00	2.95E-01	5.90E-01		
Pu-238	2.6223E-04	13,290.342	26,580.683	0.00E+00	3.49E+00	6.97E+00		
Pu-239	6.8739E-04	13,290.342	26,580.683	0.00E+00	8.87E+00	1.77E+01		
Pu-240	8.6705E-05	13,290.342	26,580.683	0.00E+00	1.15E+00	2.30E+00		
Pu-241	3.4759E-04	13,290.342	26,580.683	0.00E+00	4.62E+00	9.24E+00		
Pu-242	1.9717E-09	13,290.342	26,580.683	0.00E+00	2.62E-05	5.24E-05		
Ra-226	3.0000E-12	13,290.342	26,580.683	0.00E+00	3.99E-08	7.97E-08		
Ra-228	8.3328E-12	13,290.342	26,580.683	0.00E+00	1.11E-07	2.21E-07		
Ru-106	6.1464E-15	13,290.342	26,580.683	0.00E+00	8.17E-11	1.63E-10		
Se-79	1.3221E-05	13,290.342	26,580.683	0.00E+00	1.76E-01	3.51E-01		
Sn-126	1.1491E-05	13,290.342	26,580.683	0.00E+00	1.53E-01	3.05E-01		
Sr-90	9.5541E-01	13,290.342	26,580.683	0.00E+00	1.27E+04	2.54E+04		
Tc-99	4.6656E-04	13,290.342	26,580.683	0.00E+00	6.20E+00	1.24E+01		
Th-229	1.9085E-11	13,290.342	26,580.683	0.00E+00	2.54E-07	5.07E-07		
Th-230	2.1913E-10	13,290.342	26,580.683	0.00E+00	2.91E-06	5.82E-06		
Th-232	8.3478E-12	13,290.342	26,580.683	0.00E+00	1.11E-07	2.22E-07		
Ti-208	1.8752E-08	13,290.342	26,580.683	0.00E+00	2.49E-04	4.98E-04		
U-232	5.0782E-08	13,290.342	26,580.683	0.00E+00	6.75E-04	1.35E-03		
U-233	3.2596E-09	13,290.342	26,580.683	0.00E+00	4.33E-05	8.66E-05		
U-234	3.9817E-07	13,290.342	26,580.683	0.00E+00	5.29E-03	1.06E-02		
U-235	-2.7761E-06	13,290.342	0.000	3.53E-02	0.00E+00	3.53E-02		
U-236	1.6190E-05	13,290.342	26,580.683	0.00E+00	2.15E-01	4.30E-01		
U-238	-2.8547E-09	13,290.342	0.000	1.32E-01	1.32E-01	1.32E-01		
Y-90	9.5557E-01	13,290.342	26,580.683	0.00E+00	1.27E+04	2.54E+04		
Other Radionuclides					1.62E+04	3.24E+04		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							1.55E+02	3.10E+02
							Total	Total

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 Pathfinder Template on all but one parameter (enrichment) making Pathfinder a reasonable match.
Fuel Cladding:	SST (304L)	SST	
BOL HM Constituents:	UC2	U	
BOL Enrichment %:	4.00000037	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	13,139.889	13,290.342	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		26,580.683	Bounding burnup assumed to be twice nominal burnup.

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.70	1.01
Bounding:	1.40	
		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: COOPER NUCLEAR
 SNF ID #: 308
 Fuel Units & Descr: 2 - 7 X 7 ROD ARRAY
 Heavy Metal Mass: BOL=370.00kg ; EOL=368.20kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1982
 Estimates as of: 2030
 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"x15"
 1.00

Radionuclide	m		x _n		x _b		b		y _n		y _b		Gamma Sources	
	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	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	8.7758E-10	10,273.050	10,273.050	10,378.500	0.00E+00	9.02E-06	9.11E-06	0.0150	5.584E+14	0.0150				
Am-241	1.4352E-01	10,273.050	10,273.050	10,378.500	0.00E+00	1.47E+03	1.49E+03	0.0250	1.126E+14	0.0250				
Am-242m	2.8698E-04	10,273.050	10,273.050	10,378.500	0.00E+00	2.95E+00	2.98E+00	0.0375	1.074E+14	0.0375				
Am-243	6.2565E-04	10,273.050	10,273.050	10,378.500	0.00E+00	6.43E+00	6.49E+00	0.0575	1.241E+14	0.0575				
C-14	4.7901E-05	10,273.050	10,273.050	10,378.500	0.00E+00	4.92E-01	4.97E-01	0.0850	6.248E+13	0.0850				
Cl-36	8.0297E-07	10,273.050	10,273.050	10,378.500	0.00E+00	8.25E-03	8.33E-03	0.1250	4.336E+13	0.1250				
Cm-243	2.5081E-04	10,273.050	10,273.050	10,378.500	0.00E+00	2.58E+00	2.60E+00	0.2250	5.358E+13	0.2250				
Cm-244	4.9015E-02	10,273.050	10,273.050	10,378.500	0.00E+00	5.04E+02	5.09E+02	0.3750	2.304E+13	0.3750				
Co-60	2.5581E-03	10,273.050	10,273.050	10,378.500	0.00E+00	2.63E+01	2.65E+01	0.5750	5.358E+12	0.5750				
Cs-134	4.0536E-05	10,273.050	10,273.050	10,378.500	0.00E+00	4.16E-01	4.21E-01	0.8500	7.413E+14	0.8500				
Cs-135	1.4433E-05	10,273.050	10,273.050	10,378.500	0.00E+00	1.48E-01	1.50E-01	1.2500	7.282E+12	1.2500				
Cs-137	1.3979E+00	10,273.050	10,273.050	10,378.500	0.00E+00	1.44E+04	1.45E+04	1.7500	2.181E+11	1.7500				
Eu-154	2.0203E-02	10,273.050	10,273.050	10,378.500	0.00E+00	2.08E+02	2.10E+02	2.2500	3.512E+07	2.2500				
Eu-155	1.7684E-03	10,273.050	10,273.050	10,378.500	0.00E+00	1.82E+01	1.84E+01	2.7500	7.194E+07	2.7500				
Fe-55	4.3136E-05	10,273.050	10,273.050	10,378.500	0.00E+00	4.43E-01	4.48E-01	3.5000	7.409E+06	3.5000				
H-3	2.0769E-02	10,273.050	10,273.050	10,378.500	0.00E+00	2.13E+02	2.16E+02	5.0000	3.167E+06	5.0000				
I-129	9.8288E-07	10,273.050	10,273.050	10,378.500	0.00E+00	1.01E-02	1.02E-02	7.0000	3.651E+05	7.0000				
Kr-85	2.8214E-02	10,273.050	10,273.050	10,378.500	0.00E+00	2.90E+02	2.93E+02	11.0000	4.193E+04	11.0000				
Np-237	1.1218E-05	10,273.050	10,273.050	10,378.500	0.00E+00	1.15E-01	1.16E-01							
Pa-231	1.3036E-09	10,273.050	10,273.050	10,378.500	0.00E+00	1.34E-05	1.35E-05							
Pb-210	8.5078E-11	10,273.050	10,273.050	10,378.500	0.00E+00	8.74E-07	8.83E-07							
Pm-147	3.6531E-04	10,273.050	10,273.050	10,378.500	0.00E+00	3.75E+00	3.79E+00							
Pu-238	7.4564E-02	10,273.050	10,273.050	10,378.500	0.00E+00	7.66E+02	7.74E+02							
Pu-239	1.1623E-02	10,273.050	10,273.050	10,378.500	0.00E+00	1.19E+02	1.21E+02							
Pu-240	1.5132E-02	10,273.050	10,273.050	10,378.500	0.00E+00	1.55E+02	1.57E+02							
Pu-241	9.0036E-01	10,273.050	10,273.050	10,378.500	0.00E+00	9.25E+03	9.34E+03							
Pu-242	6.4260E-05	10,273.050	10,273.050	10,378.500	0.00E+00	6.60E-01	6.67E-01							
Ra-226	2.2804E-10	10,273.050	10,273.050	10,378.500	0.00E+00	2.34E-06	2.37E-06							
Ra-228	5.2713E-12	10,273.050	10,273.050	10,378.500	0.00E+00	5.42E-08	5.47E-08							
Ru-106	6.1160E-10	10,273.050	10,273.050	10,378.500	0.00E+00	6.28E-06	6.35E-06							
Se-79	1.2377E-05	10,273.050	10,273.050	10,378.500	0.00E+00	1.27E-01	1.28E-01							
Sn-126	2.5210E-05	10,273.050	10,273.050	10,378.500	0.00E+00	2.59E-01	2.62E-01							
Sr-90	9.1667E-01	10,273.050	10,273.050	10,378.500	0.00E+00	9.42E+03	9.51E+03							
Tc-99	3.9357E-04	10,273.050	10,273.050	10,378.500	0.00E+00	4.04E+00	4.08E+00							
Th-229	1.2057E-10	10,273.050	10,273.050	10,378.500	0.00E+00	1.24E-06	1.25E-06							
Th-230	2.1043E-08	10,273.050	10,273.050	10,378.500	0.00E+00	2.16E-04	2.18E-04							
Th-232	5.2972E-12	10,273.050	10,273.050	10,378.500	0.00E+00	5.44E-08	5.50E-08							
Tl-208	1.7474E-07	10,273.050	10,273.050	10,378.500	0.00E+00	1.80E-03	1.81E-03							
U-232	4.7368E-07	10,273.050	10,273.050	10,378.500	0.00E+00	4.87E-03	4.92E-03							
U-233	2.5097E-08	10,273.050	10,273.050	10,378.500	0.00E+00	2.58E-04	2.60E-04							
U-234	5.0000E-05	10,273.050	10,273.050	10,378.500	0.00E+00	5.14E-01	5.19E-01							
U-235	-1.4489E-06	10,273.050	0.000	1.28E-02	0.00E+00	0.00E+00	1.28E-02							
U-236	7.5824E-06	10,273.050	10,273.050	10,378.500	0.00E+00	7.79E-02	7.87E-02							
U-238	-2.6129E-07	10,273.050	0.000	1.22E-01	1.20E-01	1.20E-01	1.22E-01							
Y-90	9.1699E-01	10,273.050	10,273.050	10,378.500	0.00E+00	9.42E+03	9.52E+03							
Other Radionuclides						1.38E+04	1.39E+04							

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.36E+02	2.39E+02
Total	Total

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-2	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	1.6	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	10,273.050	1,711.715	
Bounding:	10,378.500	3,423.430	

Nominal burnup taken directly from SFD (converted to MWd).
 Bounding burnup taken directly from SFD (converted to MWd).

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.79	0.17	
Bounding:	0.80	0.33	

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: CP-5 CONVERTER CYLINDERS
 SNF ID #: 36
 Fuel Units & Descr: 2 - CONVERTER CYLINDERS
 Heavy Metal Mass: BOL=1.23kg ; EOL=1.21kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1979
 Estimates as of: 2030
 Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
²Template Burnup(MWd): 5
 Template BOL Heavy Metal Mass (MT): 0.00034251
 Template Decay Time: 50 years

Estimated
 Canister usage:
 HIC
 1.00

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	6.2320E-09	24.539	49.078	0.00E+00	1.53E-07	3.06E-07	0.0150	2.395E+12
Am-241	2.3540E-02	24.539	49.078	0.00E+00	5.78E-01	1.16E+00	0.0250	4.954E+11
Am-242m	3.3060E-06	24.539	49.078	0.00E+00	8.11E-05	1.62E-04	0.0375	4.359E+11
Am-243	2.0560E-06	24.539	49.078	0.00E+00	5.05E-05	1.01E-04	0.0575	4.768E+11
C-14	1.1244E-03	24.539	49.078	0.00E+00	2.76E-02	5.52E-02	0.0850	2.782E+11
Cl-36	8.3760E-11	24.539	49.078	0.00E+00	2.06E-09	4.11E-09	0.1250	1.817E+11
Cm-243	3.4960E-07	24.539	49.078	0.00E+00	8.58E-06	1.72E-05	0.2250	2.396E+11
Cm-244	5.8860E-06	24.539	49.078	0.00E+00	1.44E-04	2.89E-04	0.3750	1.043E+11
Co-60	8.9560E-03	24.539	49.078	0.00E+00	2.20E-01	4.40E-01	0.5750	1.846E+12
Cs-134	5.1180E-08	24.539	49.078	0.00E+00	1.26E-06	2.51E-06	0.8500	1.876E+10
Cs-135	7.9140E-06	24.539	49.078	0.00E+00	1.94E-04	3.88E-04	1.2500	4.005E+10
Cs-137	1.0122E+00	24.539	49.078	0.00E+00	2.48E+01	4.97E+01	1.7500	4.937E+08
Eu-154	2.0260E-03	24.539	49.078	0.00E+00	4.97E-02	9.94E-02	2.2500	2.208E+05
Eu-155	7.7180E-05	24.539	49.078	0.00E+00	1.89E-03	3.79E-03	2.7500	6.984E+04
Fe-55	1.0538E-06	24.539	49.078	0.00E+00	2.59E-05	5.17E-05	3.5000	2.484E+02
H-3	1.0256E-02	24.539	49.078	0.00E+00	2.52E-01	5.03E-01	5.0000	1.042E+02
I-129	7.5020E-07	24.539	49.078	0.00E+00	1.84E-05	3.68E-05	7.0000	1.172E+01
Kr-85	1.4492E-02	24.539	49.078	0.00E+00	3.56E-01	7.11E-01	11.0000	1.330E+00
Np-237	5.6900E-06	24.539	49.078	0.00E+00	1.40E-04	2.79E-04		
Pa-231	9.4900E-09	24.539	49.078	0.00E+00	2.33E-07	4.66E-07		
Pb-210	8.6720E-09	24.539	49.078	0.00E+00	2.13E-07	4.26E-07		
Pm-147	1.8906E-05	24.539	49.078	0.00E+00	4.64E-04	9.28E-04		
Pu-238	5.7080E-03	24.539	49.078	0.00E+00	1.40E-01	2.80E-01		
Pu-239	1.8736E-02	24.539	49.078	0.00E+00	4.60E-01	9.20E-01		
Pu-240	8.3420E-03	24.539	49.078	0.00E+00	2.05E-01	4.09E-01		
Pu-241	7.0960E-02	24.539	49.078	0.00E+00	1.74E+00	3.48E+00		
Pu-242	2.0400E-06	24.539	49.078	0.00E+00	5.01E-05	1.00E-04		
Ra-226	1.9722E-08	24.539	49.078	0.00E+00	4.84E-07	9.68E-07		
Ra-228	1.1912E-09	24.539	49.078	0.00E+00	2.92E-08	5.85E-08		
Ru-106	1.0798E-14	24.539	49.078	0.00E+00	2.65E-13	5.30E-13		
Se-79	1.2522E-05	24.539	49.078	0.00E+00	3.07E-04	6.15E-04		
Sn-126	1.2052E-05	24.539	49.078	0.00E+00	2.96E-04	5.91E-04		
Sr-90	8.8440E-01	24.539	49.078	0.00E+00	2.17E+01	4.34E+01		
Tc-99	4.4120E-04	24.539	49.078	0.00E+00	1.08E-02	2.17E-02		
Th-229	5.6400E-09	24.539	49.078	0.00E+00	1.38E-07	2.77E-07		
Th-230	1.3922E-06	24.539	49.078	0.00E+00	3.42E-05	6.83E-05		
Th-232	1.1926E-09	24.539	49.078	0.00E+00	2.93E-08	5.85E-08		
Tl-208	4.0060E-08	24.539	49.078	0.00E+00	9.83E-07	1.97E-06		
U-232	1.0738E-07	24.539	49.078	0.00E+00	2.63E-06	5.27E-06		
U-233	9.1640E-07	24.539	49.078	0.00E+00	2.25E-05	4.50E-05		
U-234	2.3440E-03	24.539	49.078	0.00E+00	5.75E-02	1.15E-01		
U-235	-2.3296E-06	24.539	0.000	2.47E-03	2.42E-03	2.47E-03		
U-236	2.6620E-05	24.539	49.078	0.00E+00	6.53E-04	1.31E-03		
U-238	-1.3291E-07	24.539	0.000	2.90E-05	2.57E-05	2.90E-05		
Y-90	8.8460E-01	24.539	49.078	0.00E+00	2.17E+01	4.34E+01		
Other Radionuclides					2.37E+01	4.74E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.16E-01	6.32E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
HEAVY WATER	HEAVY WATER	HEAVY WATER	This Template was used for the following reasons: This fuel matches on all parameters except enrichment.
Fuel Cladding:	ZIRC-2	ZIRC	
BOL HM Constituents:	U-Zr	U	
BOL Enrichment %:	92.99999968	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
24.539	24.539	24.539	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		49.078	

Checks		
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup
	1.37	
Bounding:	2.73	
		Estimated EOL HM/ Given EOL HM
		1.01

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: CVTR FUEL
 SNF ID #: 37
 Fuel Units & Descr: 34 - ROD
 Heavy Metal Mass: BOL=68.66kg ; EOL=67.47kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1967
 Estimates as of: 2030
 Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
²Template Burnup(MWd): 5
 Template BOL Heavy Metal Mass (MT): 0.00034251
 Template Decay Time: 50 years

Estimated
 Canister usage:
 18"x15"
 0.45

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	6.2320E-09	1,137.419	2,274.839	0.00E+00	7.09E-06	1.42E-05		
Am-241	2.3540E-02	1,137.419	2,274.839	0.00E+00	2.68E+01	5.35E+01	0.0150	1.110E+14
Am-242m	3.3060E-06	1,137.419	2,274.839	0.00E+00	3.76E-03	7.52E-03	0.0250	2.296E+13
Am-243	2.0560E-06	1,137.419	2,274.839	0.00E+00	2.34E-03	4.68E-03	0.0375	2.020E+13
C-14	1.1244E-03	1,137.419	2,274.839	0.00E+00	1.28E+00	2.56E+00	0.0575	2.210E+13
Cl-36	8.3760E-11	1,137.419	2,274.839	0.00E+00	9.53E-08	1.91E-07	0.0850	1.289E+13
Cm-243	3.4960E-07	1,137.419	2,274.839	0.00E+00	3.98E-04	7.95E-04	0.1250	8.420E+12
Cm-244	5.8860E-06	1,137.419	2,274.839	0.00E+00	6.69E-03	1.34E-02	0.2250	1.111E+13
Co-60	8.9560E-03	1,137.419	2,274.839	0.00E+00	1.02E+01	2.04E+01	0.3750	4.834E+12
Cs-134	5.1180E-08	1,137.419	2,274.839	0.00E+00	5.82E-05	1.16E-04	0.5750	8.557E+13
Cs-135	7.9140E-06	1,137.419	2,274.839	0.00E+00	9.00E-03	1.80E-02	0.8500	8.698E+11
Cs-137	1.0122E+00	1,137.419	2,274.839	0.00E+00	1.15E+03	2.30E+03	1.2500	1.856E+12
Eu-154	2.0260E-03	1,137.419	2,274.839	0.00E+00	2.30E+00	4.61E+00	1.7500	2.288E+10
Eu-155	7.7180E-05	1,137.419	2,274.839	0.00E+00	8.78E-02	1.76E-01	2.2500	1.023E+07
Fe-55	1.0538E-06	1,137.419	2,274.839	0.00E+00	1.20E-03	2.40E-03	2.7500	3.237E+06
H-3	1.0256E-02	1,137.419	2,274.839	0.00E+00	1.17E+01	2.33E+01	3.5000	1.163E+04
I-129	7.5020E-07	1,137.419	2,274.839	0.00E+00	8.53E-04	1.71E-03	5.0000	4.879E+03
Kr-85	1.4492E-02	1,137.419	2,274.839	0.00E+00	1.65E+01	3.30E+01	7.0000	5.487E+02
Np-237	5.6900E-06	1,137.419	2,274.839	0.00E+00	6.47E-03	1.29E-02	11.0000	6.227E+01
Pa-231	9.4900E-09	1,137.419	2,274.839	0.00E+00	1.08E-05	2.16E-05		
Pb-210	8.6720E-09	1,137.419	2,274.839	0.00E+00	9.86E-06	1.97E-05		
Pm-147	1.8906E-05	1,137.419	2,274.839	0.00E+00	2.15E-02	4.30E-02		
Pu-238	5.7080E-03	1,137.419	2,274.839	0.00E+00	6.49E+00	1.30E+01		
Pu-239	1.8736E-02	1,137.419	2,274.839	0.00E+00	2.13E+01	4.26E+01		
Pu-240	8.3420E-03	1,137.419	2,274.839	0.00E+00	9.49E+00	1.90E+01		
Pu-241	7.0960E-02	1,137.419	2,274.839	0.00E+00	8.07E+01	1.61E+02		
Pu-242	2.0400E-06	1,137.419	2,274.839	0.00E+00	2.32E-03	4.64E-03		
Ra-226	1.9722E-08	1,137.419	2,274.839	0.00E+00	2.24E-05	4.49E-05		
Ra-228	1.1912E-09	1,137.419	2,274.839	0.00E+00	1.35E-06	2.71E-06		
Ru-106	1.0798E-14	1,137.419	2,274.839	0.00E+00	1.23E-11	2.46E-11		
Se-79	1.2522E-05	1,137.419	2,274.839	0.00E+00	1.42E-02	2.85E-02		
Sn-126	1.2052E-05	1,137.419	2,274.839	0.00E+00	1.37E-02	2.74E-02		
Sr-90	8.8440E-01	1,137.419	2,274.839	0.00E+00	1.01E+03	2.01E+03		
Tc-99	4.4120E-04	1,137.419	2,274.839	0.00E+00	5.02E-01	1.00E+00		
Th-229	5.6400E-09	1,137.419	2,274.839	0.00E+00	6.42E-06	1.28E-05		
Th-230	1.3922E-06	1,137.419	2,274.839	0.00E+00	1.58E-03	3.17E-03		
Th-232	1.1926E-09	1,137.419	2,274.839	0.00E+00	1.36E-06	2.71E-06		
Tl-208	4.0060E-08	1,137.419	2,274.839	0.00E+00	4.56E-05	9.11E-05		
U-232	1.0738E-07	1,137.419	2,274.839	0.00E+00	1.22E-04	2.44E-04		
U-233	9.1640E-07	1,137.419	2,274.839	0.00E+00	1.04E-03	2.08E-03		
U-234	2.3440E-03	1,137.419	2,274.839	0.00E+00	2.67E+00	5.33E+00		
U-235	2.3296E-06	1,137.419	0.000	2.67E-03	2.09E-05	2.67E-03		
U-236	2.6620E-05	1,137.419	2,274.839	0.00E+00	3.03E-02	6.06E-02		
U-238	-1.3291E-07	1,137.419	0.000	2.27E-02	2.25E-02	2.27E-02		
Y-90	8.8460E-01	1,137.419	2,274.839	0.00E+00	1.01E+03	2.01E+03		
Other Radionuclides					1.10E+03	2.20E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.46E+01	2.93E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	HEAVY WATER	HEAVY WATER	This Template was used for the following reasons: This fuel matches on all parameters except possibly cladding.
Fuel Cladding:	ZIRC OR SST	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	1.800011479	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		1,137.419	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		2,274.839	

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 (DENMARK)
 SNF ID #: 759
 Fuel Units & Descr: 375 - 4 CONCENTRIC TUBES
 Heavy Metal Mass: BOL=341.66kg ; EOL=309.11kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1997
 Estimates as of: 2030
 Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
²Template Burnup(MWd): 15
 Template BOL Heavy Metal Mass (MT): 0.00034251
 Template Decay Time: 25 years

Estimated
 Canister usage:
 18"x10"
 12.50

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	1.4973E-09	30,937.629	61,875.258	0.00E+00	4.63E-05	9.26E-05	0.0150	5.562E+15
Am-241	2.6120E-02	30,937.629	61,875.258	0.00E+00	8.08E+02	1.62E+03	0.0250	1.154E+15
Am-242m	8.7133E-06	30,937.629	61,875.258	0.00E+00	2.70E-01	5.39E-01	0.0375	1.012E+15
Am-243	6.3980E-06	30,937.629	61,875.258	0.00E+00	1.98E-01	3.96E-01	0.0575	1.098E+15
C-14	2.9600E-08	30,937.629	61,875.258	0.00E+00	9.16E-04	1.83E-03	0.0850	6.497E+14
Cl-36	5.9507E-35	30,937.629	61,875.258	0.00E+00	1.84E-30	3.68E-30	0.1250	4.335E+14
Cm-243	1.9560E-06	30,937.629	61,875.258	0.00E+00	6.05E-02	1.21E-01	0.2250	5.603E+14
Cm-244	9.0867E-05	30,937.629	61,875.258	0.00E+00	2.81E+00	5.62E+00	0.3750	2.435E+14
Co-60	8.4667E-06	30,937.629	61,875.258	0.00E+00	2.62E-01	5.24E-01	0.5750	4.152E+15
Cs-134	3.9760E-04	30,937.629	61,875.258	0.00E+00	1.23E+01	2.46E+01	0.8500	5.539E+13
Cs-135	4.8607E-06	30,937.629	61,875.258	0.00E+00	1.50E-01	3.01E-01	1.2500	2.993E+13
Cs-137	1.8020E+00	30,937.629	61,875.258	0.00E+00	5.57E+04	1.11E+05	1.7500	1.519E+12
Eu-154	1.3960E-02	30,937.629	61,875.258	0.00E+00	4.32E+02	8.64E+02	2.2500	1.135E+08
Eu-155	2.0313E-03	30,937.629	61,875.258	0.00E+00	6.28E+01	1.26E+02	2.7500	1.634E+07
Fe-55	3.7360E-04	30,937.629	61,875.258	0.00E+00	1.16E+01	2.31E+01	3.5000	3.092E+05
H-3	3.5233E-03	30,937.629	61,875.258	0.00E+00	1.09E+02	2.18E+02	5.0000	1.227E+05
I-129	7.1600E-07	30,937.629	61,875.258	0.00E+00	2.22E-02	4.43E-02	7.0000	1.384E+04
Kr-85	7.4133E-02	30,937.629	61,875.258	0.00E+00	2.29E+03	4.59E+03	11.0000	1.573E+03
Np-237	3.8020E-06	30,937.629	61,875.258	0.00E+00	1.18E-01	2.35E-01		
Pa-231	3.7020E-09	30,937.629	61,875.258	0.00E+00	1.15E-04	2.29E-04		
Pb-210	1.4067E-13	30,937.629	61,875.258	0.00E+00	4.35E-09	8.70E-09		
Pm-147	1.2360E-02	30,937.629	61,875.258	0.00E+00	3.82E+02	7.65E+02		
Pu-238	5.3133E-03	30,937.629	61,875.258	0.00E+00	1.64E+02	3.29E+02		
Pu-239	1.0313E-02	30,937.629	61,875.258	0.00E+00	3.19E+02	6.38E+02		
Pu-240	5.4153E-03	30,937.629	61,875.258	0.00E+00	1.68E+02	3.35E+02		
Pu-241	2.9540E-01	30,937.629	61,875.258	0.00E+00	9.14E+03	1.83E+04		
Pu-242	3.0713E-06	30,937.629	61,875.258	0.00E+00	9.50E-02	1.90E-01		
Ra-226	5.9440E-13	30,937.629	61,875.258	0.00E+00	1.84E-08	3.68E-08		
Ra-228	1.6733E-14	30,937.629	61,875.258	0.00E+00	5.18E-10	1.04E-09		
Ru-106	2.7233E-07	30,937.629	61,875.258	0.00E+00	8.43E-03	1.69E-02		
Se-79	1.2533E-05	30,937.629	61,875.258	0.00E+00	3.88E-01	7.76E-01		
Sn-126	1.1393E-05	30,937.629	61,875.258	0.00E+00	3.52E-01	7.05E-01		
Sr-90	1.6333E+00	30,937.629	61,875.258	0.00E+00	5.05E+04	1.01E+05		
Tc-99	4.3533E-04	30,937.629	61,875.258	0.00E+00	1.35E+01	2.69E+01		
Th-229	1.0827E-12	30,937.629	61,875.258	0.00E+00	3.35E-08	6.70E-08		
Th-230	1.0793E-10	30,937.629	61,875.258	0.00E+00	3.34E-06	6.68E-06		
Th-232	2.2773E-14	30,937.629	61,875.258	0.00E+00	7.05E-10	1.41E-09		
Th-230	7.3067E-09	30,937.629	61,875.258	0.00E+00	2.26E-04	4.52E-04		
U-232	1.9833E-08	30,937.629	61,875.258	0.00E+00	6.14E-04	1.23E-03		
U-233	6.0453E-10	30,937.629	61,875.258	0.00E+00	1.87E-05	3.74E-05		
U-234	6.1000E-07	30,937.629	61,875.258	0.00E+00	1.89E-02	3.77E-02		
U-235	-2.5335E-06	30,937.629	0.000	1.46E-01	6.75E-02	1.46E-01		
U-236	1.3000E-05	30,937.629	61,875.258	0.00E+00	4.02E-01	8.04E-01		
U-238	-1.4207E-08	30,937.629	0.000	9.21E-02	9.17E-02	9.21E-02		
Y-90	1.6340E+00	30,937.629	61,875.258	0.00E+00	5.06E+04	1.01E+05		
Other Radionuclides					5.29E+04	1.06E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.63E+02	1.33E+03
Total	Total

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:	U3Si2	U	
BOL Enrichment %:	19.7578539	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		30,937.629	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		61,875.258	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	2.07		1.02
Bounding:	4.14		

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 (DENMARK)
 SNF ID #: 1059
 Fuel Units & Descr: 3 - 4 CONCENTRIC TUBES
 Heavy Metal Mass: BOL=2.75kg ; EOL=2.52kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1997
 Estimates as of: 2030
 Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
²Template Burnup(MWd): 15
 Template BOL Heavy Metal Mass (MT): 0.00034251
 Template Decay Time: 25 years

Estimated
 Canister usage:
 18"x10"
 0.10

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	1.4973E-09	224.120	448.239	0.00E+00	3.36E-07	6.71E-07	Avg. MeV	
Am-241	2.6120E-02	224.120	448.239	0.00E+00	5.85E+00	1.17E+01	0.0150	4.029E+13
Am-242m	8.7133E-06	224.120	448.239	0.00E+00	1.95E-03	3.91E-03	0.0250	8.360E+12
Am-243	6.3980E-06	224.120	448.239	0.00E+00	1.43E-03	2.87E-03	0.0375	7.333E+12
C-14	2.9600E-08	224.120	448.239	0.00E+00	6.63E-06	1.33E-05	0.0575	7.951E+12
Cf-252	5.9507E-35	224.120	448.239	0.00E+00	1.33E-32	2.67E-32	0.0850	4.707E+12
Cm-243	1.9560E-06	224.120	448.239	0.00E+00	4.38E-04	8.77E-04	0.1250	3.140E+12
Cm-244	9.0867E-05	224.120	448.239	0.00E+00	2.04E-02	4.07E-02	0.2250	4.059E+12
Co-60	8.4667E-06	224.120	448.239	0.00E+00	1.90E-03	3.80E-03	0.3750	1.764E+12
Cs-134	3.9760E-04	224.120	448.239	0.00E+00	8.91E-02	1.78E-01	0.5750	3.008E+13
Cs-135	4.8607E-06	224.120	448.239	0.00E+00	1.09E-03	2.18E-03	0.8500	4.008E+11
Cs-137	1.8020E+00	224.120	448.239	0.00E+00	4.04E+02	8.08E+02	1.2500	2.168E+11
Eu-154	1.3960E-02	224.120	448.239	0.00E+00	3.13E+00	6.26E+00	1.7500	1.101E+10
Eu-155	2.0313E-03	224.120	448.239	0.00E+00	4.55E-01	9.11E-01	2.2500	8.221E+05
Fe-55	3.7360E-04	224.120	448.239	0.00E+00	8.37E-02	1.67E-01	2.7500	1.184E+05
H-3	3.5233E-03	224.120	448.239	0.00E+00	7.90E-01	1.58E+00	3.5000	2.241E+03
I-129	7.1600E-07	224.120	448.239	0.00E+00	1.60E-04	3.21E-04	5.0000	8.887E+02
Kr-85	7.4133E-02	224.120	448.239	0.00E+00	1.66E+01	3.32E+01	7.0000	1.003E+02
Np-237	3.8020E-06	224.120	448.239	0.00E+00	8.52E-04	1.70E-03	11.0000	1.140E+01
Pa-231	3.7020E-09	224.120	448.239	0.00E+00	8.30E-07	1.66E-06		
Pb-210	1.4067E-13	224.120	448.239	0.00E+00	3.15E-11	6.31E-11		
Pm-147	1.2360E-02	224.120	448.239	0.00E+00	2.77E+00	5.54E+00		
Pu-238	5.3133E-03	224.120	448.239	0.00E+00	1.19E+00	2.38E+00		
Pu-239	1.0313E-02	224.120	448.239	0.00E+00	2.31E+00	4.62E+00		
Pu-240	5.4153E-03	224.120	448.239	0.00E+00	1.21E+00	2.43E+00		
Pu-241	2.9540E-01	224.120	448.239	0.00E+00	6.62E+01	1.32E+02		
Pu-242	3.0713E-06	224.120	448.239	0.00E+00	6.88E-04	1.38E-03		
Ra-226	5.9440E-13	224.120	448.239	0.00E+00	1.33E-10	2.66E-10		
Ra-228	1.6733E-14	224.120	448.239	0.00E+00	3.75E-12	7.50E-12		
Ru-106	2.7233E-07	224.120	448.239	0.00E+00	6.10E-05	1.22E-04		
Se-79	1.2533E-05	224.120	448.239	0.00E+00	2.81E-03	5.62E-03		
Sn-126	1.1393E-05	224.120	448.239	0.00E+00	2.55E-03	5.11E-03		
Sr-90	1.6333E+00	224.120	448.239	0.00E+00	3.66E+02	7.32E+02		
Tc-99	4.3533E-04	224.120	448.239	0.00E+00	9.76E-02	1.95E-01		
Th-229	1.0827E-12	224.120	448.239	0.00E+00	2.43E-10	4.85E-10		
Th-230	1.0793E-10	224.120	448.239	0.00E+00	2.42E-08	4.84E-08		
Th-232	2.2773E-14	224.120	448.239	0.00E+00	5.10E-12	1.02E-11		
Tl-208	7.3067E-09	224.120	448.239	0.00E+00	1.64E-06	3.28E-06		
U-232	1.9833E-08	224.120	448.239	0.00E+00	4.45E-06	8.89E-06		
U-233	6.0453E-10	224.120	448.239	0.00E+00	1.35E-07	2.71E-07		
U-234	6.1000E-07	224.120	448.239	0.00E+00	1.37E-04	2.73E-04		
U-235	-2.5335E-06	224.120	0.000	1.16E-03	5.97E-04	1.16E-03		
U-236	1.3000E-05	224.120	448.239	0.00E+00	2.91E-03	5.83E-03		
U-238	-1.4207E-08	224.120	0.000	7.44E-04	7.41E-04	7.44E-04		
Y-90	1.6340E+00	224.120	448.239	0.00E+00	3.66E+02	7.32E+02		
Other Radionuclides					3.84E+02	7.67E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.80E+00	9.61E+00
Total	Total

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:	U3Si2	U	
BOL Enrichment %:	19.58291238	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		224.120	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		448.239	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.86		1.02
Bounding:	3.72		

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: DR-3 (DENMARK)
 SNF ID #: 714
 Fuel Units & Descr: 88 - 4 CONCENTRIC TUBES
 Heavy Metal Mass: BOL=14.53kg ; EOL=8.80kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1997
 Estimates as of: 2030
 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: 25 years

Estimated
 Canister usage:
 18"x10"
 2.93

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	5.4520E-10	5,276.815	10,553.630	0.00E+00	2.88E-06	5.75E-06	Avg. MeV	
Am-241	9.2284E-03	5,276.815	10,553.630	0.00E+00	4.87E+01	9.74E+01	0.0150	9.894E+14
Am-242m	1.3390E-06	5,276.815	10,553.630	0.00E+00	7.07E-03	1.41E-02	0.0250	2.036E+14
Am-243	3.7084E-05	5,276.815	10,553.630	0.00E+00	1.96E-01	3.91E-01	0.0375	1.798E+14
C-14	2.6452E-08	5,276.815	10,553.630	0.00E+00	1.40E-04	2.79E-04	0.0575	1.918E+14
Cl-36	4.4441E-31	5,276.815	10,553.630	0.00E+00	2.35E-27	4.69E-27	0.0850	1.154E+14
Cm-243	5.0498E-06	5,276.815	10,553.630	0.00E+00	2.66E-02	5.33E-02	0.1250	8.010E+13
Cm-244	3.8451E-03	5,276.815	10,553.630	0.00E+00	2.03E+01	4.06E+01	0.2250	9.963E+13
Co-60	2.5225E-05	5,276.815	10,553.630	0.00E+00	1.33E-01	2.66E-01	0.3750	4.313E+13
Cs-134	1.9830E-03	5,276.815	10,553.630	0.00E+00	1.05E+01	2.09E+01	0.5750	7.152E+14
Cs-135	4.2564E-06	5,276.815	10,553.630	0.00E+00	2.25E-02	4.49E-02	0.8500	1.408E+13
Cs-137	1.8141E+00	5,276.815	10,553.630	0.00E+00	9.57E+03	1.91E+04	1.2500	9.507E+12
Eu-154	3.4733E-02	5,276.815	10,553.630	0.00E+00	1.83E+02	3.67E+02	1.7500	3.935E+11
Eu-155	7.1081E-03	5,276.815	10,553.630	0.00E+00	3.75E+01	7.50E+01	2.2500	2.122E+07
Fe-55	3.5790E-04	5,276.815	10,553.630	0.00E+00	1.89E+00	3.78E+00	2.7500	1.823E+07
H-3	3.4945E-03	5,276.815	10,553.630	0.00E+00	1.84E+01	3.69E+01	3.5000	6.260E+05
I-129	6.6403E-07	5,276.815	10,553.630	0.00E+00	3.50E-03	7.01E-03	5.0000	2.653E+05
Kr-85	7.8250E-02	5,276.815	10,553.630	0.00E+00	4.13E+02	8.26E+02	7.0000	3.044E+04
Np-237	3.1567E-05	5,276.815	10,553.630	0.00E+00	1.67E-01	3.33E-01	11.0000	3.486E+03
Pa-231	1.3372E-09	5,276.815	10,553.630	0.00E+00	7.06E-06	1.41E-05		
Pb-210	3.0644E-11	5,276.815	10,553.630	0.00E+00	1.62E-07	3.23E-07		
Pm-147	6.5188E-03	5,276.815	10,553.630	0.00E+00	3.44E+01	6.88E+01		
Pu-238	1.4769E-01	5,276.815	10,553.630	0.00E+00	7.79E+02	1.56E+03		
Pu-239	6.9502E-04	5,276.815	10,553.630	0.00E+00	3.67E+00	7.33E+00		
Pu-240	3.7928E-04	5,276.815	10,553.630	0.00E+00	2.00E+00	4.00E+00		
Pu-241	1.0565E-01	5,276.815	10,553.630	0.00E+00	5.57E+02	1.11E+03		
Pu-242	3.0911E-06	5,276.815	10,553.630	0.00E+00	1.63E-02	3.26E-02		
Ra-226	1.1081E-10	5,276.815	10,553.630	0.00E+00	5.85E-07	1.17E-06		
Ra-228	2.1185E-14	5,276.815	10,553.630	0.00E+00	1.12E-10	2.24E-10		
Ru-106	2.3621E-07	5,276.815	10,553.630	0.00E+00	1.25E-03	2.49E-03		
Se-79	1.2339E-05	5,276.815	10,553.630	0.00E+00	6.51E-02	1.30E-01		
Sn-126	1.0194E-05	5,276.815	10,553.630	0.00E+00	5.38E-02	1.08E-01		
Sr-90	1.6932E+00	5,276.815	10,553.630	0.00E+00	8.93E+03	1.79E+04		
Tc-99	3.8056E-04	5,276.815	10,553.630	0.00E+00	2.01E+00	4.02E+00		
Th-229	9.1252E-12	5,276.815	10,553.630	0.00E+00	4.82E-08	9.63E-08		
Th-230	1.5407E-08	5,276.815	10,553.630	0.00E+00	8.13E-05	1.63E-04		
Th-232	2.8937E-14	5,276.815	10,553.630	0.00E+00	1.53E-10	3.05E-10		
Tl-208	4.7272E-08	5,276.815	10,553.630	0.00E+00	2.49E-04	4.99E-04		
U-232	1.2855E-07	5,276.815	10,553.630	0.00E+00	6.78E-04	1.36E-03		
U-233	5.1470E-09	5,276.815	10,553.630	0.00E+00	2.72E-05	5.43E-05		
U-234	5.6069E-05	5,276.815	10,553.630	0.00E+00	2.96E-01	5.92E-01		
U-235	-2.8661E-06	5,276.815	0.000	2.79E-02	1.28E-02	2.79E-02		
U-236	1.6701E-05	5,276.815	10,553.630	0.00E+00	8.81E-02	1.76E-01		
U-238	-9.4194E-09	5,276.815	0.000	5.43E-04	4.94E-04	5.43E-04		
Y-90	1.6932E+00	5,276.815	10,553.630	0.00E+00	8.93E+03	1.79E+04		
Other Radionuclides					9.16E+03	1.83E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.37E+02	2.74E+02
Total	Total

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-ALX	U	
BOL Enrichment %:	88.87461392	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		5,276.815	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		10,553.630	Bounding burnup assumed to be twice nominal burnup.

Checks		
	Burnup Multiplier	Estimated EOL HM/Given EOL HM
Nominal:	0.83	1.01
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: DRCT
 SNF ID #: 756
 Fuel Units & Descr: 6936 - ROD
 Heavy Metal Mass: BOL=15512.36kg ; EOL=15006.04kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1981
 Estimates as of: 2030
 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"x15"
 8.50

Radionuclide	II. Estimates		Gamma Sources					
	m	x _n	x _b	b	y _n	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	481,493.979	962,987.957	0.00E+00	4.23E-04	8.45E-04	0.0150	5.181E+16
Am-241	1.4352E-01	481,493.979	962,987.957	0.00E+00	6.91E+04	1.38E+05	0.0250	1.045E+16
Am-242m	2.8698E-04	481,493.979	962,987.957	0.00E+00	1.38E+02	2.76E+02	0.0375	9.966E+15
Am-243	6.2565E-04	481,493.979	962,987.957	0.00E+00	3.01E+02	6.02E+02	0.0575	1.151E+16
C-14	4.7901E-05	481,493.979	962,987.957	0.00E+00	2.31E+01	4.61E+01	0.0850	5.799E+15
Cl-36	8.0297E-07	481,493.979	962,987.957	0.00E+00	3.87E-01	7.73E-01	0.1250	4.023E+15
Co-243	2.5081E-04	481,493.979	962,987.957	0.00E+00	1.21E+02	2.42E+02	0.2250	4.972E+15
Co-244	4.9015E-02	481,493.979	962,987.957	0.00E+00	2.36E+04	4.72E+04	0.3750	2.138E+15
Co-60	2.5581E-03	481,493.979	962,987.957	0.00E+00	1.23E+03	2.46E+03	0.5750	4.972E+16
Cs-134	4.0536E-05	481,493.979	962,987.957	0.00E+00	1.95E+01	3.90E+01	0.8500	6.878E+14
Cs-135	1.4438E-05	481,493.979	962,987.957	0.00E+00	6.95E+00	1.39E+01	1.2500	6.757E+14
Cs-137	1.3979E+00	481,493.979	962,987.957	0.00E+00	6.73E+05	1.35E+06	1.7500	2.024E+13
Eu-154	2.0203E-02	481,493.979	962,987.957	0.00E+00	9.73E+03	1.95E+04	2.2500	3.258E+09
Eu-155	1.7684E-03	481,493.979	962,987.957	0.00E+00	8.51E+02	1.70E+03	2.7500	6.675E+09
Fe-55	4.3136E-05	481,493.979	962,987.957	0.00E+00	2.08E+01	4.15E+01	3.5000	6.875E+08
H-3	2.0769E-02	481,493.979	962,987.957	0.00E+00	1.00E+04	2.00E+04	5.0000	2.939E+08
I-129	9.8288E-07	481,493.979	962,987.957	0.00E+00	4.73E-01	9.47E-01	7.0000	3.387E+07
Kr-85	2.8214E-02	481,493.979	962,987.957	0.00E+00	1.36E+04	2.72E+04	11.0000	3.890E+06
Np-237	1.1218E-05	481,493.979	962,987.957	0.00E+00	5.40E+00	1.08E+01		
Pa-231	1.3036E-09	481,493.979	962,987.957	0.00E+00	6.28E-04	1.26E-03		
Pb-210	8.5078E-11	481,493.979	962,987.957	0.00E+00	4.10E-05	8.19E-05		
Pm-147	3.6531E-04	481,493.979	962,987.957	0.00E+00	1.76E+02	3.52E+02		
Pu-238	7.4564E-02	481,493.979	962,987.957	0.00E+00	3.59E+04	7.18E+04		
Pu-239	1.1623E-02	481,493.979	962,987.957	0.00E+00	5.60E+03	1.12E+04		
Pu-240	1.5132E-02	481,493.979	962,987.957	0.00E+00	7.29E+03	1.46E+04		
Pu-241	9.0036E-01	481,493.979	962,987.957	0.00E+00	4.34E+05	8.67E+05		
Pu-242	6.4260E-05	481,493.979	962,987.957	0.00E+00	3.09E+01	6.19E+01		
Ra-226	2.2804E-10	481,493.979	962,987.957	0.00E+00	1.10E-04	2.20E-04		
Ra-228	5.2713E-12	481,493.979	962,987.957	0.00E+00	2.54E-06	5.08E-06		
Ru-106	6.1160E-10	481,493.979	962,987.957	0.00E+00	2.94E-04	5.89E-04		
Se-79	1.2377E-05	481,493.979	962,987.957	0.00E+00	5.96E+00	1.19E+01		
Sn-126	2.5210E-05	481,493.979	962,987.957	0.00E+00	1.21E+01	2.43E+01		
Sr-90	9.1667E-01	481,493.979	962,987.957	0.00E+00	4.41E+05	8.83E+05		
Tc-99	3.9357E-04	481,493.979	962,987.957	0.00E+00	1.90E+02	3.79E+02		
Th-229	1.2057E-10	481,493.979	962,987.957	0.00E+00	5.81E-05	1.16E-04		
Th-230	2.1043E-08	481,493.979	962,987.957	0.00E+00	1.01E-02	2.03E-02		
Th-232	5.2972E-12	481,493.979	962,987.957	0.00E+00	2.55E-06	5.10E-06		
Tl-208	1.7474E-07	481,493.979	962,987.957	0.00E+00	8.41E-02	1.68E-01		
U-232	4.7368E-07	481,493.979	962,987.957	0.00E+00	2.28E-01	4.56E-01		
U-233	2.5097E-08	481,493.979	962,987.957	0.00E+00	1.21E-02	2.42E-02		
U-234	5.0000E-05	481,493.979	962,987.957	0.00E+00	2.41E+01	4.81E+01		
U-235	-1.4489E-06	481,493.979	0.000	9.81E-01	2.83E-01	9.81E-01		
U-236	7.5824E-06	481,493.979	962,987.957	0.00E+00	3.65E+00	7.30E+00		
U-238	-2.6129E-07	481,493.979	0.000	5.06E+00	4.94E+00	5.06E+00		
Y-90	9.1699E-01	481,493.979	962,987.957	0.00E+00	4.42E+05	8.83E+05		
Other Radionuclides					6.46E+05	1.29E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.11E+04	2.22E+04
Total	Total

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-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	2.925317534	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	454,977.636	481,493.979	
Bounding:	549,758.180	962,987.957	

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:	0.89	1.06	
Bounding:	1.77	1.75	

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: DRCT
 SNF ID #: 701
 Fuel Units & Descr: 2856 - ROD
 Heavy Metal Mass: BOL=6338.89kg ; EOL=6144.97kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1981
 Estimates as of: 2030
 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"x15"
 3.50

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	8.7758E-10	185,919.702	368,822.060	0.00E+00	1.63E-04	3.24E-04	Avg. MeV	
Am-241	1.4352E-01	185,919.702	368,822.060	0.00E+00	2.67E+04	5.29E+04	0.0150	1.984E+16
Am-242m	2.8698E-04	185,919.702	368,822.060	0.00E+00	5.34E+01	1.06E+02	0.0250	4.002E+15
Am-243	6.2565E-04	185,919.702	368,822.060	0.00E+00	1.16E+02	2.31E+02	0.0375	3.817E+15
C-14	4.7901E-05	185,919.702	368,822.060	0.00E+00	8.91E+00	1.77E+01	0.0575	4.410E+15
Cl-36	8.0297E-07	185,919.702	368,822.060	0.00E+00	1.49E-01	2.96E-01	0.0850	2.221E+15
Cm-243	2.5081E-04	185,919.702	368,822.060	0.00E+00	4.66E+01	9.25E+01	0.1250	1.541E+15
Cm-244	4.9015E-02	185,919.702	368,822.060	0.00E+00	9.11E+03	1.81E+04	0.2250	1.904E+15
Co-60	2.5581E-03	185,919.702	368,822.060	0.00E+00	4.76E+02	9.43E+02	0.3750	8.187E+14
Cs-134	4.0536E-05	185,919.702	368,822.060	0.00E+00	7.54E+00	1.50E+01	0.5750	1.904E+16
Cs-135	1.4433E-05	185,919.702	368,822.060	0.00E+00	2.68E+00	5.32E+00	0.8500	2.634E+14
Cs-137	1.3979E+00	185,919.702	368,822.060	0.00E+00	2.60E+05	5.16E+05	1.2500	2.588E+14
Eu-154	2.0203E-02	185,919.702	368,822.060	0.00E+00	3.76E+03	7.45E+03	1.7500	7.751E+12
Eu-155	1.7684E-03	185,919.702	368,822.060	0.00E+00	3.29E+02	6.52E+02	2.2500	1.248E+09
Fe-55	4.3136E-05	185,919.702	368,822.060	0.00E+00	8.02E+00	1.59E+01	2.7500	2.556E+09
H-3	2.0769E-02	185,919.702	368,822.060	0.00E+00	3.86E+03	7.66E+03	3.5000	2.633E+08
I-129	9.8288E-07	185,919.702	368,822.060	0.00E+00	1.83E-01	3.63E-01	5.0000	1.126E+08
Kr-85	2.8214E-02	185,919.702	368,822.060	0.00E+00	5.25E+03	1.04E+04	7.0000	1.297E+07
Np-237	1.1218E-05	185,919.702	368,822.060	0.00E+00	2.09E+00	4.14E+00	11.0000	1.490E+06
Pa-231	1.3036E-09	185,919.702	368,822.060	0.00E+00	2.42E-04	4.81E-04		
Pb-210	8.5078E-11	185,919.702	368,822.060	0.00E+00	1.58E-05	3.14E-05		
Pm-147	3.6531E-04	185,919.702	368,822.060	0.00E+00	6.79E+01	1.35E+02		
Pu-238	7.4564E-02	185,919.702	368,822.060	0.00E+00	1.39E+04	2.75E+04		
Pu-239	1.1623E-02	185,919.702	368,822.060	0.00E+00	2.16E+03	4.29E+03		
Pu-240	1.5132E-02	185,919.702	368,822.060	0.00E+00	2.81E+03	5.58E+03		
Pu-241	9.0036E-01	185,919.702	368,822.060	0.00E+00	1.67E+05	3.32E+05		
Pu-242	6.4260E-05	185,919.702	368,822.060	0.00E+00	1.19E+01	2.37E+01		
Ra-226	2.2804E-10	185,919.702	368,822.060	0.00E+00	4.24E-05	8.41E-05		
Ra-228	5.2713E-12	185,919.702	368,822.060	0.00E+00	9.80E-07	1.94E-06		
Ru-106	6.1160E-10	185,919.702	368,822.060	0.00E+00	1.14E-04	2.26E-04		
Se-79	1.2377E-05	185,919.702	368,822.060	0.00E+00	2.30E+00	4.57E+00		
Sn-126	2.5210E-05	185,919.702	368,822.060	0.00E+00	4.69E+00	9.30E+00		
Sr-90	9.1667E-01	185,919.702	368,822.060	0.00E+00	1.70E+05	3.38E+05		
Tc-99	3.9357E-04	185,919.702	368,822.060	0.00E+00	7.32E+01	1.45E+02		
Th-229	1.2057E-10	185,919.702	368,822.060	0.00E+00	2.24E-05	4.45E-05		
Th-230	2.1043E-08	185,919.702	368,822.060	0.00E+00	3.91E-03	7.76E-03		
Th-232	5.2972E-12	185,919.702	368,822.060	0.00E+00	9.85E-07	1.95E-06		
Tl-208	1.7474E-07	185,919.702	368,822.060	0.00E+00	3.25E-02	6.44E-02		
U-232	4.7368E-07	185,919.702	368,822.060	0.00E+00	8.81E-02	1.75E-01		
U-233	2.5097E-08	185,919.702	368,822.060	0.00E+00	4.67E-03	9.26E-03		
U-234	5.0000E-05	185,919.702	368,822.060	0.00E+00	9.30E+00	1.84E+01		
U-235	-1.4489E-06	185,919.702	0.000	3.60E-01	9.10E-02	3.60E-01		
U-236	7.5824E-06	185,919.702	368,822.060	0.00E+00	1.41E+00	2.80E+00		
U-238	-2.6129E-07	185,919.702	0.000	2.07E+00	2.03E+00	2.07E+00		
Y-90	9.1699E-01	185,919.702	368,822.060	0.00E+00	1.70E+05	3.38E+05		
Other Radionuclides					2.50E+05	4.95E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.28E+03	8.48E+03
Total	Total

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-4	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	2.631414612	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	185,919.702	184,411.030	
Bounding:	224,650.332	368,822.060	

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:	0.84	0.99		1.00
Bounding:	1.66	1.64		

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: DRESDEN I
 SNF ID #: 44
 Fuel Units & Descr: 34 - ASSEMBLY
 Heavy Metal Mass: BOL= : EOL=2544.90kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1966
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 18"x15"
 1.00

Radionuclide	II. Estimates		Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
	m	x _n						Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0595E-04	30,137.665	60,275.329	0.00E+00	3.19E+00	6.39E+00	Avg. MeV		
Am-241	2.4968E-04	30,137.665	60,275.329	0.00E+00	7.52E+00	1.50E+01	0.0150	3.488E+15	
Am-242m	1.3847E-06	30,137.665	60,275.329	0.00E+00	4.17E-02	8.35E-02	0.0250	7.166E+14	
Am-243	3.1103E-07	30,137.665	60,275.329	0.00E+00	9.37E-03	1.87E-02	0.0375	6.123E+14	
C-14	9.2267E-05	30,137.665	60,275.329	0.00E+00	2.78E+00	5.56E+00	0.0575	6.693E+14	
Cl-36	1.8103E-06	30,137.665	60,275.329	0.00E+00	5.46E-02	1.09E-01	0.0850	4.331E+14	
Cm-243	2.1248E-07	30,137.665	60,275.329	0.00E+00	6.40E-03	1.28E-02	0.1250	2.649E+14	
Cm-244	7.9666E-06	30,137.665	60,275.329	0.00E+00	2.40E-01	4.80E-01	0.2250	3.912E+14	
Co-60	1.2143E-04	30,137.665	60,275.329	0.00E+00	3.66E+00	7.32E+00	0.3750	1.545E+14	
Cs-134	1.6535E-05	30,137.665	60,275.329	0.00E+00	4.98E-03	9.97E-03	0.5750	2.380E+15	
Cs-135	2.8639E-07	30,137.665	60,275.329	0.00E+00	8.63E-01	1.73E+00	0.8500	4.093E+13	
Cs-137	1.0449E+00	30,137.665	60,275.329	0.00E+00	3.15E+04	6.30E+04	1.2500	1.246E+13	
Eu-154	2.5679E-03	30,137.665	60,275.329	0.00E+00	7.74E+01	1.55E+02	1.7500	3.259E+12	
Eu-155	8.1175E-05	30,137.665	60,275.329	0.00E+00	2.45E+00	4.89E+00	2.2500	7.259E+07	
Fe-55	4.2194E-08	30,137.665	60,275.329	0.00E+00	1.27E-03	2.54E-03	2.7500	2.557E+13	
H-3	9.1673E-04	30,137.665	60,275.329	0.00E+00	2.76E+01	5.53E+01	3.5000	9.369E+04	
I-129	1.5853E-06	30,137.665	60,275.329	0.00E+00	4.78E-02	9.56E-02	5.0000	2.895E+04	
Kr-85	2.3741E-02	30,137.665	60,275.329	0.00E+00	7.15E+02	1.43E+03	7.0000	2.051E+03	
Np-237	1.2747E-07	30,137.665	60,275.329	0.00E+00	3.84E-03	7.68E-03	11.0000	1.501E+02	
Pa-231	1.2007E-04	30,137.665	60,275.329	0.00E+00	3.62E+00	7.24E+00			
Pb-210	1.8424E-08	30,137.665	60,275.329	0.00E+00	5.55E-04	1.11E-03			
Pm-147	4.9829E-06	30,137.665	60,275.329	0.00E+00	1.50E-01	3.00E-01			
Pu-238	3.7744E-04	30,137.665	60,275.329	0.00E+00	1.14E+01	2.28E+01			
Pu-239	2.7510E-05	30,137.665	60,275.329	0.00E+00	8.29E-01	1.66E+00			
Pu-240	1.6175E-05	30,137.665	60,275.329	0.00E+00	4.87E-01	9.75E-01			
Pu-241	7.1379E-04	30,137.665	60,275.329	0.00E+00	2.15E+01	4.30E+01			
Pu-242	4.0831E-08	30,137.665	60,275.329	0.00E+00	1.23E-03	2.46E-03			
Ra-226	2.9038E-08	30,137.665	60,275.329	0.00E+00	8.75E-04	1.75E-03			
Ra-228	4.6352E-06	30,137.665	60,275.329	0.00E+00	1.40E-01	2.79E-01			
Ru-106	1.3321E-15	30,137.665	60,275.329	0.00E+00	4.01E-11	8.03E-11			
Se-79	3.5407E-05	30,137.665	60,275.329	0.00E+00	1.07E+00	2.13E+00			
Sn-126	3.9838E-05	30,137.665	60,275.329	0.00E+00	1.20E+00	2.40E+00			
Sr-90	1.0449E+00	30,137.665	60,275.329	0.00E+00	3.15E+04	6.30E+04			
Tc-99	3.2525E-04	30,137.665	60,275.329	0.00E+00	9.80E+00	1.96E+01			
Th-229	8.2305E-05	30,137.665	60,275.329	0.00E+00	2.48E+00	4.96E+00			
Th-230	1.2533E-06	30,137.665	60,275.329	0.00E+00	3.78E-02	7.55E-02			
Th-232	-9.0328E-08	30,137.665	0.000	2.72E-01	2.69E-01	2.72E-01			
Th-208	1.2085E-02	30,137.665	60,275.329	0.00E+00	3.64E+02	7.28E+02			
U-232	3.2729E-02	30,137.665	60,275.329	0.00E+00	9.86E+02	1.97E+03			
U-233	-3.3244E-03	30,137.665	0.000	9.15E+02	8.15E+02	9.15E+02			
U-234	8.1769E-04	30,137.665	60,275.329	0.00E+00	2.46E+01	4.93E+01			
U-235	5.7813E-08	30,137.665	60,275.329	1.87E-04	1.93E-03	3.67E-03			
U-236	1.3273E-07	30,137.665	60,275.329	0.00E+00	4.00E-03	8.00E-03			
U-238	-3.1121E-10	30,137.665	0.000	1.20E-04	1.10E-04	1.20E-04			
Y-90	1.0449E+00	30,137.665	60,275.329	0.00E+00	3.15E+04	6.30E+04			
Other Radionuclides					3.69E+04	7.37E+04			
							Thermal Power		
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
							6.32E+02	1.24E+03	
							Total	Total	

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 cladding and enrichment (unknown).
Fuel Cladding:	SST (304)	ZIRC	
BOL HM Constituents:	ThO ₂ -UO ₂	Th and U	
BOL Enrichment %:		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		30,137.665	Nominal burnup taken from SFD and converted to MWd using BOL=2575.869kg Bounding burnup assumed to be twice nominal burnup.
Bounding:		60,275.329	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.52		1.00
Bounding:	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: DRESDEN I (E00161)
 SNF ID #: 928
 Fuel Units & Descr: 1 - 6 X 6 ROD ARRAY
 Heavy Metal Mass: BOL=111.50kg ; EOL=109.85kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1973
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 BWR
 1.00

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	1.0733E-09	1,566.219	3,132.438	0.00E+00	1.68E-06	3.36E-06		
Am-241	1.4751E-01	1,566.219	3,132.438	0.00E+00	2.31E+02	4.62E+02	0.0150	1.192E+14
Am-242m	2.6809E-04	1,566.219	3,132.438	0.00E+00	4.20E-01	8.40E-01	0.0250	2.389E+13
Am-243	6.2484E-04	1,566.219	3,132.438	0.00E+00	9.79E-01	1.96E+00	0.0375	2.251E+13
C-14	4.7820E-05	1,566.219	3,132.438	0.00E+00	7.49E-02	1.50E-01	0.0575	2.816E+13
Ci-36	8.0297E-07	1,566.219	3,132.438	0.00E+00	1.26E-03	2.52E-03	0.0850	1.316E+13
Cm-243	1.7426E-04	1,566.219	3,132.438	0.00E+00	2.73E-01	5.46E-01	0.1250	8.755E+12
Cm-244	2.7616E-02	1,566.219	3,132.438	0.00E+00	4.33E+01	8.65E+01	0.2250	1.124E+13
Co-60	3.5610E-04	1,566.219	3,132.438	0.00E+00	5.58E-01	1.12E+00	0.3750	4.852E+12
Cs-134	2.6260E-07	1,566.219	3,132.438	0.00E+00	4.11E-04	8.23E-04	0.5750	1.143E+14
Cs-135	1.4433E-05	1,566.219	3,132.438	0.00E+00	2.26E-02	4.52E-02	0.8500	1.116E+12
Cs-137	9.8870E-01	1,566.219	3,132.438	0.00E+00	1.55E+03	3.10E+03	1.2500	7.100E+11
Eu-154	6.0320E-03	1,566.219	3,132.438	0.00E+00	9.45E+00	1.89E+01	1.7500	3.122E+10
Eu-155	2.1770E-04	1,566.219	3,132.438	0.00E+00	3.41E-01	6.82E-01	2.2500	5.131E+06
Fe-55	7.9296E-07	1,566.219	3,132.438	0.00E+00	1.24E-03	2.48E-03	2.7500	1.808E+07
H-3	8.9486E-03	1,566.219	3,132.438	0.00E+00	1.40E+01	2.80E+01	3.5000	1.291E+06
I-129	9.8288E-07	1,566.219	3,132.438	0.00E+00	1.54E-03	3.08E-03	5.0000	5.514E+05
Kr-85	1.0707E-02	1,566.219	3,132.438	0.00E+00	1.68E+01	3.35E+01	7.0000	6.352E+04
Np-237	1.1927E-05	1,566.219	3,132.438	0.00E+00	1.87E-02	3.74E-02	11.0000	7.294E+03
Pa-231	1.4703E-09	1,566.219	3,132.438	0.00E+00	2.30E-06	4.61E-06		
Pb-210	1.6828E-10	1,566.219	3,132.438	0.00E+00	2.64E-07	5.27E-07		
Pm-147	6.9606E-06	1,566.219	3,132.438	0.00E+00	1.09E-02	2.18E-02		
Pu-238	6.6263E-02	1,566.219	3,132.438	0.00E+00	1.04E+02	2.08E+02		
Pu-239	1.1618E-02	1,566.219	3,132.438	0.00E+00	1.82E+01	3.64E+01		
Pu-240	1.5142E-02	1,566.219	3,132.438	0.00E+00	2.37E+01	4.74E+01		
Pu-241	4.3766E-01	1,566.219	3,132.438	0.00E+00	6.85E+02	1.37E+03		
Pu-242	6.4260E-05	1,566.219	3,132.438	0.00E+00	1.01E-01	2.01E-01		
Ra-226	3.8501E-10	1,566.219	3,132.438	0.00E+00	6.03E-07	1.21E-06		
Ra-228	5.2955E-12	1,566.219	3,132.438	0.00E+00	8.29E-09	1.66E-08		
Ru-106	2.0413E-14	1,566.219	3,132.438	0.00E+00	3.20E-11	6.39E-11		
Se-79	1.2376E-05	1,566.219	3,132.438	0.00E+00	1.94E-02	3.88E-02		
Sn-126	2.5210E-05	1,566.219	3,132.438	0.00E+00	3.95E-02	7.90E-02		
Sr-90	6.4163E-01	1,566.219	3,132.438	0.00E+00	1.00E+03	2.01E+03		
Tc-99	3.9357E-04	1,566.219	3,132.438	0.00E+00	6.16E-01	1.23E+00		
Th-229	1.5644E-10	1,566.219	3,132.438	0.00E+00	2.45E-07	4.90E-07		
Th-230	2.7972E-08	1,566.219	3,132.438	0.00E+00	4.38E-05	8.76E-05		
Th-232	5.3036E-12	1,566.219	3,132.438	0.00E+00	8.31E-09	1.66E-08		
Ti-208	1.5136E-07	1,566.219	3,132.438	0.00E+00	2.37E-04	4.74E-04		
U-232	4.1005E-07	1,566.219	3,132.438	0.00E+00	6.42E-04	1.28E-03		
U-233	2.5856E-08	1,566.219	3,132.438	0.00E+00	4.05E-05	8.10E-05		
U-234	5.2665E-05	1,566.219	3,132.438	0.00E+00	8.25E-02	1.65E-01		
U-235	-1.4487E-06	1,566.219	0.000	3.62E-03	1.35E-03	3.62E-03		
U-236	7.5888E-06	1,566.219	3,132.438	0.00E+00	1.19E-02	2.38E-02		
U-238	-2.6129E-07	1,566.219	0.000	3.69E-02	3.65E-02	3.69E-02		
Y-90	6.4180E-01	1,566.219	3,132.438	0.00E+00	1.01E+03	2.01E+03		
Other Radionuclides					1.49E+03	2.98E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.83E+01	5.67E+01
Total	Total

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-2	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	1.50044843	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	1,533.125	1,566.219	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		3,132.438	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.40	1.02	1.00
Bounding:	0.80		

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: DRESDEN I (UN0064)
 SNF ID #: 47
 Fuel Units & Descr: 1 - 6 X 6 ROD ARRAY
 Heavy Metal Mass: BOL=58.85kg ; EOL=57.28kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1973
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 BWR
 1.00

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	1.0733E-09	1,489.192	2,978.384	0.00E+00	1.60E-06	3.20E-06	Avg. MeV	
Am-241	1.4751E-01	1,489.192	2,978.384	0.00E+00	2.20E+02	4.39E+02	0.0150	1.133E+14
Am-242m	2.6809E-04	1,489.192	2,978.384	0.00E+00	3.99E-01	7.98E-01	0.0250	2.271E+13
Am-243	6.2484E-04	1,489.192	2,978.384	0.00E+00	9.31E-01	1.86E+00	0.0375	2.140E+13
C-14	4.7820E-05	1,489.192	2,978.384	0.00E+00	7.12E-02	1.42E-01	0.0575	2.678E+13
Cl-36	8.0297E-07	1,489.192	2,978.384	0.00E+00	1.20E-03	2.39E-03	0.0850	1.251E+13
Cm-243	1.7426E-04	1,489.192	2,978.384	0.00E+00	2.60E-01	5.19E-01	0.1250	8.324E+12
Cm-244	2.7616E-02	1,489.192	2,978.384	0.00E+00	4.11E+01	8.23E+01	0.2250	1.068E+13
Co-60	3.5610E-04	1,489.192	2,978.384	0.00E+00	5.30E-01	1.06E+00	0.3750	4.613E+12
Cs-134	2.6260E-07	1,489.192	2,978.384	0.00E+00	3.91E-04	7.82E-04	0.5750	1.086E+14
Cs-135	1.4433E-05	1,489.192	2,978.384	0.00E+00	2.15E-02	4.30E-02	0.8500	1.061E+12
Cs-137	9.8870E-01	1,489.192	2,978.384	0.00E+00	1.47E+03	2.94E+03	1.2500	6.751E+11
Eu-154	6.0320E-03	1,489.192	2,978.384	0.00E+00	8.98E+00	1.80E+01	1.7500	2.969E+10
Eu-155	2.1770E-04	1,489.192	2,978.384	0.00E+00	3.24E-01	6.48E-01	2.2500	4.879E+06
Fe-55	7.9296E-07	1,489.192	2,978.384	0.00E+00	1.18E-03	2.36E-03	2.7500	1.719E+07
H-3	8.9486E-03	1,489.192	2,978.384	0.00E+00	1.33E+01	2.67E+01	3.5000	1.227E+06
I-129	9.8288E-07	1,489.192	2,978.384	0.00E+00	1.46E-03	2.93E-03	5.0000	5.243E+05
Kr-85	1.0707E-02	1,489.192	2,978.384	0.00E+00	1.59E+01	3.19E+01	7.0000	6.040E+04
Np-237	1.1927E-05	1,489.192	2,978.384	0.00E+00	1.78E-02	3.55E-02	11.0000	6.935E+03
Pa-231	1.4703E-09	1,489.192	2,978.384	0.00E+00	2.19E-06	4.38E-06		
Pb-210	1.6828E-10	1,489.192	2,978.384	0.00E+00	2.51E-07	5.01E-07		
Pm-147	6.9606E-06	1,489.192	2,978.384	0.00E+00	1.04E-02	2.07E-02		
Pu-238	6.6263E-02	1,489.192	2,978.384	0.00E+00	9.87E+01	1.97E+02		
Pu-239	1.1618E-02	1,489.192	2,978.384	0.00E+00	1.73E+01	3.46E+01		
Pu-240	1.5142E-02	1,489.192	2,978.384	0.00E+00	2.25E+01	4.51E+01		
Pu-241	4.3766E-01	1,489.192	2,978.384	0.00E+00	6.52E+02	1.30E+03		
Pu-242	6.4260E-05	1,489.192	2,978.384	0.00E+00	9.57E-02	1.91E-01		
Ra-226	3.8501E-10	1,489.192	2,978.384	0.00E+00	5.73E-07	1.15E-06		
Ra-228	5.2955E-12	1,489.192	2,978.384	0.00E+00	7.89E-09	1.58E-08		
Ru-106	2.0413E-14	1,489.192	2,978.384	0.00E+00	3.04E-11	6.08E-11		
Se-79	1.2376E-05	1,489.192	2,978.384	0.00E+00	1.84E-02	3.69E-02		
Sn-126	2.5210E-05	1,489.192	2,978.384	0.00E+00	3.75E-02	7.51E-02		
Sr-90	6.4163E-01	1,489.192	2,978.384	0.00E+00	9.56E+02	1.91E+03		
Tc-99	3.9357E-04	1,489.192	2,978.384	0.00E+00	5.86E-01	1.17E+00		
Th-229	1.5644E-10	1,489.192	2,978.384	0.00E+00	2.33E-07	4.66E-07		
Th-230	2.7972E-08	1,489.192	2,978.384	0.00E+00	4.17E-05	8.33E-05		
Th-232	5.3036E-12	1,489.192	2,978.384	0.00E+00	7.90E-09	1.58E-08		
Tl-208	1.5136E-07	1,489.192	2,978.384	0.00E+00	2.25E-04	4.51E-04		
U-232	4.1005E-07	1,489.192	2,978.384	0.00E+00	6.11E-04	1.22E-03		
U-233	2.5856E-08	1,489.192	2,978.384	0.00E+00	3.85E-05	7.70E-05		
U-234	5.2665E-05	1,489.192	2,978.384	0.00E+00	7.84E-02	1.57E-01		
U-235	-1.4487E-06	1,489.192	0.000	1.91E-03	0.00E+00	1.91E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	7.5888E-06	1,489.192	2,978.384	0.00E+00	1.13E-02	2.26E-02	2.69E+01	5.39E+01
U-238	-2.6129E-07	1,489.192	0.000	1.95E-02	1.91E-02	1.95E-02	Total	Total
Y-90	6.4180E-01	1,489.192	2,978.384	0.00E+00	9.56E+02	1.91E+03		
Other Radionuclides					1.42E+03	2.84E+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	
Fuel Cladding:	ZIRC-2	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	1.5005013	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	823.858	1,489.192	
Bounding:		2,978.384	

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	1.81
Bounding:	1.45	

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: DRESII, HBR, BR-3, BRP, TMI
 SNF ID #: 50
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL= : EOL=19.53kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1979
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 HIC
 1.00

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	1.0733E-09	815.377	815.377	0.00E+00	8.75E-07	8.75E-07	0.0150	3.103E+13
Am-241	1.4751E-01	815.377	815.377	0.00E+00	1.20E+02	1.20E+02	0.0250	6.218E+12
Am-242m	2.6809E-04	815.377	815.377	0.00E+00	2.19E-01	2.19E-01	0.0375	5.859E+12
Am-243	6.2484E-04	815.377	815.377	0.00E+00	5.09E-01	5.09E-01	0.0575	7.331E+12
C-14	4.7820E-05	815.377	815.377	0.00E+00	3.90E-02	3.90E-02	0.0850	3.426E+12
Cl-36	8.0297E-07	815.377	815.377	0.00E+00	6.55E-04	6.55E-04	0.1250	2.279E+12
Co-243	1.7426E-04	815.377	815.377	0.00E+00	1.42E-01	1.42E-01	0.2250	2.925E+12
Co-244	2.7616E-02	815.377	815.377	0.00E+00	2.25E+01	2.25E+01	0.3750	1.263E+12
Co-60	3.5610E-04	815.377	815.377	0.00E+00	2.90E-01	2.90E-01	0.5750	2.974E+13
Cs-134	2.6260E-07	815.377	815.377	0.00E+00	2.14E-04	2.14E-04	0.8500	2.904E+11
Cs-135	1.4433E-05	815.377	815.377	0.00E+00	1.18E-02	1.18E-02	1.2500	1.848E+11
Cs-137	9.8870E-01	815.377	815.377	0.00E+00	8.06E+02	8.06E+02	1.7500	8.127E+09
Eu-154	6.0320E-03	815.377	815.377	0.00E+00	4.92E+00	4.92E+00	2.2500	1.336E+06
Eu-155	2.1770E-04	815.377	815.377	0.00E+00	1.78E-01	1.78E-01	2.7500	4.707E+06
Fe-55	7.9296E-07	815.377	815.377	0.00E+00	6.47E-04	6.47E-04	3.5000	3.359E+05
H-3	8.9486E-03	815.377	815.377	0.00E+00	7.30E+00	7.30E+00	5.0000	1.435E+05
I-129	9.8288E-07	815.377	815.377	0.00E+00	8.01E-04	8.01E-04	7.0000	1.653E+04
Kr-85	1.0707E-02	815.377	815.377	0.00E+00	8.73E+00	8.73E+00	11.0000	1.899E+03
Np-237	1.1927E-05	815.377	815.377	0.00E+00	9.72E-03	9.72E-03		
Pa-231	1.4703E-09	815.377	815.377	0.00E+00	1.20E-06	1.20E-06		
Pb-210	1.6828E-10	815.377	815.377	0.00E+00	1.37E-07	1.37E-07		
Pm-147	6.9606E-06	815.377	815.377	0.00E+00	5.68E-03	5.68E-03		
Pu-238	6.6263E-02	815.377	815.377	0.00E+00	5.40E+01	5.40E+01		
Pu-239	1.1618E-02	815.377	815.377	0.00E+00	9.47E+00	9.47E+00		
Pu-240	1.5142E-02	815.377	815.377	0.00E+00	1.23E+01	1.23E+01		
Pu-241	4.3766E-01	815.377	815.377	0.00E+00	3.57E+02	3.57E+02		
Pu-242	6.4260E-05	815.377	815.377	0.00E+00	5.24E-02	5.24E-02		
Ra-226	3.8501E-10	815.377	815.377	0.00E+00	3.14E-07	3.14E-07		
Ra-228	5.2955E-12	815.377	815.377	0.00E+00	4.32E-09	4.32E-09		
Ru-106	2.0413E-14	815.377	815.377	0.00E+00	1.66E-11	1.66E-11		
Se-79	1.2376E-05	815.377	815.377	0.00E+00	1.01E-02	1.01E-02		
Sn-126	2.5210E-05	815.377	815.377	0.00E+00	2.06E-02	2.06E-02		
Sr-90	6.4163E-01	815.377	815.377	0.00E+00	5.23E+02	5.23E+02		
Tc-99	3.9357E-04	815.377	815.377	0.00E+00	3.21E-01	3.21E-01		
Th-229	1.5644E-10	815.377	815.377	0.00E+00	1.28E-07	1.28E-07		
Th-230	2.7972E-08	815.377	815.377	0.00E+00	2.28E-05	2.28E-05		
Th-232	5.3036E-12	815.377	815.377	0.00E+00	4.32E-09	4.32E-09		
Ti-208	1.5136E-07	815.377	815.377	0.00E+00	1.23E-04	1.23E-04		
U-232	4.1005E-07	815.377	815.377	0.00E+00	3.34E-04	3.34E-04		
U-233	2.5856E-08	815.377	815.377	0.00E+00	2.11E-05	2.11E-05		
U-234	5.2665E-05	815.377	815.377	0.00E+00	4.29E-02	4.29E-02		
U-235	-1.4487E-06	815.377	0.000	1.41E-03	2.28E-04	1.41E-03		
U-236	7.5888E-06	815.377	815.377	0.00E+00	6.19E-03	6.19E-03		
U-238	-2.6129E-07	815.377	0.000	6.63E-03	6.42E-03	6.63E-03		
Y-90	6.4180E-01	815.377	815.377	0.00E+00	5.23E+02	5.23E+02		
Other Radionuclides					7.77E+02	7.77E+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	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		815.377	Nominal burnup set equal to bounding burnup. Bounding burnup taken from SFD and converted to MWd using BOL=20.384kg
Bounding:		815.377	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	1.14		1.00
Bounding:	1.14		

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: EBR-II & TREAT EXPERIMENTS
 SNF ID #: 858
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL= ; EOL=17.84kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1979
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 HIC
 1.00

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	9.4369E-12	2,666.340	2,666.340	0.00E+00	2.52E-08	2.52E-08	0.0150	5.909E+13
Am-241	1.1078E-01	2,666.340	2,666.340	3.95E+01	3.35E+02	3.35E+02	0.0250	1.136E+13
Am-242m	1.7940E-03	2,666.340	2,666.340	0.00E+00	4.78E+00	4.78E+00	0.0375	1.291E+13
Am-243	1.0724E-04	2,666.340	2,666.340	0.00E+00	2.86E-01	2.86E-01	0.0575	1.475E+13
C-14	2.5942E-05	2,666.340	2,666.340	0.00E+00	6.92E-02	6.92E-02	0.0850	6.063E+12
Cl-36	3.4243E-10	2,666.340	2,666.340	0.00E+00	9.13E-07	9.13E-07	0.1250	3.994E+12
Cm-243	2.8217E-04	2,666.340	2,666.340	0.00E+00	7.52E-01	7.52E-01	0.2250	5.038E+12
Cm-244	7.7027E-04	2,666.340	2,666.340	0.00E+00	2.05E+00	2.05E+00	0.3750	2.145E+12
Co-60	1.3011E-04	2,666.340	2,666.340	0.00E+00	3.47E-01	3.47E-01	0.5750	9.087E+13
Cs-134	1.2951E-07	2,666.340	2,666.340	0.00E+00	3.45E-04	3.45E-04	0.8500	4.747E+11
Cs-135	4.7693E-05	2,666.340	2,666.340	0.00E+00	1.27E-01	1.27E-01	1.2500	2.811E+11
Cs-137	9.3351E-01	2,666.340	2,666.340	0.00E+00	2.49E+03	2.49E+03	1.7500	1.294E+10
Eu-154	2.6341E-03	2,666.340	2,666.340	0.00E+00	7.02E+00	7.02E+00	2.2500	1.412E+06
Eu-155	4.0968E-04	2,666.340	2,666.340	0.00E+00	1.09E+00	1.09E+00	2.7500	3.799E+07
Fe-55	2.5543E-07	2,666.340	2,666.340	0.00E+00	6.81E-04	6.81E-04	3.5000	1.579E+05
H-3	1.2053E-03	2,666.340	2,666.340	0.00E+00	3.21E+00	3.21E+00	5.0000	6.699E+04
I-129	1.2891E-06	2,666.340	2,666.340	0.00E+00	3.44E-03	3.44E-03	7.0000	7.628E+03
Kr-85	7.0043E-03	2,666.340	2,666.340	0.00E+00	1.87E+01	1.87E+01	11.0000	8.718E+02
Np-237	4.3622E-06	2,666.340	2,666.340	0.00E+00	1.16E-02	1.16E-02		
Pa-231	1.6733E-11	2,666.340	2,666.340	0.00E+00	4.46E-08	4.46E-08		
Pb-210	6.0684E-12	2,666.340	2,666.340	0.00E+00	1.62E-08	1.62E-08		
Pm-147	1.1315E-05	2,666.340	2,666.340	0.00E+00	3.02E-02	3.02E-02		
Pu-238	6.1482E-03	2,666.340	2,666.340	0.00E+00	1.64E+01	1.64E+01		
Pu-239	-3.5520E-02	2,666.340	0.000	3.25E+02	2.30E+02	3.25E+02		
Pu-240	2.0590E-02	2,666.340	2,666.340	1.65E+02	2.20E+02	2.20E+02		
Pu-241	-2.0307E+00	2,666.340	0.000	7.41E+03	1.99E+03	7.41E+03		
Pu-242	1.1252E-05	2,666.340	2,666.340	4.40E-02	7.40E-02	7.40E-02		
Ra-226	1.6601E-11	2,666.340	2,666.340	0.00E+00	4.43E-08	4.43E-08		
Ra-228	3.7077E-16	2,666.340	2,666.340	0.00E+00	9.89E-13	9.89E-13		
Ru-106	3.3126E-14	2,666.340	2,666.340	0.00E+00	8.83E-11	8.83E-11		
Se-79	1.0117E-05	2,666.340	2,666.340	0.00E+00	2.70E-02	2.70E-02		
Sn-126	4.3902E-05	2,666.340	2,666.340	0.00E+00	1.17E-01	1.17E-01		
Sr-90	3.2926E-01	2,666.340	2,666.340	0.00E+00	8.78E+02	8.78E+02		
Tc-99	3.9412E-04	2,666.340	2,666.340	0.00E+00	1.05E+00	1.05E+00		
Th-229	3.6957E-12	2,666.340	2,666.340	0.00E+00	9.85E-09	9.85E-09		
Th-230	1.6942E-09	2,666.340	2,666.340	0.00E+00	4.52E-06	4.52E-06		
Th-232	4.6236E-16	2,666.340	2,666.340	0.00E+00	1.23E-12	1.23E-12		
Th-208	4.0390E-07	2,666.340	2,666.340	0.00E+00	1.08E-03	1.08E-03		
U-232	1.0941E-06	2,666.340	2,666.340	0.00E+00	2.92E-03	2.92E-03		
U-233	8.1218E-10	2,666.340	2,666.340	0.00E+00	2.17E-06	2.17E-06		
U-234	5.3101E-06	2,666.340	2,666.340	0.00E+00	1.42E-02	1.42E-02		
U-235	-6.7647E-09	2,666.340	0.000	6.66E-05	4.86E-05	6.66E-05		
U-236	2.1272E-07	2,666.340	2,666.340	0.00E+00	5.67E-04	5.67E-04		
U-238	-1.7914E-07	2,666.340	0.000	4.85E-03	4.37E-03	4.85E-03		
Y-90	3.2926E-01	2,666.340	2,666.340	0.00E+00	8.78E+02	8.78E+02		
Other Radionuclides					2.56E+03	2.56E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.38E+01	4.69E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	FAST	FAST	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	SST	SST	
BOL HM Constituents:	PuO2-UO2	Pu and U	
BOL Enrichment %:		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		2,666.340	Nominal burnup set equal to bounding burnup. Bounding burnup taken from SFD and converted to MWd using BOL=20.510kg
Bounding:		2,666.340	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.85		1.00
Bounding:	0.85		

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: EBR-II NITRIDE FUEL EXPER
 SNF ID #: 363
 Fuel Units & Descr: 64 - ROD
 Heavy Metal Mass: BOL= : EOL=9.59kg
 ROD Storage Site: INEEL

Fuel decay start date: 1994
 Estimates as of: 2030
 Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
 *Template Burnup(MWd): 5011.2
 Template BOL Heavy Metal Mass (MT): 0.0329181
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x10"
 0.32

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	6.1822E-12	833.805	1,563.384	0.00E+00	5.15E-09	9.67E-09	0.0150	5.131E+13
Am-241	1.1066E-01	833.805	1,563.384	2.01E+01	1.12E+02	1.93E+02	0.0250	1.017E+13
Am-242m	1.9247E-03	833.805	1,563.384	0.00E+00	1.60E+00	3.01E+00	0.0375	1.181E+13
Am-243	1.0740E-04	833.805	1,563.384	0.00E+00	8.96E-02	1.68E-01	0.0575	1.181E+13
C-14	2.6042E-05	833.805	1,563.384	0.00E+00	2.17E-02	4.07E-02	0.0850	5.658E+12
Cl-36	3.4243E-10	833.805	1,563.384	0.00E+00	2.86E-07	5.35E-07	0.1250	3.982E+12
Cm-243	4.0629E-04	833.805	1,563.384	0.00E+00	3.39E-01	6.35E-01	0.2250	4.566E+12
Cm-244	1.6024E-03	833.805	1,563.384	0.00E+00	1.34E+00	2.51E+00	0.3750	1.979E+12
Co-60	3.4283E-03	833.805	1,563.384	0.00E+00	2.86E+00	5.36E+00	0.5750	8.020E+13
Cs-134	1.5565E-03	833.805	1,563.384	0.00E+00	1.30E+00	2.43E+00	0.8500	8.378E+11
Cs-135	4.7693E-05	833.805	1,563.384	0.00E+00	3.98E-02	7.46E-02	1.2500	1.003E+12
Cs-137	1.4007E+00	833.805	1,563.384	0.00E+00	1.17E+03	2.19E+03	1.7500	2.269E+10
Eu-154	1.6184E-02	833.805	1,563.384	0.00E+00	1.35E+01	2.53E+01	2.2500	4.554E+06
Eu-155	1.3775E-02	833.805	1,563.384	0.00E+00	1.15E+01	2.15E+01	2.7500	2.591E+07
Fe-55	3.8035E-04	833.805	1,563.384	0.00E+00	3.17E-01	5.95E-01	3.5000	1.288E+05
H-3	3.8454E-03	833.805	1,563.384	0.00E+00	3.21E+00	6.01E+00	5.0000	4.429E+04
I-129	1.2891E-06	833.805	1,563.384	0.00E+00	1.07E-03	2.02E-03	7.0000	5.054E+03
Kr-85	2.7858E-02	833.805	1,563.384	0.00E+00	2.32E+01	4.36E+01	11.0000	5.780E+02
Np-237	3.7516E-06	833.805	1,563.384	0.00E+00	3.13E-03	5.87E-03		
Pa-231	1.2488E-11	833.805	1,563.384	0.00E+00	1.04E-08	1.95E-08		
Pb-210	2.4206E-12	833.805	1,563.384	0.00E+00	2.02E-09	3.78E-09		
Pm-147	1.5671E-02	833.805	1,563.384	0.00E+00	1.31E+01	2.45E+01		
Pu-238	1.4877E-02	833.805	1,563.384	0.00E+00	1.24E+01	2.33E+01		
Pu-239	-3.5520E-02	833.805	0.000	1.65E+02	1.35E+02	1.65E+02		
Pu-240	2.0690E-02	833.805	1,563.384	8.38E+01	1.01E+02	1.16E+02		
Pu-241	-1.4799E+00	833.805	0.000	3.76E+03	2.53E+03	3.76E+03		
Pu-242	1.1252E-05	833.805	1,563.384	2.24E-02	3.17E-02	3.99E-02		
Ra-226	7.8524E-12	833.805	1,563.384	0.00E+00	6.55E-09	1.23E-08		
Ra-228	2.4086E-16	833.805	1,563.384	0.00E+00	2.01E-13	3.77E-13		
Ru-106	1.5066E-05	833.805	1,563.384	0.00E+00	1.26E-02	2.36E-02		
Se-79	1.0127E-05	833.805	1,563.384	0.00E+00	8.44E-03	1.58E-02		
Sn-126	4.3902E-05	833.805	1,563.384	0.00E+00	3.66E-02	6.86E-02		
Sr-90	5.0088E-01	833.805	1,563.384	0.00E+00	4.18E+02	7.83E+02		
Tc-99	3.9412E-04	833.805	1,563.384	0.00E+00	3.29E-01	6.16E-01		
Th-229	2.7219E-12	833.805	1,563.384	0.00E+00	2.27E-09	4.26E-09		
Th-230	1.0441E-09	833.805	1,563.384	0.00E+00	8.71E-07	1.63E-06		
Th-232	3.1689E-16	833.805	1,563.384	0.00E+00	2.64E-13	4.95E-13		
Ti-208	4.6636E-07	833.805	1,563.384	0.00E+00	3.89E-04	7.29E-04		
U-232	1.2638E-06	833.805	1,563.384	0.00E+00	1.05E-03	1.98E-03		
U-233	5.7451E-10	833.805	1,563.384	0.00E+00	4.79E-07	8.98E-07		
U-234	4.3044E-06	833.805	1,563.384	0.00E+00	3.59E-03	6.73E-03		
U-235	-7.7765E-09	833.805	0.000	3.39E-05	2.74E-05	3.39E-05		
U-236	1.8050E-07	833.805	1,563.384	0.00E+00	1.50E-04	2.82E-04		
U-238	-1.7914E-07	833.805	0.000	2.47E-03	2.32E-03	2.47E-03		
Y-90	5.0088E-01	833.805	1,563.384	0.00E+00	4.18E+02	7.83E+02		
Other Radionuclides					1.18E+03	2.22E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.03E+01	3.24E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: FAST	Used: FAST	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	SST	SST	
BOL HM Constituents:	Pu/U NITR	Pu and U	
BOL Enrichment %:		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD: 833.805	Estimated: 833.805	Nominal burnup taken from SFD and converted to MWd using BOL=10.423kg Bounding burnup taken from SFD and converted to MWd using BOL=10.423kg
Bounding:	1,563.384	1,563.384	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier: 0.59	Estimated Burnup/Given Burnup:	1.00
Bounding:	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: EBR-II OXIDE FUEL EXPER
 SNF ID #: 345
 Fuel Units & Descr: 571 - ROD
 Heavy Metal Mass: BOL= ; EOL=56.99kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1994
 Estimates as of: 2030
 Template: FTF (FAST, SST, 10 to 30%, Pu & U)
²Template Burnup(MWd): 5011.2
 Template BOL Heavy Metal Mass (MT): 0.0329181
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x10"
 2.86

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	6.1822E-12	4,956.090	12,390.224	0.00E+00	3.06E-08	7.66E-08	0.0150	4.045E+14
Am-241	1.1066E-01	4,956.090	12,390.224	1.19E+02	6.68E+02	1.49E+03	0.0250	8.058E+13
Am-242m	1.9247E-03	4,956.090	12,390.224	0.00E+00	9.54E+00	2.38E+01	0.0375	9.363E+13
Am-243	1.0740E-04	4,956.090	12,390.224	0.00E+00	5.32E-01	1.33E+00	0.0575	9.306E+13
C-14	2.6042E-05	4,956.090	12,390.224	0.00E+00	1.29E-01	3.23E-01	0.0850	4.484E+13
Cl-36	3.4243E-10	4,956.090	12,390.224	0.00E+00	1.70E-06	4.24E-06	0.1250	3.155E+13
Cm-243	4.0629E-04	4,956.090	12,390.224	0.00E+00	2.01E+00	5.03E+00	0.2250	3.619E+13
Cm-244	1.6024E-03	4,956.090	12,390.224	0.00E+00	7.94E+00	1.99E+01	0.3750	1.569E+13
Co-60	3.4283E-03	4,956.090	12,390.224	0.00E+00	1.70E+01	4.25E+01	0.5750	6.356E+14
Cs-134	1.5565E-03	4,956.090	12,390.224	0.00E+00	7.71E+00	1.93E+01	0.8500	6.640E+12
Cs-135	4.7693E-05	4,956.090	12,390.224	0.00E+00	2.36E-01	5.91E-01	1.2500	7.949E+12
Cs-137	1.4007E+00	4,956.090	12,390.224	0.00E+00	6.94E+03	1.74E+04	1.7500	1.798E+11
Eu-154	1.6184E-02	4,956.090	12,390.224	0.00E+00	8.02E+01	2.01E+02	2.2500	3.591E+07
Eu-155	1.3775E-02	4,956.090	12,390.224	0.00E+00	6.83E+01	1.71E+02	2.7500	2.052E+08
Fe-55	3.8035E-04	4,956.090	12,390.224	0.00E+00	1.89E+00	4.71E+00	3.5000	9.276E+05
H-3	3.8454E-03	4,956.090	12,390.224	0.00E+00	1.91E+01	4.76E+01	5.0000	3.116E+05
I-129	1.2891E-06	4,956.090	12,390.224	0.00E+00	6.39E-03	1.60E-02	7.0000	3.556E+04
Kr-85	2.7858E-02	4,956.090	12,390.224	0.00E+00	1.38E+02	3.45E+02	11.0000	4.068E+03
Np-237	3.7516E-06	4,956.090	12,390.224	0.00E+00	1.86E-02	4.65E-02		
Pa-231	1.2488E-11	4,956.090	12,390.224	0.00E+00	6.19E-08	1.55E-07		
Pb-210	2.4206E-12	4,956.090	12,390.224	0.00E+00	1.20E-08	3.00E-08		
Pm-147	1.5671E-02	4,956.090	12,390.224	0.00E+00	7.77E+01	1.94E+02		
Pu-238	1.4877E-02	4,956.090	12,390.224	0.00E+00	7.37E+01	1.84E+02		
Pu-239	-3.5520E-02	4,956.090	0.000	9.81E+02	8.04E+02	9.81E+02		
Pu-240	2.0690E-02	4,956.090	12,390.224	4.98E+02	6.01E+02	7.55E+02		
Pu-241	-1.4799E+00	4,956.090	0.000	2.24E+04	1.50E+04	2.24E+04		
Pu-242	1.1252E-05	4,956.090	12,390.224	1.33E-01	1.89E-01	2.72E-01		
Ra-226	7.8524E-12	4,956.090	12,390.224	0.00E+00	3.89E-08	9.73E-08		
Ra-228	2.4086E-16	4,956.090	12,390.224	0.00E+00	1.19E-12	2.98E-12		
Ru-106	1.5066E-05	4,956.090	12,390.224	0.00E+00	7.47E-02	1.87E-01		
Se-79	1.0127E-05	4,956.090	12,390.224	0.00E+00	5.02E-02	1.25E-01		
Sn-126	4.3902E-05	4,956.090	12,390.224	0.00E+00	2.18E-01	5.44E-01		
Sr-90	5.0088E-01	4,956.090	12,390.224	0.00E+00	2.48E+03	6.21E+03		
Tc-99	3.9412E-04	4,956.090	12,390.224	0.00E+00	1.95E+00	4.88E+00		
Th-229	2.7219E-12	4,956.090	12,390.224	0.00E+00	1.35E-08	3.37E-08		
Th-230	1.0441E-09	4,956.090	12,390.224	0.00E+00	5.17E-06	1.29E-05		
Th-232	3.1689E-16	4,956.090	12,390.224	0.00E+00	1.57E-12	3.93E-12		
Tl-208	4.6636E-07	4,956.090	12,390.224	0.00E+00	2.31E-03	5.78E-03		
U-232	1.2638E-06	4,956.090	12,390.224	0.00E+00	6.26E-03	1.57E-02		
U-233	5.7451E-10	4,956.090	12,390.224	0.00E+00	2.85E-06	7.12E-06		
U-234	4.3044E-06	4,956.090	12,390.224	0.00E+00	2.13E-02	5.33E-02		
U-235	-7.7765E-09	4,956.090	0.000	2.01E-04	1.63E-04	2.01E-04		
U-236	1.8050E-07	4,956.090	12,390.224	0.00E+00	8.95E-04	2.24E-03		
U-238	-1.7914E-07	4,956.090	0.000	1.47E-02	1.38E-02	1.47E-02		
Y-90	5.0088E-01	4,956.090	12,390.224	0.00E+00	2.48E+03	6.21E+03		
Other Radionuclides					7.02E+03	1.76E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.21E+02	2.40E+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:	FAST	FAST	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
BOL HM Constituents:	SST	SST	
BOL Enrichment %:	PuO2-UO2	Pu and U	
		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		4,956.090	Nominal burnup taken from SFD and converted to MWd using BOL=61.951kg
Bounding:		12,390.224	Bounding burnup taken from SFD and converted to MWd using BOL=61.951kg

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.53		1.00
Bounding:	1.31		

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: EBR-II OXIDE FUEL EXPER
 SNF ID #: 364
 Fuel Units & Descr: 992 - ROD
 Heavy Metal Mass: BOL= ; EOL=92.45kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1994
 Estimates as of: 2030
 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: 35 years

Estimated
 Canister usage:
 18"x10"
 4.96

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	6.1822E-12	8,040.815	20,102.038	0.00E+00	4.97E-08	1.24E-07	Avg. MeV	
Am-241	1.1066E-01	8,040.815	20,102.038	1.94E+02	1.08E+03	2.42E+03	0.0150	6.563E+14
Am-242m	1.9247E-03	8,040.815	20,102.038	0.00E+00	1.55E+01	3.87E+01	0.0250	1.307E+14
Am-243	1.0740E-04	8,040.815	20,102.038	0.00E+00	8.64E-01	2.16E+00	0.0375	1.519E+14
C-14	2.6042E-05	8,040.815	20,102.038	0.00E+00	2.09E-01	5.23E-01	0.0575	1.510E+14
Cl-36	3.4243E-10	8,040.815	20,102.038	0.00E+00	2.75E-06	6.88E-06	0.0850	7.276E+13
Cm-243	4.0629E-04	8,040.815	20,102.038	0.00E+00	3.27E+00	8.17E+00	0.1250	5.119E+13
Cm-244	1.6024E-03	8,040.815	20,102.038	0.00E+00	1.29E+01	3.22E+01	0.2250	5.871E+13
Co-60	3.4283E-03	8,040.815	20,102.038	0.00E+00	2.76E+01	6.89E+01	0.3750	2.545E+13
Cs-134	1.5565E-03	8,040.815	20,102.038	0.00E+00	1.25E+01	3.13E+01	0.5750	1.031E+15
Cs-135	4.7693E-05	8,040.815	20,102.038	0.00E+00	3.83E-01	9.59E-01	0.8500	1.077E+13
Cs-137	1.4007E+00	8,040.815	20,102.038	0.00E+00	1.13E+04	2.82E+04	1.2500	1.290E+13
Eu-154	1.6184E-02	8,040.815	20,102.038	0.00E+00	1.30E+02	3.25E+02	1.7500	2.917E+11
Eu-155	1.3775E-02	8,040.815	20,102.038	0.00E+00	1.11E+02	2.77E+02	2.2500	5.826E+07
Fe-55	3.8035E-04	8,040.815	20,102.038	0.00E+00	3.06E+00	7.65E+00	2.7500	3.330E+08
H-3	3.8454E-03	8,040.815	20,102.038	0.00E+00	3.09E+01	7.73E+01	3.5000	1.505E+06
I-129	1.2891E-06	8,040.815	20,102.038	0.00E+00	1.04E-02	2.59E-02	5.0000	5.055E+05
Kr-85	2.7858E-02	8,040.815	20,102.038	0.00E+00	2.24E+02	5.60E+02	7.0000	5.770E+04
Np-237	3.7516E-06	8,040.815	20,102.038	0.00E+00	3.02E-02	7.54E-02	11.0000	6.600E+03
Pa-231	1.2488E-11	8,040.815	20,102.038	0.00E+00	1.00E-07	2.51E-07		
Pb-210	2.4206E-12	8,040.815	20,102.038	0.00E+00	1.95E-08	4.87E-08		
Pm-147	1.5671E-02	8,040.815	20,102.038	0.00E+00	1.26E+02	3.15E+02		
Pu-238	1.4877E-02	8,040.815	20,102.038	0.00E+00	1.20E+02	2.99E+02		
Pu-239	-3.5520E-02	8,040.815	0.000	1.59E+03	1.31E+03	1.59E+03		
Pu-240	2.0690E-02	8,040.815	20,102.038	8.09E+02	9.75E+02	1.22E+03		
Pu-241	-1.4799E+00	8,040.815	0.000	3.63E+04	2.44E+04	3.63E+04		
Pu-242	1.1252E-05	8,040.815	20,102.038	2.16E-01	3.06E-01	4.42E-01		
Ra-226	7.8524E-12	8,040.815	20,102.038	0.00E+00	6.31E-08	1.58E-07		
Ra-228	2.4086E-16	8,040.815	20,102.038	0.00E+00	1.94E-12	4.84E-12		
Ru-106	1.5066E-05	8,040.815	20,102.038	0.00E+00	1.21E-01	3.03E-01		
Se-79	1.0127E-05	8,040.815	20,102.038	0.00E+00	8.14E-02	2.04E-01		
Sn-126	4.3902E-05	8,040.815	20,102.038	0.00E+00	3.53E-01	8.83E-01		
Sr-90	5.0088E-01	8,040.815	20,102.038	0.00E+00	4.03E+03	1.01E+04		
Tc-99	3.9412E-04	8,040.815	20,102.038	0.00E+00	3.17E+00	7.92E+00		
Th-229	2.7219E-12	8,040.815	20,102.038	0.00E+00	2.19E-08	5.47E-08		
Th-230	1.0441E-09	8,040.815	20,102.038	0.00E+00	8.40E-06	2.10E-05		
Th-232	3.1689E-16	8,040.815	20,102.038	0.00E+00	2.55E-12	6.37E-12		
Th-208	4.6636E-07	8,040.815	20,102.038	0.00E+00	3.75E-03	9.37E-03		
U-232	1.2638E-06	8,040.815	20,102.038	0.00E+00	1.02E-02	2.54E-02		
U-233	5.7451E-10	8,040.815	20,102.038	0.00E+00	4.62E-06	1.15E-05		
U-234	4.3044E-06	8,040.815	20,102.038	0.00E+00	3.46E-02	8.65E-02		
U-235	-7.7765E-09	8,040.815	0.000	3.27E-04	2.64E-04	3.27E-04		
U-236	1.8050E-07	8,040.815	20,102.038	0.00E+00	1.45E-03	3.63E-03		
U-238	-1.7914E-07	8,040.815	0.000	2.38E-02	2.23E-02	2.38E-02		
Y-90	5.0088E-01	8,040.815	20,102.038	0.00E+00	4.03E+03	1.01E+04		
Other Radionuclides					1.14E+04	2.85E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.86E+02	3.89E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: FAST	Used: FAST	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	SST	SST	
BOL HM Constituents:	PuO2-UO2	Pu and U	
BOL Enrichment %:		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD:	Estimated: 8,040.815	Nominal burnup taken from SFD and converted to MWd using BOL=100.510kg Bounding burnup taken from SFD and converted to MWd using BOL=100.510kg
Bounding:		20,102.038	

Checks		
Nominal:	Burnup Multiplier: 0.53	Estimated Burnup/ Given Burnup
Bounding:	1.31	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: EBR-II, TREAT, MTR EXPR. & IPNS TARGET
 SNF ID #: 1088
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL= : EOL=33.25kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2050
 Estimates as of: 2030
 Template: FERMI (Fast, Zirc, 10 to 40%, U)
²Template Burnup(MWd): 58.6725048
 Template BOL Heavy Metal Mass (MT): 0.018774
 Template Decay Time: 5 years

Estimated
 Canister usage:
 HIC
 2.00

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6471E-09	3,750.412	3,750.412	0.00E+00	2.49E-05	2.49E-05	Avg. MeV	
Am-241	2.9452E-07	3,750.412	3,750.412	0.00E+00	1.10E-03	1.10E-03	0.0150	6.405E+14
Am-242m	0.0000E+00	3,750.412	3,750.412	0.00E+00	0.00E+00	0.00E+00	0.0250	1.548E+14
Am-243	8.4009E-15	3,750.412	3,750.412	0.00E+00	3.15E-11	3.15E-11	0.0375	1.291E+14
C-14	2.1799E-05	3,750.412	3,750.412	0.00E+00	8.18E-02	8.18E-02	0.0575	1.245E+14
Ci-36	5.5188E-08	3,750.412	3,750.412	0.00E+00	2.07E-04	2.07E-04	0.0850	8.119E+13
Cm-243	3.2145E-14	3,750.412	3,750.412	0.00E+00	1.21E-10	1.21E-10	0.1250	6.297E+13
Cm-244	1.6510E-15	3,750.412	3,750.412	0.00E+00	6.19E-12	6.19E-12	0.2250	6.788E+13
Co-60	1.0840E-01	3,750.412	3,750.412	0.00E+00	4.07E+02	4.07E+02	0.3750	4.178E+13
Cs-134	1.4973E-02	3,750.412	3,750.412	0.00E+00	5.62E+01	5.62E+01	0.5750	4.204E+14
Cs-135	4.4996E-05	3,750.412	3,750.412	0.00E+00	1.69E-01	1.69E-01	0.8500	1.035E+13
Cs-137	2.7543E+00	3,750.412	3,750.412	0.00E+00	1.03E+04	1.03E+04	1.2500	3.340E+13
Eu-154	2.0793E-03	3,750.412	3,750.412	0.00E+00	7.80E+00	7.80E+00	1.7500	3.833E+11
Eu-155	9.3809E-02	3,750.412	3,750.412	0.00E+00	3.52E+02	3.52E+02	2.2500	8.324E+11
Fe-55	4.2166E-02	3,750.412	3,750.412	0.00E+00	1.58E+02	1.58E+02	2.7500	9.101E+09
H-3	1.9055E-02	3,750.412	3,750.412	0.00E+00	7.15E+01	7.15E+01	3.5000	1.099E+09
I-129	1.1426E-06	3,750.412	3,750.412	0.00E+00	4.29E-03	4.29E-03	5.0000	2.316E+02
Kr-85	2.6861E-01	3,750.412	3,750.412	0.00E+00	1.01E+03	1.01E+03	7.0000	1.941E+01
Np-237	3.3099E-06	3,750.412	3,750.412	0.00E+00	1.24E-02	1.24E-02	11.0000	1.750E+00
Pa-231	4.1655E-08	3,750.412	3,750.412	0.00E+00	1.56E-04	1.56E-04		
Pb-210	1.1039E-13	3,750.412	3,750.412	0.00E+00	4.14E-10	4.14E-10		
Pm-147	3.2093E+00	3,750.412	3,750.412	0.00E+00	1.20E+04	1.20E+04		
Pu-238	2.1731E-04	3,750.412	3,750.412	0.00E+00	8.15E-01	8.15E-01		
Pu-239	1.9481E-02	3,750.412	3,750.412	0.00E+00	7.31E+01	7.31E+01		
Pu-240	6.8141E-05	3,750.412	3,750.412	0.00E+00	2.56E-01	2.56E-01		
Pu-241	1.7708E-05	3,750.412	3,750.412	0.00E+00	6.64E-02	6.64E-02		
Pu-242	4.3751E-13	3,750.412	3,750.412	0.00E+00	1.64E-09	1.64E-09		
Ra-226	1.0792E-12	3,750.412	3,750.412	0.00E+00	4.05E-09	4.05E-09		
Ra-228	1.6234E-11	3,750.412	3,750.412	0.00E+00	6.09E-08	6.09E-08		
Ru-106	2.8173E-01	3,750.412	3,750.412	0.00E+00	1.06E+03	1.06E+03		
Se-79	1.6493E-05	3,750.412	3,750.412	0.00E+00	6.19E-02	6.19E-02		
Sn-126	3.7581E-05	3,750.412	3,750.412	0.00E+00	1.41E-01	1.41E-01		
Sr-90	2.4611E+00	3,750.412	3,750.412	0.00E+00	9.23E+03	9.23E+03		
Tc-99	4.4842E-04	3,750.412	3,750.412	0.00E+00	1.68E+00	1.68E+00		
Th-229	9.4814E-12	3,750.412	3,750.412	0.00E+00	3.56E-08	3.56E-08		
Th-230	4.6717E-10	3,750.412	3,750.412	0.00E+00	1.75E-06	1.75E-06		
Th-232	2.3674E-11	3,750.412	3,750.412	0.00E+00	8.88E-08	8.88E-08		
Tl-208	7.2112E-09	3,750.412	3,750.412	0.00E+00	2.70E-05	2.70E-05		
U-232	2.1032E-08	3,750.412	3,750.412	0.00E+00	7.89E-05	7.89E-05		
U-233	9.5326E-09	3,750.412	3,750.412	0.00E+00	3.58E-05	3.58E-05		
U-234	4.8711E-06	3,750.412	3,750.412	0.00E+00	1.83E-02	1.83E-02		
U-235	-2.3191E-06	3,750.412	0.000	2.07E-02	1.21E-02	2.07E-02		
U-236	1.2631E-05	3,750.412	3,750.412	0.00E+00	4.74E-02	4.74E-02		
U-238	-9.5407E-08	3,750.412	0.000	9.38E-03	9.02E-03	9.38E-03		
Y-90	2.4611E+00	3,750.412	3,750.412	0.00E+00	9.23E+03	9.23E+03		
Other Radionuclides					1.79E+04	1.79E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.63E+02	1.63E+02
Total	Total

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 and enrichment (unknown).
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	FAST	FAST	
BOL HM Constituents:	SST	ZIRC	
BOL Enrichment %:	U METAL	U	
		10 to 40	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup Bounding burnup taken from SFD and converted to MWd using BOL=37.504kg
Nominal:	From SFD	Estimated	
		3,750.412	
Bounding:		3,750.412	

Checks			Estimated EOL HM/Given EOL HM 1.03
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup	
	32.00		
Bounding:	32.00		

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
 SNF ID #: 65
 Fuel Units & Descr: 61 - 6 FLAT PLATES
 Heavy Metal Mass: BOL=1636.02kg ; EOL=1603.52kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1966
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 18"x10"
 5.08

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	1.0733E-09	30,906.724	61,813.447	0.00E+00	3.32E-05	6.63E-05	0.0150	2.352E+15
Am-241	1.4751E-01	30,906.724	61,813.447	0.00E+00	4.56E+03	9.12E+03	0.0250	4.714E+14
Am-242m	2.6809E-04	30,906.724	61,813.447	0.00E+00	8.29E+00	1.66E+01	0.0375	4.442E+14
Am-243	6.2484E-04	30,906.724	61,813.447	0.00E+00	1.93E+01	3.86E+01	0.0575	5.557E+14
C-14	4.7820E-05	30,906.724	61,813.447	0.00E+00	1.48E+00	2.96E+00	0.0850	1.728E+14
Cl-36	8.0297E-07	30,906.724	61,813.447	0.00E+00	2.48E-02	4.96E-02	0.1250	2.217E+14
Cm-243	1.7426E-04	30,906.724	61,813.447	0.00E+00	5.39E+00	1.08E+01	0.2250	9.575E+13
Cm-244	2.7616E-02	30,906.724	61,813.447	0.00E+00	8.54E+02	1.71E+03	0.3750	2.255E+15
Co-60	3.5610E-04	30,906.724	61,813.447	0.00E+00	1.10E+01	2.20E+01	0.8500	2.202E+13
Cs-134	2.6260E-07	30,906.724	61,813.447	0.00E+00	8.12E-03	1.62E-02	1.2500	1.401E+13
Cs-135	1.4433E-05	30,906.724	61,813.447	0.00E+00	4.46E-01	8.92E-01	1.7500	6.161E+11
Cs-137	9.8870E-01	30,906.724	61,813.447	0.00E+00	3.06E+04	6.11E+04	2.2500	1.013E+08
Eu-154	6.0320E-03	30,906.724	61,813.447	0.00E+00	1.86E+02	3.73E+02	2.7500	3.568E+08
Eu-155	2.1770E-04	30,906.724	61,813.447	0.00E+00	6.73E+00	1.35E+01	3.5000	2.546E+07
Fe-55	7.9296E-07	30,906.724	61,813.447	0.00E+00	2.45E-02	4.90E-02	5.0000	1.088E+07
H-3	8.9486E-03	30,906.724	61,813.447	0.00E+00	2.77E+02	5.53E+02	7.0000	1.253E+06
I-129	9.8288E-07	30,906.724	61,813.447	0.00E+00	3.04E-02	6.08E-02	11.0000	1.439E+05
Kr-85	1.0707E-02	30,906.724	61,813.447	0.00E+00	3.31E+02	6.62E+02		
Np-237	1.1927E-05	30,906.724	61,813.447	0.00E+00	3.69E-01	7.37E-01		
Pa-231	1.4703E-09	30,906.724	61,813.447	0.00E+00	4.54E-05	9.09E-05		
Pb-210	1.6828E-10	30,906.724	61,813.447	0.00E+00	5.20E-06	1.04E-05		
Pm-147	6.9606E-06	30,906.724	61,813.447	0.00E+00	2.15E-01	4.30E-01		
Pu-238	6.6263E-02	30,906.724	61,813.447	0.00E+00	2.05E+03	4.10E+03		
Pu-239	1.1618E-02	30,906.724	61,813.447	0.00E+00	3.59E+02	7.18E+02		
Pu-240	1.5142E-02	30,906.724	61,813.447	0.00E+00	4.68E+02	9.36E+02		
Pu-241	4.3766E-01	30,906.724	61,813.447	0.00E+00	1.35E+04	2.71E+04		
Pu-242	6.4260E-05	30,906.724	61,813.447	0.00E+00	1.99E+00	3.97E+00		
Ra-226	3.8501E-10	30,906.724	61,813.447	0.00E+00	1.19E-05	2.38E-05		
Ra-228	5.2955E-12	30,906.724	61,813.447	0.00E+00	1.64E-07	3.27E-07		
Ru-106	2.0413E-14	30,906.724	61,813.447	0.00E+00	6.31E-10	1.26E-09		
Se-79	1.2376E-05	30,906.724	61,813.447	0.00E+00	3.82E-01	7.65E-01		
Sn-126	2.5210E-05	30,906.724	61,813.447	0.00E+00	7.79E-01	1.56E+00		
Sr-90	6.4163E-01	30,906.724	61,813.447	0.00E+00	1.98E+04	3.97E+04		
Tc-99	3.9357E-04	30,906.724	61,813.447	0.00E+00	1.22E+01	2.43E+01		
Th-229	1.5644E-10	30,906.724	61,813.447	0.00E+00	4.84E-06	9.67E-06		
Th-230	2.7972E-08	30,906.724	61,813.447	0.00E+00	8.65E-04	1.73E-03		
Th-232	5.3036E-12	30,906.724	61,813.447	0.00E+00	1.64E-07	3.28E-07		
Th-208	1.5136E-07	30,906.724	61,813.447	0.00E+00	4.68E-03	9.36E-03		
U-232	4.1005E-07	30,906.724	61,813.447	0.00E+00	1.27E-02	2.53E-02		
U-233	2.5856E-08	30,906.724	61,813.447	0.00E+00	7.99E-04	1.60E-03		
U-234	5.2665E-05	30,906.724	61,813.447	0.00E+00	1.63E+00	3.26E+00		
U-235	-1.4487E-06	30,906.724	0.000	2.11E-01	1.66E-01	2.11E-01		
U-236	7.5888E-06	30,906.724	61,813.447	0.00E+00	2.35E-01	4.69E-01		
U-238	-2.6129E-07	30,906.724	0.000	5.17E-01	5.09E-01	5.17E-01		
Y-90	6.4180E-01	30,906.724	61,813.447	0.00E+00	1.98E+04	3.97E+04		
Other Radionuclides					2.95E+04	5.89E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.59E+02	1.12E+03
Total	Total

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 PWR Template on all but one parameter (enrichment) making PWR a reasonable match.
Fuel Cladding:	ZIRC-2	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	5.973154429	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		30,906.724	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	2,617.632	61,813.447	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.54		1.00
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
 SNF ID #: 63
 Fuel Units & Descr: 25 - 6 FLAT PLATES
 Heavy Metal Mass: BOL=986.00kg ; EOL=932.56kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1966
 Estimates as of: 2030
 Template: (Worst Case)
²Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 50 years

Estimated
 Canister usage:
 18"x10"
 2.08

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.5200E-06	50,784.462	101,568.923	0.00E+00	1.28E-01	2.56E-01	Avg. MeV	
Am-241	8.6432E+00	50,784.462	101,568.923	0.00E+00	4.39E+05	8.78E+05	0.0150	8.689E+16
Am-242m	1.5728E-02	50,784.462	101,568.923	0.00E+00	7.99E+02	1.60E+03	0.0250	1.700E+16
Am-243	1.6288E-02	50,784.462	101,568.923	0.00E+00	8.27E+02	1.65E+03	0.0375	1.438E+16
C-14	1.2068E-01	50,784.462	101,568.923	0.00E+00	6.13E+03	1.23E+04	0.0575	2.715E+16
Cl-36	2.2849E-03	50,784.462	101,568.923	0.00E+00	1.16E+02	2.32E+02	0.0850	9.101E+15
Cm-243	6.0144E-04	50,784.462	101,568.923	0.00E+00	3.05E+01	6.11E+01	0.1250	6.439E+15
Cm-244	9.4880E-02	50,784.462	101,568.923	0.00E+00	4.82E+03	9.64E+03	0.2250	7.877E+15
Co-60	3.9052E+00	50,784.462	101,568.923	0.00E+00	1.98E+05	3.97E+05	0.3750	3.409E+15
Cs-134	2.2139E-06	50,784.462	101,568.923	0.00E+00	1.12E-01	2.25E-01	0.5750	5.642E+16
Cs-135	4.3976E-04	50,784.462	101,568.923	0.00E+00	2.23E+01	4.47E+01	0.8500	1.236E+15
Cs-137	1.4887E-01	50,784.462	101,568.923	0.00E+00	7.56E+05	1.51E+06	1.2500	3.029E+16
Eu-154	3.7342E-01	50,784.462	101,568.923	0.00E+00	1.90E+04	3.79E+04	1.7500	3.641E+13
Eu-155	8.4893E-03	50,784.462	101,568.923	0.00E+00	4.31E+02	8.62E+02	2.2500	1.574E+11
Fe-55	5.3750E-03	50,784.462	101,568.923	0.00E+00	2.73E+02	5.46E+02	2.7500	2.710E+11
H-3	1.0472E-01	50,784.462	101,568.923	0.00E+00	5.32E+03	1.06E+04	3.5000	1.622E+08
I-129	1.0618E-05	50,784.462	101,568.923	0.00E+00	5.39E-01	1.08E+00	5.0000	6.851E+07
Kr-85	2.2717E-01	50,784.462	101,568.923	0.00E+00	1.15E+04	2.31E+04	7.0000	7.798E+06
Np-237	1.6400E-04	50,784.462	101,568.923	0.00E+00	8.33E+00	1.67E+01	11.0000	8.893E+05
Pa-231	2.8688E-06	50,784.462	101,568.923	0.00E+00	1.46E-01	2.91E-01		
Pb-210	4.7312E-08	50,784.462	101,568.923	0.00E+00	2.40E-03	4.81E-03		
Pm-147	3.2198E-04	50,784.462	101,568.923	0.00E+00	1.64E+01	3.27E+01		
Pu-238	-1.1924E+00	50,784.462	0.000	1.27E+05	6.61E+04	1.27E+05		
Pu-239	-4.8600E-02	50,784.462	0.000	1.53E+04	1.29E+04	1.53E+04		
Pu-240	-3.0127E-01	50,784.462	0.000	1.96E+04	4.28E+03	1.96E+04		
Pu-241	-1.2917E+02	50,784.462	0.000	5.04E+06	0.00E+00	5.04E+06		
Pu-242	-1.1381E-04	50,784.462	0.000	8.47E+01	7.90E+01	8.47E+01		
Ra-226	1.0760E-07	50,784.462	101,568.923	0.00E+00	5.46E-03	1.09E-02		
Ra-228	6.0160E-07	50,784.462	101,568.923	0.00E+00	3.06E-02	6.11E-02		
Ru-106	1.3388E-13	50,784.462	101,568.923	0.00E+00	6.80E-09	1.36E-08		
Se-79	1.9179E-04	50,784.462	101,568.923	0.00E+00	9.74E+00	1.95E+01		
Sn-126	1.6669E-04	50,784.462	101,568.923	0.00E+00	8.47E+00	1.69E+01		
Sr-90	1.3859E+01	50,784.462	101,568.923	0.00E+00	7.04E+05	1.41E+06		
Tc-99	6.7678E-03	50,784.462	101,568.923	0.00E+00	3.44E+02	6.87E+02		
Th-229	2.2592E-06	50,784.462	101,568.923	0.00E+00	1.15E-01	2.29E-01		
Th-230	7.5955E-06	50,784.462	101,568.923	0.00E+00	3.86E-01	7.71E-01		
Th-232	6.0208E-07	50,784.462	101,568.923	0.00E+00	3.06E-02	6.12E-02		
Ti-208	7.5795E-05	50,784.462	101,568.923	0.00E+00	3.85E+00	7.70E+00		
U-232	2.0521E-04	50,784.462	101,568.923	0.00E+00	1.04E+01	2.08E+01		
U-233	3.6128E-04	50,784.462	101,568.923	0.00E+00	1.83E+01	3.67E+01		
U-234	1.2788E-02	50,784.462	101,568.923	0.00E+00	6.49E+02	1.30E+03		
U-235	5.7486E-04	50,784.462	101,568.923	4.24E-01	2.96E+01	5.88E+01		
U-236	2.3485E-04	50,784.462	101,568.923	0.00E+00	1.19E+01	2.39E+01		
U-238	1.1581E-04	50,784.462	101,568.923	5.28E-02	5.93E+00	1.18E+01		
Y-90	1.3861E+01	50,784.462	101,568.923	0.00E+00	7.04E+05	1.41E+06		
Other Radionuclides					2.61E+06	5.22E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.00E+04	5.99E+04
Total	Total

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 Template was used for the following reasons:
Fuel Cladding:	ZIRC	SST/Inconel	This fuel didn't closely match any existing templates, therefore the worst case template was used.
BOL HM Constituents:	PuO ₂ -UO ₂	U, Th, & Pu	
BOL Enrichment %:	0.222222216	0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		50,784.462	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		101,568.923	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
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
 SNF ID #: 60
 Fuel Units & Descr: 51 - 6 FLAT PLATES
 Heavy Metal Mass: BOL=1358.64kg ; EOL=1357.82kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1966
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 18"x10"
 4.25

Radionuclide	m	x _n	x _p	b	y _n	y _p	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-09	775.977	1,551.955	0.00E+00	8.33E-07	1.67E-06	Avg. MeV	
Am-241	1.4751E-01	775.977	1,551.955	0.00E+00	1.14E+02	2.29E+02	0.0150	5.905E+13
Am-242m	2.6809E-04	775.977	1,551.955	0.00E+00	2.08E-01	4.16E-01	0.0250	1.183E+13
Am-243	6.2484E-04	775.977	1,551.955	0.00E+00	4.85E-01	9.70E-01	0.0375	1.115E+13
C-14	4.7820E-05	775.977	1,551.955	0.00E+00	3.71E-02	7.42E-02	0.0575	1.395E+13
Cl-36	8.0297E-07	775.977	1,551.955	0.00E+00	6.23E-04	1.25E-03	0.0850	6.520E+12
Cm-243	1.7426E-04	775.977	1,551.955	0.00E+00	1.35E-01	2.70E-01	0.1250	4.338E+12
Cm-244	2.7616E-02	775.977	1,551.955	0.00E+00	2.14E+01	4.29E+01	0.2250	5.567E+12
Co-60	3.5610E-04	775.977	1,551.955	0.00E+00	2.76E-01	5.53E-01	0.3750	2.404E+12
Cs-134	2.6260E-07	775.977	1,551.955	0.00E+00	2.04E-04	4.08E-04	0.5750	5.661E+13
Cs-135	1.4433E-05	775.977	1,551.955	0.00E+00	1.12E-02	2.24E-02	0.8500	5.528E+11
Cs-137	9.8870E-07	775.977	1,551.955	0.00E+00	7.67E+02	1.53E+03	1.2500	3.518E+11
Eu-154	6.0320E-03	775.977	1,551.955	0.00E+00	4.68E+00	9.36E+00	1.7500	1.547E+10
Eu-155	2.1770E-04	775.977	1,551.955	0.00E+00	1.69E-01	3.38E-01	2.2500	2.547E+06
Fe-55	7.9296E-07	775.977	1,551.955	0.00E+00	6.15E-04	1.23E-03	2.7500	8.961E+06
H-3	8.9486E-03	775.977	1,551.955	0.00E+00	6.94E+00	1.39E+01	3.5000	6.417E+05
I-129	9.8288E-07	775.977	1,551.955	0.00E+00	7.63E-04	1.53E-03	5.0000	2.742E+05
Kr-85	1.0707E-02	775.977	1,551.955	0.00E+00	8.31E+00	1.66E+01	7.0000	3.159E+04
Np-237	1.1927E-05	775.977	1,551.955	0.00E+00	9.25E-03	1.85E-02	11.0000	3.627E+03
Pa-231	1.4703E-09	775.977	1,551.955	0.00E+00	1.14E-06	2.28E-06		
Pb-210	1.6828E-10	775.977	1,551.955	0.00E+00	1.31E-07	2.61E-07		
Pm-147	6.9606E-06	775.977	1,551.955	0.00E+00	5.40E-03	1.08E-02		
Pu-238	6.6263E-02	775.977	1,551.955	0.00E+00	5.14E+01	1.03E+02		
Pu-239	1.1618E-02	775.977	1,551.955	0.00E+00	9.02E+00	1.80E+01		
Pu-240	1.5142E-02	775.977	1,551.955	0.00E+00	1.17E+01	2.35E+01		
Pu-241	4.3766E-01	775.977	1,551.955	0.00E+00	3.40E+02	6.79E+02		
Pu-242	6.4260E-05	775.977	1,551.955	0.00E+00	4.99E-02	9.97E-02		
Ra-226	3.8501E-10	775.977	1,551.955	0.00E+00	2.99E-07	5.98E-07		
Ra-228	5.2955E-12	775.977	1,551.955	0.00E+00	4.11E-09	8.22E-09		
Ru-106	2.0413E-14	775.977	1,551.955	0.00E+00	1.58E-11	3.17E-11		
Se-79	1.2376E-05	775.977	1,551.955	0.00E+00	9.60E-03	1.92E-02		
Sn-126	2.5210E-05	775.977	1,551.955	0.00E+00	1.96E-02	3.91E-02		
Sr-90	6.4163E-01	775.977	1,551.955	0.00E+00	4.98E+02	9.96E+02		
Tc-99	3.9357E-04	775.977	1,551.955	0.00E+00	3.05E-01	6.11E-01		
Th-229	1.5644E-10	775.977	1,551.955	0.00E+00	1.21E-07	2.43E-07		
Th-230	2.7972E-08	775.977	1,551.955	0.00E+00	2.17E-05	4.34E-05		
Th-232	5.3036E-12	775.977	1,551.955	0.00E+00	4.12E-09	8.23E-09		
Tl-208	1.5136E-07	775.977	1,551.955	0.00E+00	1.17E-04	2.35E-04		
U-232	4.1005E-07	775.977	1,551.955	0.00E+00	3.18E-04	6.36E-04		
U-233	2.5856E-08	775.977	1,551.955	0.00E+00	2.01E-05	4.01E-05		
U-234	5.2665E-05	775.977	1,551.955	0.00E+00	4.09E-02	8.17E-02		
U-235	-1.4487E-06	775.977	0.000	2.09E-02	1.98E-02	2.09E-02		
U-236	7.5888E-06	775.977	1,551.955	0.00E+00	5.89E-03	1.18E-02		
U-238	-2.6129E-07	775.977	0.000	4.53E-01	4.53E-01	4.53E-01		
Y-90	6.4180E-01	775.977	1,551.955	0.00E+00	4.98E+02	9.96E+02		
Other Radionuclides					7.39E+02	1.48E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.40E+01	2.81E+01
Total	Total

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-2	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	0.71100391	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		775.977	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,551.955	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.02		1.00
Bounding:	0.03		

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: EBWR (FUEL FOLLOWER)
 SNF ID #: 740
 Fuel Units & Descr: 4 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=1.76kg ; EOL=1.73kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1966
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 HIC
 1.00

Radionuclide	m		x _n		x _b		b		y _n		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)	Avg. MeV					
Ac-227	3.4276E-08	29.851	59.702	0.00E+00	1.02E-06	2.05E-06								
Am-241	1.1458E-04	29.851	59.702	0.00E+00	3.42E-03	6.84E-03	0.0150	3.113E+12						
Am-242m	7.9468E-09	29.851	59.702	0.00E+00	2.37E-07	4.74E-07	0.0250	6.469E+11						
Am-243	9.8386E-10	29.851	59.702	0.00E+00	2.94E-08	5.87E-08	0.0375	5.609E+11						
C-14	2.2978E-04	29.851	59.702	0.00E+00	6.86E-03	1.37E-02	0.0575	6.033E+11						
Cl-36	1.2261E-06	29.851	59.702	0.00E+00	3.66E-05	7.32E-05	0.0850	3.644E+11						
Cm-243	1.7271E-10	29.851	59.702	0.00E+00	5.16E-09	1.03E-08	0.1250	2.364E+11						
Cm-244	1.3058E-09	29.851	59.702	0.00E+00	3.90E-08	7.80E-08	0.2250	3.141E+11						
Co-60	9.8636E-03	29.851	59.702	0.00E+00	2.94E-01	5.89E-01	0.3750	1.370E+11						
Cs-134	1.9617E-08	29.851	59.702	0.00E+00	5.86E-07	1.17E-06	0.5750	2.281E+12						
Cs-135	3.0316E-05	29.851	59.702	0.00E+00	9.05E-04	1.81E-03	0.8500	2.252E+10						
Cs-137	1.0263E+00	29.851	59.702	0.00E+00	3.06E+01	6.13E+01	1.2500	5.129E+10						
Eu-154	2.0017E-04	29.851	59.702	0.00E+00	5.98E-03	1.20E-02	1.7500	5.800E+08						
Eu-155	8.5957E-05	29.851	59.702	0.00E+00	2.57E-03	5.13E-03	2.2500	2.939E+05						
Fe-55	2.2646E-05	29.851	59.702	0.00E+00	6.76E-04	1.35E-03	2.7500	4.003E+04						
H-3	1.0835E-03	29.851	59.702	0.00E+00	3.23E-02	6.47E-02	3.5000	3.796E+00						
I-129	7.3195E-07	29.851	59.702	0.00E+00	2.18E-05	4.37E-05	5.0000	1.569E+00						
Kr-85	1.5661E-02	29.851	59.702	0.00E+00	4.67E-01	9.35E-01	7.0000	1.736E-01						
Np-237	1.1494E-06	29.851	59.702	0.00E+00	3.43E-05	6.86E-05	11.0000	1.950E-02						
Pa-231	5.8070E-08	29.851	59.702	0.00E+00	1.73E-06	3.47E-06								
Pb-210	1.2985E-12	29.851	59.702	0.00E+00	3.88E-11	7.75E-11								
Pm-147	2.2196E-05	29.851	59.702	0.00E+00	6.63E-04	1.33E-03								
Pu-238	2.6223E-04	29.851	59.702	0.00E+00	7.83E-03	1.57E-02								
Pu-239	6.6739E-04	29.851	59.702	0.00E+00	1.99E-02	3.98E-02								
Pu-240	8.6705E-05	29.851	59.702	0.00E+00	2.59E-03	5.18E-03								
Pu-241	3.4759E-04	29.851	59.702	0.00E+00	1.04E-02	2.08E-02								
Pu-242	1.9717E-09	29.851	59.702	0.00E+00	5.89E-08	1.18E-07								
Ra-226	3.0000E-12	29.851	59.702	0.00E+00	8.96E-11	1.79E-10								
Ra-228	8.3328E-12	29.851	59.702	0.00E+00	2.49E-10	4.97E-10								
Ru-106	6.1464E-15	29.851	59.702	0.00E+00	1.83E-13	3.67E-13								
Se-79	1.3221E-05	29.851	59.702	0.00E+00	3.95E-04	7.89E-04								
Sn-126	1.1491E-05	29.851	59.702	0.00E+00	3.43E-04	6.86E-04								
Sr-90	9.5541E-01	29.851	59.702	0.00E+00	2.85E+01	5.70E+01								
Tc-99	4.6656E-04	29.851	59.702	0.00E+00	1.39E-02	2.79E-02								
Th-229	1.9085E-11	29.851	59.702	0.00E+00	5.70E-10	1.14E-09								
Th-230	2.1913E-10	29.851	59.702	0.00E+00	6.54E-09	1.31E-08								
Th-232	8.3478E-12	29.851	59.702	0.00E+00	2.49E-10	4.98E-10								
Ti-208	1.8752E-08	29.851	59.702	0.00E+00	5.60E-07	1.12E-06								
U-232	5.0782E-08	29.851	59.702	0.00E+00	1.52E-06	3.03E-06								
U-233	3.2596E-09	29.851	59.702	0.00E+00	9.73E-08	1.95E-07								
U-234	3.9817E-07	29.851	59.702	0.00E+00	1.19E-05	2.38E-05								
U-235	-2.7761E-06	29.851	0.000	3.56E-03	3.48E-03	3.56E-03								
U-236	1.6190E-05	29.851	59.702	0.00E+00	4.83E-04	9.67E-04								
U-238	-2.8547E-09	29.851	0.000	3.76E-05	3.76E-05	3.76E-05								
Y-90	9.5557E-01	29.851	59.702	0.00E+00	2.85E+01	5.70E+01								
Other Radionuclides					3.64E+01	7.28E+01								

Thermal Power		
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
3.48E-01	6.97E-01	
Total	Total	

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 Pathfinder Template on all but one parameter (cladding, but substituting Stainless Steel is a good conservative assumption).
Fuel Cladding:	ZIRC	SST	
BOL HM Constituents:	UO ₂	U	
BOL Enrichment %:	93.63636364	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		29.851	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		59.702	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.36		
Bounding:	0.73		

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=29.21kg ; EOL=26.99kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1966
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 18"x10"
 2.58

Radionuclide	II. Estimates		x _b	b	y _n	y _b	Gamma Sources	
	m	x _n					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	3.4276E-08	2,093.811	4,187.623	0.00E+00	7.18E-05	1.44E-04	0.0150	2.184E+14
Am-241	1.1458E-04	2,093.811	4,187.623	0.00E+00	2.40E-01	4.80E-01	0.0250	4.538E+13
Am-242m	7.9468E-09	2,093.811	4,187.623	0.00E+00	1.66E-05	3.33E-05	0.0375	3.934E+13
Am-243	9.8386E-10	2,093.811	4,187.623	0.00E+00	2.06E-06	4.12E-06	0.0575	4.232E+13
C-14	2.2978E-04	2,093.811	4,187.623	0.00E+00	4.81E-01	9.62E-01	0.0850	2.556E+13
Cl-36	1.2261E-06	2,093.811	4,187.623	0.00E+00	2.57E-03	5.13E-03	0.1250	1.638E+13
Cm-243	1.7271E-10	2,093.811	4,187.623	0.00E+00	3.62E-07	7.23E-07	0.2250	2.203E+13
Cm-244	1.3058E-09	2,093.811	4,187.623	0.00E+00	2.73E-06	5.47E-06	0.3750	9.608E+12
Co-60	9.8636E-03	2,093.811	4,187.623	0.00E+00	2.07E+01	4.13E+01	0.5750	1.600E+14
Cs-134	1.9617E-08	2,093.811	4,187.623	0.00E+00	4.11E-05	8.21E-05	0.8500	1.580E+12
Cs-135	3.0316E-05	2,093.811	4,187.623	0.00E+00	6.35E-02	1.27E-01	1.2500	3.597E+12
Cs-137	1.0263E+00	2,093.811	4,187.623	0.00E+00	2.15E+03	4.30E+03	1.7500	4.068E+10
Eu-154	2.0017E-04	2,093.811	4,187.623	0.00E+00	4.19E-01	8.38E-01	2.2500	2.061E+07
Eu-155	8.5957E-05	2,093.811	4,187.623	0.00E+00	1.80E-01	3.60E-01	2.7500	2.808E+06
Fe-55	2.2646E-05	2,093.811	4,187.623	0.00E+00	4.74E-02	9.48E-02	3.5000	2.493E+02
H-3	1.0835E-03	2,093.811	4,187.623	0.00E+00	2.27E+00	4.54E+00	5.0000	1.029E+02
I-129	7.3195E-07	2,093.811	4,187.623	0.00E+00	1.53E-03	3.07E-03	7.0000	1.137E+01
Kr-85	1.5661E-02	2,093.811	4,187.623	0.00E+00	3.28E+01	6.56E+01	11.0000	1.277E+00
Np-237	1.1494E-06	2,093.811	4,187.623	0.00E+00	2.41E-03	4.81E-03		
Pa-231	5.8070E-08	2,093.811	4,187.623	0.00E+00	1.22E-04	2.43E-04		
Pb-210	1.2985E-12	2,093.811	4,187.623	0.00E+00	2.72E-09	5.44E-09		
Pm-147	2.2196E-05	2,093.811	4,187.623	0.00E+00	4.65E-02	9.29E-02		
Pu-238	2.6223E-04	2,093.811	4,187.623	0.00E+00	5.49E-01	1.10E+00		
Pu-239	6.6739E-04	2,093.811	4,187.623	0.00E+00	1.40E+00	2.79E+00		
Pu-240	8.6705E-05	2,093.811	4,187.623	0.00E+00	1.82E-01	3.63E-01		
Pu-241	3.4759E-04	2,093.811	4,187.623	0.00E+00	7.28E-01	1.46E+00		
Pu-242	1.9717E-09	2,093.811	4,187.623	0.00E+00	4.13E-06	8.26E-06		
Ra-226	3.0000E-12	2,093.811	4,187.623	0.00E+00	6.28E-09	1.26E-08		
Ra-228	8.3328E-12	2,093.811	4,187.623	0.00E+00	1.74E-08	3.49E-08		
Ru-106	6.1464E-15	2,093.811	4,187.623	0.00E+00	1.29E-11	2.57E-11		
Se-79	1.3221E-05	2,093.811	4,187.623	0.00E+00	2.77E-02	5.54E-02		
Sn-126	1.1491E-05	2,093.811	4,187.623	0.00E+00	2.41E-02	4.81E-02		
Sr-90	9.5541E-01	2,093.811	4,187.623	0.00E+00	2.00E+03	4.00E+03		
Tc-99	4.6656E-04	2,093.811	4,187.623	0.00E+00	9.77E-01	1.95E+00		
Th-229	1.9085E-11	2,093.811	4,187.623	0.00E+00	4.00E-08	7.99E-08		
Th-230	2.1913E-10	2,093.811	4,187.623	0.00E+00	4.59E-07	9.18E-07		
Th-232	8.3478E-12	2,093.811	4,187.623	0.00E+00	1.75E-08	3.50E-08		
Tl-208	1.8752E-08	2,093.811	4,187.623	0.00E+00	3.93E-05	7.85E-05		
U-232	5.0782E-08	2,093.811	4,187.623	0.00E+00	1.06E-04	2.13E-04		
U-233	3.2596E-09	2,093.811	4,187.623	0.00E+00	6.82E-06	1.36E-05		
U-234	3.9817E-07	2,093.811	4,187.623	0.00E+00	8.34E-04	1.67E-03		
U-235	-2.7761E-06	2,093.811	0.000	5.88E-02	5.30E-02	5.88E-02		
U-236	1.6190E-05	2,093.811	4,187.623	0.00E+00	3.39E-02	6.78E-02		
U-238	-2.8547E-09	2,093.811	0.000	6.68E-04	6.62E-04	6.68E-04		
Y-90	9.5557E-01	2,093.811	4,187.623	0.00E+00	2.00E+03	4.00E+03		
Other Radionuclides					2.55E+03	5.11E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.44E+01	4.89E+01
Total	Total

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 Pathfinder Template on all but one parameter (cladding, but substituting Stainless Steel is a good conservative assumption).
Fuel Cladding:	ZIRC-2	SST	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:	93.18999022	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	1,233.244	2,093.811	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	1,767.055	4,187.623	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
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 ENRICHED HEAVY
 SNF ID #: 64
 Fuel Units & Descr: 53 - 6 FLAT PLATES
 Heavy Metal Mass: BOL=2989.20kg ; EOL=2982.96kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1966
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 18"x10"
 4.42

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	1.0733E-09	5,932.138	11,864.276	0.00E+00	6.37E-06	1.27E-05	0.0150	4.514E+14
Am-241	1.4751E-01	5,932.138	11,864.276	0.00E+00	8.75E+02	1.75E+03	0.0250	9.047E+13
Am-242m	2.6809E-04	5,932.138	11,864.276	0.00E+00	1.59E+00	3.18E+00	0.0375	8.525E+13
Am-243	6.2484E-04	5,932.138	11,864.276	0.00E+00	3.71E+00	7.41E+00	0.0575	1.067E+14
C-14	4.7820E-05	5,932.138	11,864.276	0.00E+00	2.84E-01	5.67E-01	0.0850	4.984E+13
Cl-36	8.0297E-07	5,932.138	11,864.276	0.00E+00	4.76E-03	9.53E-03	0.1250	3.316E+13
Cm-243	1.7426E-04	5,932.138	11,864.276	0.00E+00	1.03E+00	2.07E+00	0.2250	4.256E+13
Cm-244	2.7616E-02	5,932.138	11,864.276	0.00E+00	1.64E+02	3.28E+02	0.3750	1.838E+13
Co-60	3.5610E-04	5,932.138	11,864.276	0.00E+00	2.11E+00	4.22E+00	0.5750	4.328E+14
Cs-134	2.6260E-07	5,932.138	11,864.276	0.00E+00	1.56E-03	3.12E-03	0.8500	4.226E+12
Cs-135	1.4433E-05	5,932.138	11,864.276	0.00E+00	8.56E-02	1.71E-01	1.2500	2.689E+12
Cs-137	9.8870E-01	5,932.138	11,864.276	0.00E+00	5.87E+03	1.17E+04	1.7500	1.183E+11
Eu-154	6.0320E-03	5,932.138	11,864.276	0.00E+00	3.58E+01	7.16E+01	2.2500	1.944E+07
Eu-155	2.1770E-04	5,932.138	11,864.276	0.00E+00	1.29E+00	2.58E+00	2.7500	6.849E+07
Fe-55	7.9296E-07	5,932.138	11,864.276	0.00E+00	4.70E-03	9.41E-03	3.5000	4.892E+06
H-3	8.9486E-03	5,932.138	11,864.276	0.00E+00	5.31E+01	1.06E+02	5.0000	2.090E+06
I-129	9.8288E-07	5,932.138	11,864.276	0.00E+00	5.83E-03	1.17E-02	7.0000	2.408E+05
Kr-85	1.0707E-02	5,932.138	11,864.276	0.00E+00	6.35E+01	1.27E+02	11.0000	2.765E+04
Np-237	1.1927E-05	5,932.138	11,864.276	0.00E+00	7.08E-02	1.42E-01		
Pa-231	1.4703E-09	5,932.138	11,864.276	0.00E+00	8.72E-06	1.74E-05		
Pb-210	1.6828E-10	5,932.138	11,864.276	0.00E+00	9.98E-07	2.00E-06		
Pm-147	6.9606E-06	5,932.138	11,864.276	0.00E+00	4.13E-02	8.26E-02		
Pu-238	6.6263E-02	5,932.138	11,864.276	0.00E+00	3.93E+02	7.86E+02		
Pu-239	1.1618E-02	5,932.138	11,864.276	0.00E+00	6.89E+01	1.38E+02		
Pu-240	1.5142E-02	5,932.138	11,864.276	0.00E+00	8.98E+01	1.80E+02		
Pu-241	4.3766E-01	5,932.138	11,864.276	0.00E+00	2.60E+03	5.19E+03		
Pu-242	6.4260E-05	5,932.138	11,864.276	0.00E+00	3.81E-01	7.62E-01		
Ra-226	3.8501E-10	5,932.138	11,864.276	0.00E+00	2.28E-06	4.57E-06		
Ra-228	5.2955E-12	5,932.138	11,864.276	0.00E+00	3.14E-08	6.28E-08		
Ru-106	2.0413E-14	5,932.138	11,864.276	0.00E+00	1.21E-10	2.42E-10		
Se-79	1.2376E-05	5,932.138	11,864.276	0.00E+00	7.34E-02	1.47E-01		
Sn-126	2.5210E-05	5,932.138	11,864.276	0.00E+00	1.50E-01	2.99E-01		
Sr-90	6.4163E-01	5,932.138	11,864.276	0.00E+00	3.81E+03	7.61E+03		
Tc-99	3.9357E-04	5,932.138	11,864.276	0.00E+00	2.33E+00	4.67E+00		
Th-229	1.5644E-10	5,932.138	11,864.276	0.00E+00	9.28E-07	1.86E-06		
Th-230	2.7972E-08	5,932.138	11,864.276	0.00E+00	1.66E-04	3.32E-04		
Th-232	5.3036E-12	5,932.138	11,864.276	0.00E+00	3.15E-08	6.29E-08		
Th-208	1.5136E-07	5,932.138	11,864.276	0.00E+00	8.98E-04	1.80E-03		
U-232	4.1005E-07	5,932.138	11,864.276	0.00E+00	2.43E-03	4.86E-03		
U-233	2.5856E-08	5,932.138	11,864.276	0.00E+00	1.53E-04	3.07E-04		
U-234	5.2665E-05	5,932.138	11,864.276	0.00E+00	3.12E-01	6.25E-01		
U-235	-1.4487E-06	5,932.138	0.000	9.28E-02	8.42E-02	9.28E-02		
U-236	7.5888E-06	5,932.138	11,864.276	0.00E+00	4.50E-02	9.00E-02		
U-238	-2.6129E-07	5,932.138	0.000	9.90E-01	9.89E-01	9.90E-01		
Y-90	6.4180E-01	5,932.138	11,864.276	0.00E+00	3.81E+03	7.61E+03		
Other Radionuclides					5.65E+03	1.13E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.07E+02	2.15E+02
Total	Total

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 METAL	U	
BOL Enrichment %:	1.436170175	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		5,932.138	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	4,782.720	11,864.276	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.06		1.00
Bounding:	0.11	2.48	

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 ENRICHED THIN
 SNF ID #: 887
 Fuel Units & Descr: 54 - 6 FLAT PLATES
 Heavy Metal Mass: BOL= : EOL=2194.10kg
 ROD Storage Sits: INEEL

¹Fuel decay start date: 1966
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 18"x10"
 4.50

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-09	3,516.478	3,516.478	0.00E+00	3.77E-06	3.77E-06	Avg. MeV	
Am-241	1.4751E-01	3,516.478	3,516.478	0.00E+00	5.19E+02	5.19E+02	0.0150	1.338E+14
Am-242m	2.6809E-04	3,516.478	3,516.478	0.00E+00	9.43E-01	9.43E-01	0.0250	2.682E+13
Am-243	6.2484E-04	3,516.478	3,516.478	0.00E+00	2.20E+00	2.20E+00	0.0375	2.527E+13
C-14	4.7820E-05	3,516.478	3,516.478	0.00E+00	1.68E-01	1.68E-01	0.0575	3.162E+13
Cl-36	8.0297E-07	3,516.478	3,516.478	0.00E+00	2.82E-03	2.82E-03	0.0850	1.477E+13
Cm-243	1.7426E-04	3,516.478	3,516.478	0.00E+00	6.13E-01	6.13E-01	0.1250	9.829E+12
Cm-244	2.7616E-02	3,516.478	3,516.478	0.00E+00	9.71E+01	9.71E+01	0.2250	1.262E+13
Co-60	3.5610E-04	3,516.478	3,516.478	0.00E+00	1.25E+00	1.25E+00	0.3750	5.447E+12
Cs-134	2.6260E-07	3,516.478	3,516.478	0.00E+00	9.23E-04	9.23E-04	0.5750	1.283E+14
Cs-135	1.4433E-05	3,516.478	3,516.478	0.00E+00	5.08E-02	5.08E-02	0.8500	1.253E+12
Cs-137	9.8870E-01	3,516.478	3,516.478	0.00E+00	3.48E+03	3.48E+03	1.2500	7.971E+11
Eu-154	6.0320E-03	3,516.478	3,516.478	0.00E+00	2.12E+01	2.12E+01	1.7500	3.505E+10
Eu-155	2.1770E-04	3,516.478	3,516.478	0.00E+00	7.66E-01	7.66E-01	2.2500	5.767E+06
Fe-55	7.9296E-07	3,516.478	3,516.478	0.00E+00	2.79E-03	2.79E-03	2.7500	2.030E+07
H-3	8.9486E-03	3,516.478	3,516.478	0.00E+00	3.15E+01	3.15E+01	3.5000	1.452E+06
I-129	9.8288E-07	3,516.478	3,516.478	0.00E+00	3.46E-03	3.46E-03	5.0000	6.206E+05
Kr-85	1.0707E-02	3,516.478	3,516.478	0.00E+00	3.77E+01	3.77E+01	7.0000	7.149E+04
Np-237	1.1927E-05	3,516.478	3,516.478	0.00E+00	4.19E-02	4.19E-02	11.0000	8.209E+03
Pa-231	1.4703E-09	3,516.478	3,516.478	0.00E+00	5.17E-06	5.17E-06		
Pb-210	1.6828E-10	3,516.478	3,516.478	0.00E+00	5.92E-07	5.92E-07		
Pm-147	6.9606E-06	3,516.478	3,516.478	0.00E+00	2.45E-02	2.45E-02		
Pu-238	6.6263E-02	3,516.478	3,516.478	0.00E+00	2.33E+02	2.33E+02		
Pu-239	1.1618E-02	3,516.478	3,516.478	0.00E+00	4.09E+01	4.09E+01		
Pu-240	1.5142E-02	3,516.478	3,516.478	0.00E+00	5.32E+01	5.32E+01		
Pu-241	4.3766E-01	3,516.478	3,516.478	0.00E+00	1.54E+03	1.54E+03		
Pu-242	6.4260E-05	3,516.478	3,516.478	0.00E+00	2.26E-01	2.26E-01		
Ra-226	3.8501E-10	3,516.478	3,516.478	0.00E+00	1.35E-06	1.35E-06		
Ra-228	5.2955E-12	3,516.478	3,516.478	0.00E+00	1.86E-08	1.86E-08		
Ru-106	2.0413E-14	3,516.478	3,516.478	0.00E+00	7.18E-11	7.18E-11		
Se-79	1.2376E-05	3,516.478	3,516.478	0.00E+00	4.35E-02	4.35E-02		
Sn-126	2.5210E-05	3,516.478	3,516.478	0.00E+00	8.87E-02	8.87E-02		
Sr-90	6.4163E-01	3,516.478	3,516.478	0.00E+00	2.26E+03	2.26E+03		
Tc-99	3.9357E-04	3,516.478	3,516.478	0.00E+00	1.38E+00	1.38E+00		
Th-229	1.5644E-10	3,516.478	3,516.478	0.00E+00	5.50E-07	5.50E-07		
Th-230	2.7972E-08	3,516.478	3,516.478	0.00E+00	9.84E-05	9.84E-05		
Th-232	5.3036E-12	3,516.478	3,516.478	0.00E+00	1.87E-08	1.87E-08		
Ti-208	1.5136E-07	3,516.478	3,516.478	0.00E+00	5.32E-04	5.32E-04		
U-232	4.1005E-07	3,516.478	3,516.478	0.00E+00	1.44E-03	1.44E-03		
U-233	2.5856E-08	3,516.478	3,516.478	0.00E+00	9.09E-05	9.09E-05		
U-234	5.2665E-05	3,516.478	3,516.478	0.00E+00	1.85E-01	1.85E-01		
U-235	-1.4487E-06	3,516.478	0.000	1.52E-01	1.47E-01	1.52E-01		
U-236	7.5888E-06	3,516.478	3,516.478	0.00E+00	2.67E-02	2.67E-02		
U-238	-2.6129E-07	3,516.478	0.000	7.15E-01	7.14E-01	7.15E-01		
Y-90	6.4180E-01	3,516.478	3,516.478	0.00E+00	2.26E+03	2.26E+03		
Other Radionuclides					3.35E+03	3.35E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.36E+01	6.36E+01
Total	Total

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 (unknown).
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U METAL	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		3,516.478	Nominal burnup set equal to bounding burnup.
Bounding:		3,516.478	Bounding burnup taken from SFD and converted to MWd using BOL=2197.799kg

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.05		1.00
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 ET-11
 SNF ID #: 888
 Fuel Units & Descr: 1 - 6 FLAT PLATES
 Heavy Metal Mass: BOL=40.20kg ; EOL=38.37kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1966
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 18"x10"
 0.08

Radionuclide	m	x _a	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-09	1,744.998	3,489.996	0.00E+00	1.87E-06	3.75E-06	Avg. MeV	
Am-241	1.4751E-01	1,744.998	3,489.996	0.00E+00	2.57E+02	5.15E+02	0.0150	1.328E+14
Am-242m	2.6809E-04	1,744.998	3,489.996	0.00E+00	4.68E-01	9.36E-01	0.0250	2.661E+13
Am-243	6.2484E-04	1,744.998	3,489.996	0.00E+00	1.09E+00	2.18E+00	0.0375	2.508E+13
C-14	4.7820E-05	1,744.998	3,489.996	0.00E+00	8.34E-02	1.67E-01	0.0575	3.138E+13
Cl-36	8.0297E-07	1,744.998	3,489.996	0.00E+00	1.40E-03	2.80E-03	0.0850	1.466E+13
Cm-243	1.7426E-04	1,744.998	3,489.996	0.00E+00	3.04E-01	6.08E-01	0.1250	9.754E+12
Cm-244	2.7616E-02	1,744.998	3,489.996	0.00E+00	4.82E+01	9.64E+01	0.2250	1.252E+13
Co-60	3.5610E-04	1,744.998	3,489.996	0.00E+00	6.21E-01	1.24E+00	0.3750	5.406E+12
Cs-134	2.6260E-07	1,744.998	3,489.996	0.00E+00	4.58E-04	9.16E-04	0.5750	1.273E+14
Cs-135	1.4433E-05	1,744.998	3,489.996	0.00E+00	2.52E-02	5.04E-02	0.8500	1.243E+12
Cs-137	9.8870E-01	1,744.998	3,489.996	0.00E+00	1.73E+03	3.45E+03	1.2500	7.911E+11
Eu-154	6.0320E-03	1,744.998	3,489.996	0.00E+00	1.05E+01	2.11E+01	1.7500	3.478E+10
Eu-155	2.1770E-04	1,744.998	3,489.996	0.00E+00	3.80E-01	7.60E-01	2.2500	5.717E+06
Fe-55	7.9296E-07	1,744.998	3,489.996	0.00E+00	1.38E-03	2.77E-03	2.7500	2.015E+07
H-3	8.9486E-03	1,744.998	3,489.996	0.00E+00	1.56E+01	3.12E+01	3.5000	1.438E+06
I-129	9.8288E-07	1,744.998	3,489.996	0.00E+00	1.72E-03	3.43E-03	5.0000	6.143E+05
Kr-85	1.0707E-02	1,744.998	3,489.996	0.00E+00	1.87E+01	3.74E+01	7.0000	7.077E+04
Np-237	1.1927E-05	1,744.998	3,489.996	0.00E+00	2.08E-02	4.16E-02	11.0000	8.126E+03
Pa-231	1.4703E-09	1,744.998	3,489.996	0.00E+00	2.57E-06	5.13E-06		
Pb-210	1.6828E-10	1,744.998	3,489.996	0.00E+00	2.94E-07	5.87E-07		
Pm-147	6.9606E-06	1,744.998	3,489.996	0.00E+00	1.21E-02	2.43E-02		
Pu-238	6.6263E-02	1,744.998	3,489.996	0.00E+00	1.16E+02	2.31E+02		
Pu-239	1.1618E-02	1,744.998	3,489.996	0.00E+00	2.03E+01	4.05E+01		
Pu-240	1.5142E-02	1,744.998	3,489.996	0.00E+00	2.64E+01	5.28E+01		
Pu-241	4.3766E-01	1,744.998	3,489.996	0.00E+00	7.64E+02	1.53E+03		
Pu-242	6.4260E-05	1,744.998	3,489.996	0.00E+00	1.12E-01	2.24E-01		
Ra-226	3.8501E-10	1,744.998	3,489.996	0.00E+00	6.72E-07	1.34E-06		
Ra-228	5.2955E-12	1,744.998	3,489.996	0.00E+00	9.24E-09	1.85E-08		
Ru-106	2.0413E-14	1,744.998	3,489.996	0.00E+00	3.56E-11	7.12E-11		
Se-79	1.2376E-05	1,744.998	3,489.996	0.00E+00	2.16E-02	4.32E-02		
Sn-126	2.5210E-05	1,744.998	3,489.996	0.00E+00	4.40E-02	8.80E-02		
Sr-90	6.4163E-01	1,744.998	3,489.996	0.00E+00	1.12E+03	2.24E+03		
Tc-99	3.9357E-04	1,744.998	3,489.996	0.00E+00	6.87E-01	1.37E+00		
Th-229	1.5644E-10	1,744.998	3,489.996	0.00E+00	2.73E-07	5.46E-07		
Th-230	2.7972E-08	1,744.998	3,489.996	0.00E+00	4.88E-05	9.76E-05		
Th-232	5.3036E-12	1,744.998	3,489.996	0.00E+00	9.25E-09	1.85E-08		
Ti-208	1.5136E-07	1,744.998	3,489.996	0.00E+00	2.64E-04	5.28E-04		
U-232	4.1005E-07	1,744.998	3,489.996	0.00E+00	7.16E-04	1.43E-03		
U-233	2.5858E-08	1,744.998	3,489.996	0.00E+00	4.51E-05	9.02E-05		
U-234	5.2665E-05	1,744.998	3,489.996	0.00E+00	9.19E-02	1.84E-01		
U-235	-1.4487E-06	1,744.998	0.000	1.26E-03	0.00E+00	1.26E-03		
U-236	7.5888E-06	1,744.998	3,489.996	0.00E+00	1.32E-02	2.65E-02		
U-238	-2.6129E-07	1,744.998	0.000	1.33E-02	1.29E-02	1.33E-02		
Y-90	6.4180E-01	1,744.998	3,489.996	0.00E+00	1.12E+03	2.24E+03		
Other Radionuclides					1.66E+03	3.33E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.16E+01	6.31E+01
Total	Total

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 METAL	U	
BOL Enrichment %:	1.447761165	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		1,744.998	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	64.320	3,489.996	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	1.24		
Bounding:	2.48	54.26	

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 HEAVY
 SNF ID #: 889
 Fuel Units & Descr: 11 - 6 FLAT PLATES
 Heavy Metal Mass: BOL=620.40kg ; EOL=566.14kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1966
 Estimates as of: 2030
 Template: PWR (Light Water, Zinc, 0 to 5%, U)
²Template Burnup(MWd): 61.92
 Template BOL Heavy Metal Mass (MT): 0.00176911
 Template Decay Time: 50 years

Estimated
 Canister usage:
 18"x10"
 0.92

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	1.0733E-09	51,594.224	103,188.448	0.00E+00	5.54E-05	1.11E-04		
Am-241	1.4751E-01	51,594.224	103,188.448	0.00E+00	7.61E+03	1.52E+04	0.0150	3.926E+15
Am-242m	2.6809E-04	51,594.224	103,188.448	0.00E+00	1.38E+01	2.77E+01	0.0250	7.869E+14
Am-243	6.2484E-04	51,594.224	103,188.448	0.00E+00	3.22E+01	6.45E+01	0.0375	7.415E+14
C-14	4.7820E-05	51,594.224	103,188.448	0.00E+00	2.47E+00	4.93E+00	0.0575	9.277E+14
Ci-36	8.0297E-07	51,594.224	103,188.448	0.00E+00	4.14E-02	8.29E-02	0.0850	4.335E+14
Cm-243	1.7426E-04	51,594.224	103,188.448	0.00E+00	8.99E+00	1.80E+01	0.1250	2.884E+14
Cm-244	2.7616E-02	51,594.224	103,188.448	0.00E+00	1.42E+03	2.85E+03	0.2250	3.701E+14
Co-60	3.5610E-04	51,594.224	103,188.448	0.00E+00	1.84E+01	3.67E+01	0.3750	1.598E+14
Cs-134	2.6260E-07	51,594.224	103,188.448	0.00E+00	1.35E-02	2.71E-02	0.5750	3.764E+15
Cs-135	1.4433E-05	51,594.224	103,188.448	0.00E+00	7.45E-01	1.49E+00	0.8500	3.675E+13
Cs-137	9.8870E-01	51,594.224	103,188.448	0.00E+00	5.10E+04	1.02E+05	1.2500	2.399E+13
Eu-154	6.0320E-03	51,594.224	103,188.448	0.00E+00	3.11E+02	6.22E+02	1.7500	1.028E+12
Eu-155	2.1770E-04	51,594.224	103,188.448	0.00E+00	1.12E+01	2.25E+01	2.2500	1.690E+08
Fe-55	7.9296E-07	51,594.224	103,188.448	0.00E+00	4.09E-02	8.18E-02	2.7500	5.956E+08
H-3	8.9486E-03	51,594.224	103,188.448	0.00E+00	4.62E+02	9.23E+02	3.5000	4.251E+07
I-129	9.8288E-07	51,594.224	103,188.448	0.00E+00	5.07E-02	1.01E-01	5.0000	1.816E+07
Kr-85	1.0707E-02	51,594.224	103,188.448	0.00E+00	5.52E+02	1.10E+03	7.0000	2.092E+06
Np-237	1.1927E-05	51,594.224	103,188.448	0.00E+00	6.15E-01	1.23E+00	11.0000	2.403E+05
Pa-231	1.4703E-09	51,594.224	103,188.448	0.00E+00	7.59E-05	1.52E-04		
Pb-210	1.6828E-10	51,594.224	103,188.448	0.00E+00	8.68E-06	1.74E-05		
Pm-147	6.9606E-06	51,594.224	103,188.448	0.00E+00	3.59E-01	7.18E-01		
Pu-238	6.6263E-02	51,594.224	103,188.448	0.00E+00	3.42E+03	6.84E+03		
Pu-239	1.1618E-02	51,594.224	103,188.448	0.00E+00	5.99E+02	1.20E+03		
Pu-240	1.5142E-02	51,594.224	103,188.448	0.00E+00	7.81E+02	1.56E+03		
Pu-241	4.3766E-01	51,594.224	103,188.448	0.00E+00	2.26E+04	4.52E+04		
Pu-242	6.4260E-05	51,594.224	103,188.448	0.00E+00	3.32E+00	6.63E+00		
Ra-226	3.8501E-10	51,594.224	103,188.448	0.00E+00	1.99E-05	3.97E-05		
Ra-228	5.2955E-12	51,594.224	103,188.448	0.00E+00	2.73E-07	5.46E-07		
Ru-106	2.0413E-14	51,594.224	103,188.448	0.00E+00	1.05E-09	2.11E-09		
Se-79	1.2376E-05	51,594.224	103,188.448	0.00E+00	6.39E-01	1.28E+00		
Sn-126	2.5210E-05	51,594.224	103,188.448	0.00E+00	1.30E+00	2.60E+00		
Sr-90	6.4163E-01	51,594.224	103,188.448	0.00E+00	3.31E+04	6.62E+04		
Tc-99	3.9357E-04	51,594.224	103,188.448	0.00E+00	2.03E+01	4.06E+01		
Th-229	1.5644E-10	51,594.224	103,188.448	0.00E+00	8.07E-06	1.61E-05		
Th-230	2.7972E-08	51,594.224	103,188.448	0.00E+00	1.44E-03	2.89E-03		
Th-232	5.3036E-12	51,594.224	103,188.448	0.00E+00	2.74E-07	5.47E-07		
Tl-208	1.5136E-07	51,594.224	103,188.448	0.00E+00	7.81E-03	1.56E-02		
U-232	4.1005E-07	51,594.224	103,188.448	0.00E+00	2.12E-02	4.23E-02		
U-233	2.5856E-08	51,594.224	103,188.448	0.00E+00	1.33E-03	2.67E-03		
U-234	5.2665E-05	51,594.224	103,188.448	0.00E+00	2.72E+00	5.43E+00		
U-235	-1.4487E-06	51,594.224	0.000	9.56E-03	0.00E+00	9.56E-03		
U-236	7.5888E-06	51,594.224	103,188.448	0.00E+00	3.92E-01	7.83E-01		
U-238	-2.6129E-07	51,594.224	0.000	2.07E-01	1.94E-01	2.07E-01		
Y-90	6.4180E-01	51,594.224	103,188.448	0.00E+00	3.31E+04	6.62E+04		
Other Radionuclides					4.92E+04	9.83E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.33E+02	1.87E+03
Total	Total

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 METAL	U	
BOL Enrichment %:	0.712765938	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		51,594.224	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	992.640	103,188.448	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	2.38		
Bounding:	4.75	103.95	

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 THIN	¹ Fuel decay start date: 1966
SNF ID #: 890	Estimates as of: 2030
Fuel Units & Descr: 7 - 6 FLAT PLATES	Template: PWR (Light Water, Zirc, 0 to 5%, U)
Heavy Metal Mass: BOL=281.40kg ; EOL=279.08kg	² Template Burnup(MWd): 61.92
ROD Storage Site: INEEL	Template BOL Heavy Metal Mass (MT): 0.00176911
	Template Decay Time: 50 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 Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-09	2,210.006	4,420.012	0.00E+00	2.37E-06	4.74E-06	Avg. MeV	
Am-241	1.4751E-01	2,210.006	4,420.012	0.00E+00	3.26E+02	6.52E+02	0.0150	1.682E+14
Am-242m	2.6809E-04	2,210.006	4,420.012	0.00E+00	5.92E-01	1.18E+00	0.0250	3.371E+13
Am-243	6.2484E-04	2,210.006	4,420.012	0.00E+00	1.38E+00	2.76E+00	0.0375	3.176E+13
C-14	4.7820E-05	2,210.006	4,420.012	0.00E+00	1.06E-01	2.11E-01	0.0575	3.974E+13
Cl-36	8.0297E-07	2,210.006	4,420.012	0.00E+00	1.77E-03	3.55E-03	0.0850	1.857E+13
Cm-243	1.7426E-04	2,210.006	4,420.012	0.00E+00	3.85E-01	7.70E-01	0.1250	1.235E+13
Cm-244	2.7616E-02	2,210.006	4,420.012	0.00E+00	6.10E+01	1.22E+02	0.2250	1.585E+13
Co-60	3.5610E-04	2,210.006	4,420.012	0.00E+00	7.87E-01	1.57E+00	0.3750	6.846E+12
Cs-134	2.6260E-07	2,210.006	4,420.012	0.00E+00	5.80E-04	1.16E-03	0.5750	1.612E+14
Cs-135	1.4433E-05	2,210.006	4,420.012	0.00E+00	3.19E-02	6.38E-02	0.8500	1.574E+12
Cs-137	9.8870E-01	2,210.006	4,420.012	0.00E+00	2.19E+03	4.37E+03	1.2500	1.002E+12
Eu-154	6.0320E-03	2,210.006	4,420.012	0.00E+00	1.33E+01	2.67E+01	1.7500	4.405E+10
Eu-155	2.1770E-04	2,210.006	4,420.012	0.00E+00	4.81E-01	9.62E-01	2.2500	7.241E+06
Fe-55	7.9296E-07	2,210.006	4,420.012	0.00E+00	1.75E-03	3.50E-03	2.7500	2.551E+07
H-3	8.9486E-03	2,210.006	4,420.012	0.00E+00	1.98E+01	3.96E+01	3.5000	1.821E+06
I-129	9.8288E-07	2,210.006	4,420.012	0.00E+00	2.17E-03	4.34E-03	5.0000	7.782E+05
Kr-85	1.0707E-02	2,210.006	4,420.012	0.00E+00	2.37E+01	4.73E+01	7.0000	8.965E+04
Np-237	1.1927E-05	2,210.006	4,420.012	0.00E+00	2.64E-02	5.27E-02	11.0000	1.029E+04
Pa-231	1.4703E-09	2,210.006	4,420.012	0.00E+00	3.25E-06	6.50E-06		
Pb-210	1.6828E-10	2,210.006	4,420.012	0.00E+00	3.72E-07	7.44E-07		
Pm-147	6.9606E-06	2,210.006	4,420.012	0.00E+00	1.54E-02	3.08E-02		
Pu-238	6.6263E-02	2,210.006	4,420.012	0.00E+00	1.46E+02	2.93E+02		
Pu-239	1.1618E-02	2,210.006	4,420.012	0.00E+00	2.57E+01	5.14E+01		
Pu-240	1.5142E-02	2,210.006	4,420.012	0.00E+00	3.35E+01	6.69E+01		
Pu-241	4.3766E-01	2,210.006	4,420.012	0.00E+00	9.67E+02	1.93E+03		
Pu-242	6.4260E-05	2,210.006	4,420.012	0.00E+00	1.42E-01	2.84E-01		
Ra-226	3.8501E-10	2,210.006	4,420.012	0.00E+00	8.51E-07	1.70E-06		
Ra-228	5.2955E-12	2,210.006	4,420.012	0.00E+00	1.17E-08	2.34E-08		
Ru-106	2.0413E-14	2,210.006	4,420.012	0.00E+00	4.51E-11	9.02E-11		
Se-79	1.2376E-05	2,210.006	4,420.012	0.00E+00	2.74E-02	5.47E-02		
Sn-126	2.5210E-05	2,210.006	4,420.012	0.00E+00	5.57E-02	1.11E-01		
Sr-90	6.4163E-01	2,210.006	4,420.012	0.00E+00	1.42E+03	2.84E+03		
Tc-99	3.9357E-04	2,210.006	4,420.012	0.00E+00	8.70E-01	1.74E+00		
Th-229	1.5644E-10	2,210.006	4,420.012	0.00E+00	3.46E-07	6.91E-07		
Th-230	2.7972E-08	2,210.006	4,420.012	0.00E+00	6.18E-05	1.24E-04		
Th-232	5.3036E-12	2,210.006	4,420.012	0.00E+00	1.17E-08	2.34E-08		
Th-208	1.5136E-07	2,210.006	4,420.012	0.00E+00	3.34E-04	6.69E-04		
U-232	4.1005E-07	2,210.006	4,420.012	0.00E+00	9.06E-04	1.81E-03		
U-233	2.5856E-08	2,210.006	4,420.012	0.00E+00	5.71E-05	1.14E-04		
U-234	5.2665E-05	2,210.006	4,420.012	0.00E+00	1.16E-01	2.33E-01		
U-235	-1.4487E-06	2,210.006	0.000	4.36E-03	1.15E-03	4.36E-03		
U-236	7.5888E-06	2,210.006	4,420.012	0.00E+00	1.68E-02	3.35E-02		
U-238	-2.6129E-07	2,210.006	0.000	9.39E-02	9.33E-02	9.39E-02		
Y-90	6.4180E-01	2,210.006	4,420.012	0.00E+00	1.42E+03	2.84E+03		
Other Radionuclides					2.11E+03	4.21E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.00E+01	7.99E+01
Total	Total

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 METAL	U	
BOL Enrichment %:	0.716417866	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		2,210.006	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	450.240	4,420.012	

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 SALUGGIA (ITALY) 1 Fuel decay start date: 1996
 SNF ID #: 574 Estimates as of: 2030
 Fuel Units & Descr: 116 - MTR TYPE Template: ATR (Light Water, Alum., 60 to 100%, U)
 Heavy Metal Mass: BOL=18.56kg ; EOL=17.23kg 2 Template Burnup(MWd): 367.2
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated
 Canister usage:
 18"x10"
 3.22

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-09	1,263.324	2,526.648	0.00E+00	1.45E-06	2.90E-06	Avg. MeV	
Am-241	2.3056E-03	1,263.324	2,526.648	0.00E+00	2.91E+00	5.83E+00	0.0150	2.364E+14
Am-242m	4.1476E-07	1,263.324	2,526.648	0.00E+00	5.24E-04	1.05E-03	0.0250	4.912E+13
Am-243	1.4894E-06	1,263.324	2,526.648	0.00E+00	1.88E-03	3.76E-03	0.0375	4.278E+13
C-14	5.7108E-09	1,263.324	2,526.648	0.00E+00	7.21E-06	1.44E-05	0.0575	4.593E+13
Cl-36	1.3124E-32	1,263.324	2,526.648	0.00E+00	1.66E-29	3.32E-29	0.0850	2.772E+13
Cm-243	1.4562E-07	1,263.324	2,526.648	0.00E+00	1.84E-04	3.68E-04	0.1250	1.856E+13
Cm-244	2.4221E-05	1,263.324	2,526.648	0.00E+00	3.06E-02	6.12E-02	0.2250	2.393E+13
Co-60	2.7560E-06	1,263.324	2,526.648	0.00E+00	3.48E-03	6.96E-03	0.3750	1.040E+13
Cs-134	5.8851E-04	1,263.324	2,526.648	0.00E+00	7.43E-01	1.49E+00	0.5750	1.705E+14
Cs-135	3.4477E-06	1,263.324	2,526.648	0.00E+00	4.36E-03	8.71E-03	0.8500	2.457E+12
Cs-137	1.8099E+00	1,263.324	2,526.648	0.00E+00	2.29E+03	4.57E+03	1.2500	1.367E+12
Eu-154	1.6386E-02	1,263.324	2,526.648	0.00E+00	2.07E+01	4.14E+01	1.7500	6.753E+10
Eu-155	2.3957E-03	1,263.324	2,526.648	0.00E+00	3.03E+00	6.05E+00	2.2500	4.814E+06
Fe-55	3.2707E-05	1,263.324	2,526.648	0.00E+00	4.13E-02	8.26E-02	2.7500	3.940E+06
H-3	3.4504E-03	1,263.324	2,526.648	0.00E+00	4.36E+00	8.72E+00	3.5000	2.977E+03
I-129	7.5300E-07	1,263.324	2,526.648	0.00E+00	9.51E-04	1.90E-03	5.0000	1.001E+03
Kr-85	7.8540E-02	1,263.324	2,526.648	0.00E+00	9.92E+01	1.98E+02	7.0000	1.102E+02
Np-237	9.5615E-06	1,263.324	2,526.648	0.00E+00	1.21E-02	2.42E-02	11.0000	1.232E+01
Pa-231	2.7968E-09	1,263.324	2,526.648	0.00E+00	3.53E-06	7.07E-06		
Pb-210	1.2612E-10	1,263.324	2,526.648	0.00E+00	1.59E-07	3.19E-07		
Pm-147	1.2952E-02	1,263.324	2,526.648	0.00E+00	1.64E+01	3.27E+01		
Pu-238	1.7549E-02	1,263.324	2,526.648	0.00E+00	2.22E+01	4.43E+01		
Pu-239	4.2810E-04	1,263.324	2,526.648	0.00E+00	5.41E-01	1.08E+00		
Pu-240	2.4357E-04	1,263.324	2,526.648	0.00E+00	3.08E-01	6.15E-01		
Pu-241	2.6277E-02	1,263.324	2,526.648	0.00E+00	3.32E+01	6.64E+01		
Pu-242	3.6329E-07	1,263.324	2,526.648	0.00E+00	4.59E-04	9.18E-04		
Ra-226	4.4444E-10	1,263.324	2,526.648	0.00E+00	5.61E-07	1.12E-06		
Ra-228	1.9714E-14	1,263.324	2,526.648	0.00E+00	2.49E-11	4.98E-11		
Ru-106	2.0477E-07	1,263.324	2,526.648	0.00E+00	2.59E-04	5.17E-04		
Se-79	1.2933E-05	1,263.324	2,526.648	0.00E+00	1.63E-02	3.27E-02		
Sn-126	1.1574E-05	1,263.324	2,526.648	0.00E+00	1.46E-02	2.92E-02		
Sr-90	1.7092E+00	1,263.324	2,526.648	0.00E+00	2.16E+03	4.32E+03		
Tc-99	4.2239E-04	1,263.324	2,526.648	0.00E+00	5.34E-01	1.07E+00		
Th-229	7.7260E-12	1,263.324	2,526.648	0.00E+00	9.76E-09	1.95E-08		
Th-230	5.8497E-08	1,263.324	2,526.648	0.00E+00	7.39E-05	1.48E-04		
Th-232	2.6906E-14	1,263.324	2,526.648	0.00E+00	3.40E-11	6.80E-11		
Ti-208	4.4336E-08	1,263.324	2,526.648	0.00E+00	5.60E-05	1.12E-04		
U-232	1.2037E-07	1,263.324	2,526.648	0.00E+00	1.52E-04	3.04E-04		
U-233	3.0011E-09	1,263.324	2,526.648	0.00E+00	3.79E-06	7.58E-06		
U-234	1.8497E-04	1,263.324	2,526.648	0.00E+00	2.34E-01	4.67E-01		
U-235	-2.7235E-06	1,263.324	0.000	3.74E-02	3.39E-02	3.74E-02		
U-236	1.5493E-05	1,263.324	2,526.648	0.00E+00	1.96E-02	3.91E-02		
U-238	-4.2851E-09	1,263.324	0.000	4.29E-04	4.23E-04	4.29E-04		
Y-90	1.7094E+00	1,263.324	2,526.648	0.00E+00	2.16E+03	4.32E+03		
Other Radionuclides					2.18E+03	4.35E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.67E+01	5.34E+01
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-ALX	U	
	93.125	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		1,263.324	Nominal burnup calculated from the heavy metal mass destroyed.
		2,526.648	Bounding burnup assumed to be twice nominal burnup.

Checks			Est'mated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Bounding:	0.22		1.00
	0.43		

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: ENEA SALUGGIA (ITALY) ¹Fuel decay start date: 1996
 SNF ID #: 760 Estimates as of: 2030
 Fuel Units & Descr: 32 - MTR TYPE Template: ATR (Light Water, Alum., 60 to 100%, U)
 Heavy Metal Mass: BOL=22.40kg ; EOL=21.57kg ²Template Burnup(MWd): 367.2
 ROD Storage Site: SRS Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 25 years

Estimated
 Canister usage:
 18"x10"
 0.89

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	1.1465E-09	787.920	1,575.840	0.00E+00	9.03E-07	1.81E-06	Avg. MeV	
Am-241	2.3056E-03	787.920	1,575.840	0.00E+00	1.82E+00	3.63E+00	0.0150	1.475E+14
Am-242m	4.1476E-07	787.920	1,575.840	0.00E+00	3.27E-04	6.54E-04	0.0250	3.063E+13
Am-243	1.4894E-06	787.920	1,575.840	0.00E+00	1.17E-03	2.35E-03	0.0375	2.668E+13
C-14	5.7108E-09	787.920	1,575.840	0.00E+00	4.50E-06	9.00E-06	0.0575	2.865E+13
Cl-36	1.3124E-32	787.920	1,575.840	0.00E+00	1.03E-29	2.07E-29	0.0850	1.729E+13
Cm-243	1.4562E-07	787.920	1,575.840	0.00E+00	1.15E-04	2.29E-04	0.1250	1.158E+13
Cm-244	2.4221E-05	787.920	1,575.840	0.00E+00	1.91E-02	3.82E-02	0.2250	1.492E+13
Co-60	2.7560E-06	787.920	1,575.840	0.00E+00	2.17E-03	4.34E-03	0.3750	6.487E+12
Cs-134	5.8851E-04	787.920	1,575.840	0.00E+00	4.64E-01	9.27E-01	0.5750	1.064E+14
Cs-135	3.4477E-06	787.920	1,575.840	0.00E+00	2.72E-03	5.43E-03	0.8500	1.533E+12
Cs-137	1.8099E+00	787.920	1,575.840	0.00E+00	1.43E+03	2.85E+03	1.2500	8.524E+11
Eu-154	1.6386E-02	787.920	1,575.840	0.00E+00	1.29E+01	2.58E+01	1.7500	4.212E+10
Eu-155	2.3957E-03	787.920	1,575.840	0.00E+00	1.89E+00	3.78E+00	2.2500	3.002E+06
Fe-55	3.2707E-05	787.920	1,575.840	0.00E+00	2.58E-02	5.15E-02	2.7500	2.457E+06
H-3	3.4504E-03	787.920	1,575.840	0.00E+00	2.72E+00	5.44E+00	3.5000	1.887E+03
I-129	7.5300E-07	787.920	1,575.840	0.00E+00	5.93E-04	1.19E-03	5.0000	6.374E+02
Kr-85	7.8540E-02	787.920	1,575.840	0.00E+00	6.19E+01	1.24E+02	7.0000	7.022E+01
Np-237	9.5615E-06	787.920	1,575.840	0.00E+00	7.53E-03	1.51E-02	11.0000	7.859E+00
Pa-231	2.7968E-09	787.920	1,575.840	0.00E+00	2.20E-06	4.41E-06		
Pb-210	1.2612E-10	787.920	1,575.840	0.00E+00	9.94E-08	1.99E-07		
Pm-147	1.2952E-02	787.920	1,575.840	0.00E+00	1.02E+01	2.04E+01		
Pu-238	1.7549E-02	787.920	1,575.840	0.00E+00	1.38E+01	2.77E+01		
Pu-239	4.2810E-04	787.920	1,575.840	0.00E+00	3.37E-01	6.75E-01		
Pu-240	2.4357E-04	787.920	1,575.840	0.00E+00	1.92E-01	3.84E-01		
Pu-241	2.6277E-02	787.920	1,575.840	0.00E+00	2.07E+01	4.14E+01		
Pu-242	3.6329E-07	787.920	1,575.840	0.00E+00	2.86E-04	5.72E-04		
Ra-226	4.4444E-10	787.920	1,575.840	0.00E+00	3.50E-07	7.00E-07		
Ra-228	1.9714E-14	787.920	1,575.840	0.00E+00	1.55E-11	3.11E-11		
Ru-106	2.0477E-07	787.920	1,575.840	0.00E+00	1.61E-04	3.23E-04		
Se-79	1.2933E-05	787.920	1,575.840	0.00E+00	1.02E-02	2.04E-02		
Sn-126	1.1574E-05	787.920	1,575.840	0.00E+00	9.12E-03	1.82E-02		
Sr-90	1.7092E+00	787.920	1,575.840	0.00E+00	1.35E+03	2.69E+03		
Tc-99	4.2239E-04	787.920	1,575.840	0.00E+00	3.33E-01	6.66E-01		
Th-229	7.7260E-12	787.920	1,575.840	0.00E+00	6.09E-09	1.22E-08		
Th-230	5.8497E-08	787.920	1,575.840	0.00E+00	4.61E-05	9.22E-05		
Th-232	2.6906E-14	787.920	1,575.840	0.00E+00	2.12E-11	4.24E-11		
Tl-208	4.4336E-08	787.920	1,575.840	0.00E+00	3.49E-05	6.99E-05		
U-232	1.2037E-07	787.920	1,575.840	0.00E+00	9.48E-05	1.90E-04		
U-233	3.0011E-09	787.920	1,575.840	0.00E+00	2.36E-06	4.73E-06		
U-234	1.8497E-04	787.920	1,575.840	0.00E+00	1.46E-01	2.91E-01		
U-235	-2.7235E-06	787.920	0.000	9.68E-03	7.54E-03	9.68E-03		
U-236	1.5493E-05	787.920	1,575.840	0.00E+00	1.22E-02	2.44E-02		
U-238	-4.2851E-09	787.920	0.000	6.02E-03	6.02E-03	6.02E-03		
Y-90	1.7094E+00	787.920	1,575.840	0.00E+00	1.35E+03	2.69E+03		
Other Radionuclides					1.36E+03	2.71E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.67E+01	3.33E+01
Total	Total

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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U-ALX	U	
BOL Enrichment %:	20	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		787.920	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		1,575.840	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.11		
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: EPRI
 SNF ID #: 67
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL= ; EOL=.02kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1966
 Estimates as of: 2030
 Template: (Worst Case)
²Template Burnup(MWD): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 50 years

Estimated
 Canister usage:
 18"x10"
 0.03

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	2.5200E-06	19.007	19.007	0.00E+00	4.79E-05	4.79E-05		Avg. MeV	
Am-241	8.6432E+00	19.007	19.007	0.00E+00	1.64E+02	1.64E+02	0.0150		1.611E+13
Am-242m	1.5728E-02	19.007	19.007	0.00E+00	2.99E-01	2.99E-01	0.0250		3.182E+12
Am-243	1.6288E-02	19.007	19.007	0.00E+00	3.10E-01	3.10E-01	0.0375		2.690E+12
C-14	1.2068E-01	19.007	19.007	0.00E+00	2.29E+00	2.29E+00	0.0575		5.081E+12
Cl-36	2.2849E-03	19.007	19.007	0.00E+00	4.34E-02	4.34E-02	0.0850		1.703E+12
Cm-243	6.0144E-04	19.007	19.007	0.00E+00	1.14E-02	1.14E-02	0.1250		1.205E+12
Cm-244	9.4880E-02	19.007	19.007	0.00E+00	1.80E+00	1.80E+00	0.2250		1.474E+12
Co-60	3.9052E+00	19.007	19.007	0.00E+00	7.42E+01	7.42E+01	0.3750		6.380E+11
Cs-134	2.2139E-06	19.007	19.007	0.00E+00	4.21E-05	4.21E-05	0.5750		1.056E+13
Cs-135	4.3976E-04	19.007	19.007	0.00E+00	8.36E-03	8.36E-03	0.8500		2.312E+11
Cs-137	1.4887E+01	19.007	19.007	0.00E+00	2.83E+02	2.83E+02	1.2500		5.668E+12
Eu-154	3.7342E-01	19.007	19.007	0.00E+00	7.10E+00	7.10E+00	1.7500		6.813E+09
Eu-155	8.4893E-03	19.007	19.007	0.00E+00	1.61E-01	1.61E-01	2.2500		2.946E+07
Fe-55	5.3750E-03	19.007	19.007	0.00E+00	1.02E-01	1.02E-01	2.7500		5.070E+07
H-3	1.0472E-01	19.007	19.007	0.00E+00	1.99E+00	1.99E+00	3.5000		2.761E+04
I-129	1.0618E-05	19.007	19.007	0.00E+00	2.02E-04	2.02E-04	5.0000		1.167E+04
Kr-85	2.2717E-01	19.007	19.007	0.00E+00	4.32E+00	4.32E+00	7.0000		1.329E+03
Np-237	1.6400E-04	19.007	19.007	0.00E+00	3.12E-03	3.12E-03	11.0000		1.516E+02
Pa-231	2.8688E-06	19.007	19.007	0.00E+00	5.45E-05	5.45E-05			
Pb-210	4.7312E-08	19.007	19.007	0.00E+00	8.99E-07	8.99E-07			
Pm-147	3.2198E-04	19.007	19.007	0.00E+00	6.12E-03	6.12E-03			
Pu-238	-1.1924E+00	19.007	0.000	5.14E+00	0.00E+00	5.14E+00			
Pu-239	-4.8600E-02	19.007	0.000	6.22E-01	0.00E+00	6.22E-01			
Pu-240	-3.0127E-01	19.007	0.000	7.94E-01	0.00E+00	7.94E-01			
Pu-241	-1.2917E+02	19.007	0.000	2.04E+02	0.00E+00	2.04E+02			
Pu-242	-1.1381E-04	19.007	0.000	3.44E-03	1.27E-03	3.44E-03			
Ra-226	1.0760E-07	19.007	19.007	0.00E+00	2.05E-06	2.05E-06			
Ra-228	6.0160E-07	19.007	19.007	0.00E+00	1.14E-05	1.14E-05			
Ru-106	1.3388E-13	19.007	19.007	0.00E+00	2.54E-12	2.54E-12			
Se-79	1.9179E-04	19.007	19.007	0.00E+00	3.65E-03	3.65E-03			
Sn-126	1.6669E-04	19.007	19.007	0.00E+00	3.17E-03	3.17E-03			
Sr-90	1.3859E+01	19.007	19.007	0.00E+00	2.63E+02	2.63E+02			
Tc-99	6.7678E-03	19.007	19.007	0.00E+00	1.29E-01	1.29E-01			
Th-229	2.2592E-06	19.007	19.007	0.00E+00	4.29E-05	4.29E-05			
Th-230	7.5955E-06	19.007	19.007	0.00E+00	1.44E-04	1.44E-04			
Th-232	6.0208E-07	19.007	19.007	0.00E+00	1.14E-05	1.14E-05			
Th-208	7.5795E-05	19.007	19.007	0.00E+00	1.44E-03	1.44E-03			
U-232	2.0521E-04	19.007	19.007	0.00E+00	3.90E-03	3.90E-03			
U-233	3.6128E-04	19.007	19.007	0.00E+00	6.87E-03	6.87E-03			
U-234	1.2788E-02	19.007	19.007	0.00E+00	2.43E-01	2.43E-01			
U-235	5.8772E-04	19.007	19.007	0.00E+00	1.12E-02	1.12E-02			
U-236	2.3485E-04	19.007	19.007	0.00E+00	4.46E-03	4.46E-03			
U-238	1.1741E-04	19.007	19.007	0.00E+00	2.23E-03	2.23E-03			
Y-90	1.3861E+01	19.007	19.007	0.00E+00	2.63E+02	2.63E+02			
Other Radionuclides					9.77E+02	9.77E+02			

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.02E+01	1.04E+01
Total	Total

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 Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	SST	SST/Inconel	
BOL HM Constituents:	PuO2	U, Th, & Pu	
BOL Enrichment %:		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		19.007	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		19.007	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	14.21		
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
 SNF ID #: 68
 Fuel Units & Descr: 190 - 5 X 5 ROD ARRAY
 Heavy Metal Mass: BOL=5079.65kg ; EOL=5032.83kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1966
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 18"x10"
 10.56

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	1.0595E-04	45,559.594	91,119.189	0.00E+00	4.83E+00	9.65E+00		0.0150
Am-241	2.4968E-04	45,559.594	91,119.189	0.00E+00	1.14E+01	2.28E+01		5.274E+15
Am-242m	1.3847E-06	45,559.594	91,119.189	0.00E+00	6.31E-02	1.26E-01		0.0250
Am-243	3.1103E-07	45,559.594	91,119.189	0.00E+00	1.42E-02	2.83E-02		0.0375
C-14	9.2267E-05	45,559.594	91,119.189	0.00E+00	4.20E+00	8.41E+00		0.0575
Cl-36	1.8103E-06	45,559.594	91,119.189	0.00E+00	8.25E-02	1.65E-01		0.0850
Cm-243	2.1248E-07	45,559.594	91,119.189	0.00E+00	9.68E-03	1.94E-02		0.1250
Cm-244	7.9666E-06	45,559.594	91,119.189	0.00E+00	3.63E-01	7.26E-01		0.2250
Co-60	1.2143E-04	45,559.594	91,119.189	0.00E+00	5.53E+00	1.11E+01		0.3750
Cs-134	1.6535E-07	45,559.594	91,119.189	0.00E+00	7.53E-03	1.51E-02		0.5750
Cs-135	2.8639E-05	45,559.594	91,119.189	0.00E+00	1.30E+00	2.61E+00		0.8500
Cs-137	1.0449E+00	45,559.594	91,119.189	0.00E+00	4.76E+04	9.52E+04		1.2500
Eu-154	2.5679E-03	45,559.594	91,119.189	0.00E+00	1.17E+02	2.34E+02		1.7500
Eu-155	8.1175E-05	45,559.594	91,119.189	0.00E+00	3.70E+00	7.40E+00		2.2500
Fe-55	4.2194E-08	45,559.594	91,119.189	0.00E+00	1.92E-03	3.84E-03		2.7500
H-3	9.1673E-04	45,559.594	91,119.189	0.00E+00	4.18E+01	8.35E+01		3.5000
I-129	1.5853E-06	45,559.594	91,119.189	0.00E+00	7.22E-02	1.44E-01		5.0000
Kr-85	2.3741E-02	45,559.594	91,119.189	0.00E+00	1.08E+03	2.16E+03		7.0000
Np-237	1.2747E-07	45,559.594	91,119.189	0.00E+00	5.81E-03	1.16E-02		11.0000
Pa-231	1.2007E-04	45,559.594	91,119.189	0.00E+00	5.47E+00	1.09E+01		
Pb-210	1.8424E-08	45,559.594	91,119.189	0.00E+00	8.39E-04	1.68E-03		
Pm-147	4.9829E-06	45,559.594	91,119.189	0.00E+00	2.27E-01	4.54E-01		
Pu-238	3.7744E-04	45,559.594	91,119.189	0.00E+00	1.72E+01	3.44E+01		
Pu-239	2.7510E-05	45,559.594	91,119.189	0.00E+00	1.25E+00	2.51E+00		
Pu-240	1.6175E-05	45,559.594	91,119.189	0.00E+00	7.37E-01	1.47E+00		
Pu-241	7.1379E-04	45,559.594	91,119.189	0.00E+00	3.25E+01	6.50E+01		
Pu-242	4.0831E-08	45,559.594	91,119.189	0.00E+00	1.86E-03	3.72E-03		
Ra-226	2.9038E-08	45,559.594	91,119.189	0.00E+00	1.32E-03	2.65E-03		
Ra-228	4.6352E-06	45,559.594	91,119.189	0.00E+00	2.11E-01	4.22E-01		
Ru-106	1.3321E-15	45,559.594	91,119.189	0.00E+00	6.07E-11	1.21E-10		
Se-79	3.5407E-05	45,559.594	91,119.189	0.00E+00	1.61E+00	3.23E+00		
Sn-126	3.9838E-05	45,559.594	91,119.189	0.00E+00	1.81E+00	3.63E+00		
Sr-90	1.0449E+00	45,559.594	91,119.189	0.00E+00	4.76E+04	9.52E+04		
Tc-99	3.2525E-04	45,559.594	91,119.189	0.00E+00	1.48E+01	2.96E+01		
Th-229	8.2305E-05	45,559.594	91,119.189	0.00E+00	3.75E+00	7.50E+00		
Th-230	1.2533E-06	45,559.594	91,119.189	0.00E+00	5.71E-02	1.14E-01		
Th-232	-9.0328E-08	45,559.594	0.000	5.36E-01	5.32E-01	5.36E-01		
Tl-208	1.2085E-02	45,559.594	91,119.189	0.00E+00	5.51E+02	1.10E+03		
U-232	3.2729E-02	45,559.594	91,119.189	0.00E+00	1.49E+03	2.98E+03		
U-233	-3.3244E-03	45,559.594	0.000	1.80E+03	1.65E+03	1.80E+03		
U-234	8.1769E-04	45,559.594	91,119.189	0.00E+00	3.73E+01	7.45E+01		
U-235	5.7813E-08	45,559.594	91,119.189	3.69E-04	3.00E-03	5.64E-03		
U-236	1.3273E-07	45,559.594	91,119.189	0.00E+00	6.05E-03	1.21E-02		
U-238	-3.1121E-10	45,559.594	0.000	2.36E-04	2.22E-04	2.36E-04		
Y-90	1.0449E+00	45,559.594	91,119.189	0.00E+00	4.76E+04	9.52E+04		
Other Radionuclides					5.57E+04	1.11E+05		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							9.68E+02	1.89E+03
							Total	Total

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 LWBR Template on all but one parameter (cladding) making LWBR a reasonable match.
Fuel Cladding:	SST (304)	ZIRC	
BOL HM Constituents:	ThO ₂ UO ₂	Th and U	
BOL Enrichment %:	92.94902719	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	27,491.066	45,559.594	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	66,035.450	91,119.189	

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.40	1.66
Bounding:	0.80	1.38
		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: ERR
 SNF ID #: 1057
 Fuel Units & Descr: 4 - ROD
 Heavy Metal Mass: BOL=4.29kg : EOL=4.23kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1966
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 18"x10"
 0.17

Radionuclide	m		x _n		x _b		b		y _n		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)	Avg. MeV					
Ac-227	1.0595E-04	56.833	113.665	0.00E+00	6.02E-03	1.20E-02								
Am-241	2.4968E-04	56.833	113.665	0.00E+00	1.42E-02	2.84E-02								
Am-242m	1.3847E-06	56.833	113.665	0.00E+00	7.87E-05	1.57E-04								
Am-243	3.1103E-07	56.833	113.665	0.00E+00	1.77E-05	3.54E-05								
C-14	9.2267E-05	56.833	113.665	0.00E+00	5.24E-03	1.05E-02								
Cl-36	1.8103E-06	56.833	113.665	0.00E+00	1.03E-04	2.06E-04								
Cm-243	2.1248E-07	56.833	113.665	0.00E+00	1.21E-05	2.42E-05								
Cm-244	7.9666E-06	56.833	113.665	0.00E+00	4.53E-04	9.06E-04								
Co-60	1.2143E-04	56.833	113.665	0.00E+00	6.90E-03	1.38E-02								
Cs-134	1.6535E-07	56.833	113.665	0.00E+00	9.40E-06	1.88E-05								
Cs-135	2.8639E-05	56.833	113.665	0.00E+00	1.63E-03	3.26E-03								
Cs-137	1.0449E+00	56.833	113.665	0.00E+00	5.94E+01	1.19E+02								
Eu-154	2.5679E-03	56.833	113.665	0.00E+00	1.46E-01	2.92E-01								
Eu-155	8.1175E-05	56.833	113.665	0.00E+00	4.61E-03	9.23E-03								
Fe-55	4.2194E-08	56.833	113.665	0.00E+00	2.40E-06	4.80E-06								
H-3	9.1673E-04	56.833	113.665	0.00E+00	5.21E-02	1.04E-01								
I-129	1.5853E-06	56.833	113.665	0.00E+00	9.01E-05	1.80E-04								
Kr-85	2.3741E-02	56.833	113.665	0.00E+00	1.35E+00	2.70E+00								
Np-237	1.2747E-07	56.833	113.665	0.00E+00	7.24E-06	1.45E-05								
Pa-231	1.2007E-04	56.833	113.665	0.00E+00	6.82E-03	1.36E-02								
Pb-210	1.8424E-08	56.833	113.665	0.00E+00	1.05E-06	2.09E-06								
Pm-147	4.9829E-06	56.833	113.665	0.00E+00	2.83E-04	5.66E-04								
Pu-238	3.7744E-04	56.833	113.665	0.00E+00	2.15E-02	4.29E-02								
Pu-239	2.7510E-05	56.833	113.665	0.00E+00	1.56E-03	3.13E-03								
Pu-240	1.6175E-05	56.833	113.665	0.00E+00	9.19E-04	1.84E-03								
Pu-241	7.1379E-04	56.833	113.665	0.00E+00	4.06E-02	8.11E-02								
Pu-242	4.0831E-08	56.833	113.665	0.00E+00	2.32E-06	4.64E-06								
Ra-226	2.9038E-08	56.833	113.665	0.00E+00	1.65E-06	3.30E-06								
Ra-228	4.6352E-06	56.833	113.665	0.00E+00	2.63E-04	5.27E-04								
Ru-106	1.3321E-15	56.833	113.665	0.00E+00	7.57E-14	1.51E-13								
Se-79	3.5407E-05	56.833	113.665	0.00E+00	2.01E-03	4.02E-03								
Sn-126	3.9838E-05	56.833	113.665	0.00E+00	2.26E-03	4.53E-03								
Sr-90	1.0449E+00	56.833	113.665	0.00E+00	5.94E+01	1.19E+02								
Tc-99	3.2525E-04	56.833	113.665	0.00E+00	1.85E-02	3.70E-02								
Th-229	8.2305E-05	56.833	113.665	0.00E+00	4.68E-03	9.36E-03								
Th-230	1.2533E-06	56.833	113.665	0.00E+00	7.12E-05	1.42E-04								
Th-232	-9.0328E-08	56.833	0.000	4.53E-04	4.48E-04	4.53E-04								
Tl-208	1.2085E-02	56.833	113.665	0.00E+00	6.87E-01	1.37E+00								
U-232	3.2729E-02	56.833	113.665	0.00E+00	1.86E+00	3.72E+00								
U-233	-3.3244E-03	56.833	0.000	1.52E+00	1.34E+00	1.52E+00								
U-234	8.1769E-04	56.833	113.665	0.00E+00	4.65E-02	9.29E-02								
U-235	5.7813E-08	56.833	113.665	3.12E-07	3.60E-06	6.88E-06								
U-236	1.3273E-07	56.833	113.665	0.00E+00	7.54E-06	1.51E-05								
U-238	-3.1121E-10	56.833	0.000	1.99E-07	1.82E-07	1.99E-07								
Y-90	1.0449E+00	56.833	113.665	0.00E+00	5.94E+01	1.19E+02								
Other Radionuclides					6.95E+01	1.39E+02								

Thermal Power	
Nominal Output (Watts)	Bounding Heat Output (Watts)
1.19E+00	2.34E+00
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	This Template was used for the following reasons: This fuel matches LWBR Template on all but one parameter (cladding) making LWBR a reasonable match.
BOL HM Constituents:	SST (304)	ZIRC	
BOL Enrichment %:	ThO ₂ -UO ₂	Th and U	
	93.0868939	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	28.264	56.833	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	45.487	113.665	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.59	2.01	1.00
Bounding:	1.19	2.50	

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: FAST REACTOR FUEL
 SNF ID #: 1029
 Fuel Units & Descr: 11 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=13.33kg ; EOL=11.09kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1985
 Estimates as of: 2030
 Template: FFFF (FAST, SST, 10 to 30%, Pu & U)
²Template Burnup(MWd): 5011.2
 Template BOL Heavy Metal Mass (MT): 0.0329181
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x10"
 0.85

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-12	3,998.940	7,997.880	0.00E+00	2.47E-08	4.94E-08	Avg. MeV	
Am-241	1.1066E-01	3,998.940	7,997.880	2.57E+01	4.68E+02	9.11E+02	0.0150	2.583E+14
Am-242m	1.9247E-03	3,998.940	7,997.880	0.00E+00	7.70E+00	1.54E+01	0.0250	5.197E+13
Am-243	1.0740E-04	3,998.940	7,997.880	0.00E+00	4.29E-01	8.59E-01	0.0375	6.043E+13
C-14	2.6042E-05	3,998.940	7,997.880	0.00E+00	1.04E-01	2.08E-01	0.0575	5.935E+13
Cl-36	3.4243E-10	3,998.940	7,997.880	0.00E+00	1.37E-06	2.74E-06	0.0850	2.895E+13
Cm-243	4.0629E-04	3,998.940	7,997.880	0.00E+00	1.62E+00	3.25E+00	0.1250	2.037E+13
Cm-244	1.6024E-03	3,998.940	7,997.880	0.00E+00	6.41E+00	1.28E+01	0.2250	2.336E+13
Co-60	3.4283E-03	3,998.940	7,997.880	0.00E+00	1.37E+01	2.74E+01	0.3750	1.012E+13
Cs-134	1.5565E-03	3,998.940	7,997.880	0.00E+00	6.22E+00	1.24E+01	0.5750	4.103E+14
Cs-135	4.7693E-05	3,998.940	7,997.880	0.00E+00	1.91E-01	3.81E-01	0.8500	4.286E+12
Cs-137	1.4007E+00	3,998.940	7,997.880	0.00E+00	5.60E+03	1.12E+04	1.2500	5.131E+12
Eu-154	1.6184E-02	3,998.940	7,997.880	0.00E+00	6.47E+01	1.29E+02	1.7500	1.161E+11
Eu-155	1.3775E-02	3,998.940	7,997.880	0.00E+00	5.51E+01	1.10E+02	2.2500	2.295E+07
Fe-55	3.8035E-04	3,998.940	7,997.880	0.00E+00	1.52E+00	3.04E+00	2.7500	1.323E+08
H-3	3.8454E-03	3,998.940	7,997.880	0.00E+00	1.54E+01	3.08E+01	3.5000	4.789E+05
I-129	1.2891E-06	3,998.940	7,997.880	0.00E+00	5.16E-03	1.03E-02	5.0000	1.502E+05
Kr-85	2.7858E-02	3,998.940	7,997.880	0.00E+00	1.11E+02	2.23E+02	7.0000	1.716E+04
Np-237	3.7516E-06	3,998.940	7,997.880	0.00E+00	1.50E-02	3.00E-02	11.0000	1.963E+03
Pa-231	1.2488E-11	3,998.940	7,997.880	0.00E+00	4.99E-08	9.99E-08		
Pb-210	2.4206E-12	3,998.940	7,997.880	0.00E+00	9.68E-09	1.94E-08		
Pm-147	1.5671E-02	3,998.940	7,997.880	0.00E+00	6.27E+01	1.25E+02		
Pu-238	1.4877E-02	3,998.940	7,997.880	0.00E+00	5.95E+01	1.19E+02		
Pu-239	-3.5520E-02	3,998.940	0.000	2.11E+02	6.89E+01	2.11E+02		
Pu-240	2.0690E-02	3,998.940	7,997.880	1.07E+02	1.90E+02	2.73E+02		
Pu-241	-1.4799E+00	3,998.940	0.000	4.81E+03	0.00E+00	4.81E+03		
Pu-242	1.1252E-05	3,998.940	7,997.880	2.86E-02	7.36E-02	1.19E-01		
Ra-226	7.8524E-12	3,998.940	7,997.880	0.00E+00	3.14E-08	6.28E-08		
Ra-228	2.4086E-16	3,998.940	7,997.880	0.00E+00	9.63E-13	1.93E-12		
Ru-106	1.5066E-05	3,998.940	7,997.880	0.00E+00	6.02E-02	1.20E-01		
Se-79	1.0127E-05	3,998.940	7,997.880	0.00E+00	4.05E-02	8.10E-02		
Sn-126	4.3902E-05	3,998.940	7,997.880	0.00E+00	1.76E-01	3.51E-01		
Sr-90	5.0088E-01	3,998.940	7,997.880	0.00E+00	2.00E+03	4.01E+03		
Tc-99	3.9412E-04	3,998.940	7,997.880	0.00E+00	1.58E+00	3.15E+00		
Th-229	2.7219E-12	3,998.940	7,997.880	0.00E+00	1.09E-08	2.18E-08		
Th-230	1.0441E-09	3,998.940	7,997.880	0.00E+00	4.18E-06	8.35E-06		
Th-232	3.1689E-16	3,998.940	7,997.880	0.00E+00	1.27E-12	2.53E-12		
Th-208	4.6636E-07	3,998.940	7,997.880	0.00E+00	1.86E-03	3.73E-03		
U-232	1.2638E-06	3,998.940	7,997.880	0.00E+00	5.05E-03	1.01E-02		
U-233	5.7451E-10	3,998.940	7,997.880	0.00E+00	2.30E-06	4.59E-06		
U-234	4.3044E-06	3,998.940	7,997.880	0.00E+00	1.72E-02	3.44E-02		
U-235	-7.7765E-09	3,998.940	0.000	4.33E-05	1.22E-05	4.33E-05		
U-236	1.8050E-07	3,998.940	7,997.880	0.00E+00	7.22E-04	1.44E-03		
U-238	-1.7914E-07	3,998.940	0.000	3.15E-03	2.44E-03	3.15E-03		
Y-90	5.0088E-01	3,998.940	7,997.880	0.00E+00	2.00E+03	4.01E+03		
Other Radionuclides					5.67E+03	1.13E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.75E+01	1.33E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	FAST	FAST	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (very close to 30%)
Fuel Cladding:	SST	SST	
BOL HM Constituents:	Pu/U CARB	Pu and U	
BOL Enrichment %:	31.10053362	10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	3,998.940	2,231.045	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.
Bounding:		7,997.880	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.97	0.56	0.83
Bounding:	3.94		

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: FAST REACTOR FUEL
 SNF ID #: 906
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=9.04kg ; EOL=9.04kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1985
 Estimates as of: 2030
 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"
 0.08

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	2.3072E-06	904.400	1,808.800	0.00E+00	2.09E-03	4.17E-03	Avg. MeV	
Am-241	8.4448E+00	904.400	1,808.800	0.00E+00	7.64E+03	1.53E+04	0.0150	2.251E+15
Am-242m	1.6848E-02	904.400	1,808.800	0.00E+00	1.52E+01	3.05E+01	0.0250	4.411E+14
Am-243	1.6320E-02	904.400	1,808.800	0.00E+00	1.48E+01	2.95E+01	0.0375	3.854E+14
C-14	1.2090E-01	904.400	1,808.800	0.00E+00	1.09E+02	2.19E+02	0.0575	6.062E+14
Cl-36	2.2849E-03	904.400	1,808.800	0.00E+00	2.07E+00	4.13E+00	0.0850	2.366E+14
Cm-243	8.6624E-04	904.400	1,808.800	0.00E+00	7.83E-01	1.57E+00	0.1250	1.855E+14
Cm-244	1.6848E-01	904.400	1,808.800	0.00E+00	1.52E+02	3.05E+02	0.2250	2.050E+14
Co-60	2.8086E+01	904.400	1,808.800	0.00E+00	2.54E+04	5.08E+04	0.3750	8.767E+13
Cs-134	3.4148E-04	904.400	1,808.800	0.00E+00	3.09E-01	6.18E-01	0.5750	1.426E+15
Cs-135	4.3976E-04	904.400	1,808.800	0.00E+00	3.98E-01	7.95E-01	0.8500	5.448E+13
Cs-137	2.1049E+01	904.400	1,808.800	0.00E+00	1.90E+04	3.81E+04	1.2500	3.809E+15
Eu-154	1.2500E+00	904.400	1,808.800	0.00E+00	1.13E+03	2.26E+03	1.7500	1.685E+12
Eu-155	6.8986E-02	904.400	1,808.800	0.00E+00	6.24E+01	1.25E+02	2.2500	1.997E+10
Fe-55	2.9308E-01	904.400	1,808.800	0.00E+00	2.65E+02	5.30E+02	2.7500	5.629E+09
H-3	2.4311E-01	904.400	1,808.800	0.00E+00	2.20E+02	4.40E+02	3.5000	5.115E+06
I-129	1.0618E-05	904.400	1,808.800	0.00E+00	9.60E-03	1.92E-02	5.0000	2.170E+06
Kr-85	5.9882E-01	904.400	1,808.800	0.00E+00	5.42E+02	1.08E+03	7.0000	2.480E+05
Np-237	1.5668E-04	904.400	1,808.800	0.00E+00	1.42E-01	2.83E-01	11.0000	2.836E+04
Pa-231	2.8656E-06	904.400	1,808.800	0.00E+00	2.59E-03	5.18E-03		
Pb-210	2.3918E-08	904.400	1,808.800	0.00E+00	2.16E-05	4.33E-05		
Pm-147	1.6900E-02	904.400	1,808.800	0.00E+00	1.53E+01	3.06E+01		
Pu-238	2.9808E+00	904.400	1,808.800	0.00E+00	2.70E+03	5.39E+03		
Pu-239	4.1648E-01	904.400	1,808.800	0.00E+00	3.77E+02	7.53E+02		
Pu-240	2.9264E-01	904.400	1,808.800	0.00E+00	2.65E+02	5.29E+02		
Pu-241	4.8704E+01	904.400	1,808.800	0.00E+00	4.40E+04	8.81E+04		
Pu-242	2.4560E-03	904.400	1,808.800	0.00E+00	2.22E+00	4.44E+00		
Ra-226	6.4400E-08	904.400	1,808.800	0.00E+00	5.82E-05	1.16E-04		
Ra-228	5.9952E-07	904.400	1,808.800	0.00E+00	5.42E-04	1.08E-03		
Ru-106	8.5526E-07	904.400	1,808.800	0.00E+00	7.73E-04	1.55E-03		
Se-79	1.9181E-04	904.400	1,808.800	0.00E+00	1.73E-01	3.47E-01		
Sn-126	1.6671E-04	904.400	1,808.800	0.00E+00	1.51E-01	3.02E-01		
Sr-90	1.9799E+01	904.400	1,808.800	0.00E+00	1.79E+04	3.58E+04		
Tc-99	6.7678E-03	904.400	1,808.800	0.00E+00	6.12E+00	1.22E+01		
Th-229	1.7488E-06	904.400	1,808.800	0.00E+00	1.58E-03	3.16E-03		
Th-230	5.8704E-06	904.400	1,808.800	0.00E+00	5.31E-03	1.06E-02		
Th-232	-4.2431E-09	904.400	0.000	1.83E-04	1.80E-04	1.83E-04		
Ti-208	8.7573E-05	904.400	1,808.800	0.00E+00	7.92E-02	1.58E-01		
U-232	2.3706E-04	904.400	1,808.800	0.00E+00	2.14E-01	4.29E-01		
U-233	3.6128E-04	904.400	1,808.800	0.00E+00	3.27E-01	6.53E-01		
U-234	1.2788E-02	904.400	1,808.800	0.00E+00	1.16E+01	2.31E+01		
U-235	5.7486E-04	904.400	1,808.800	3.89E-03	5.24E-01	1.04E+00		
U-236	2.3485E-04	904.400	1,808.800	0.00E+00	2.12E-01	4.25E-01		
U-238	1.1581E-04	904.400	1,808.800	4.84E-04	1.05E-01	2.10E-01		
Y-90	1.9804E+01	904.400	1,808.800	0.00E+00	1.79E+04	3.58E+04		
Other Radionuclides					5.58E+04	1.12E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.00E+03	2.00E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	FAST	(Worst Case)	This Template was used for the following reasons: This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	SST	SST/Inconel	
BOL HM Constituents:	ThO2-UO2	U, Th, & Pu	
BOL Enrichment %:	7.591623037	0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	904.400		Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.
Bounding:		1,808.800	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	2.99	0.00	63.10
Bounding:	5.98		

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: FERMI CORE 1 & 2 (CORE FOIL)
 SNF ID #: 457
 Fuel Units & Descr: 136 - ROD
 Heavy Metal Mass: BOL=18.21kg ; EOL=17.73kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1972
 Estimates as of: 2030
 Template: FERMI (Fast, Zirc, 10 to 40%, U)
²Template Burnup(MWd): 58.6725048
 Template BOL Heavy Metal Mass (MT): 0.018774
 Template Decay Time: 50 years

Estimated
 Canister usage:
 18"x10"
 0.04

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	1.4291E-07	419.738	839.476	0.00E+00	6.00E-05	1.20E-04		
Am-241	6.7476E-07	419.738	839.476	0.00E+00	2.83E-04	5.66E-04	0.0150	3.886E+13
Am-242m	0.0000E+00	419.738	839.476	0.00E+00	0.00E+00	0.00E+00	0.0250	8.068E+12
Am-243	8.3651E-15	419.738	839.476	0.00E+00	3.51E-12	7.02E-12	0.0375	7.113E+12
C-14	2.1680E-05	419.738	839.476	0.00E+00	9.10E-03	1.82E-02	0.0575	7.517E+12
Cl-36	5.5188E-08	419.738	839.476	0.00E+00	2.32E-05	4.63E-05	0.0850	4.540E+12
Cm-243	1.0760E-14	419.738	839.476	0.00E+00	4.52E-12	9.03E-12	0.1250	2.941E+12
Cm-244	2.9486E-16	419.738	839.476	0.00E+00	1.24E-13	2.48E-13	0.2250	3.904E+12
Co-60	2.9128E-04	419.738	839.476	0.00E+00	1.22E-01	2.45E-01	0.3750	1.701E+12
Cs-134	4.0326E-09	419.738	839.476	0.00E+00	1.69E-06	3.39E-06	0.5750	3.037E+13
Cs-135	4.4996E-05	419.738	839.476	0.00E+00	1.89E-02	3.78E-02	0.8500	2.768E+11
Cs-137	9.7388E-01	419.738	839.476	0.00E+00	4.09E+02	8.18E+02	1.2500	1.100E+11
Eu-154	5.5290E-05	419.738	839.476	0.00E+00	2.32E-02	4.64E-02	1.7500	7.132E+09
Eu-155	1.7402E-04	419.738	839.476	0.00E+00	7.30E-02	1.46E-01	2.2500	8.774E+05
Fe-55	2.5992E-07	419.738	839.476	0.00E+00	1.09E-04	2.18E-04	2.7500	1.492E+05
H-3	1.5242E-03	419.738	839.476	0.00E+00	6.40E-01	1.28E+00	3.5000	1.653E+02
I-129	1.1426E-06	419.738	839.476	0.00E+00	4.80E-04	9.59E-04	5.0000	5.688E+01
Kr-85	1.4635E-02	419.738	839.476	0.00E+00	6.14E+00	1.23E+01	7.0000	4.931E+00
Np-237	3.3099E-06	419.738	839.476	0.00E+00	1.39E-03	2.78E-03	11.0000	4.595E-01
Pa-231	2.4492E-07	419.738	839.476	0.00E+00	1.03E-04	2.06E-04		
Pb-210	1.7794E-11	419.738	839.476	0.00E+00	7.47E-09	1.49E-08		
Pm-147	2.2021E-05	419.738	839.476	0.00E+00	9.24E-03	1.85E-02		
Pu-238	1.5235E-04	419.738	839.476	0.00E+00	6.39E-02	1.28E-01		
Pu-239	1.9464E-02	419.738	839.476	0.00E+00	8.17E+00	1.63E+01		
Pu-240	6.7817E-05	419.738	839.476	0.00E+00	2.85E-02	5.69E-02		
Pu-241	2.0282E-06	419.738	839.476	0.00E+00	8.51E-04	1.70E-03		
Pu-242	4.3751E-13	419.738	839.476	0.00E+00	1.84E-10	3.67E-10		
Ra-226	4.0632E-11	419.738	839.476	0.00E+00	1.71E-08	3.41E-08		
Ra-228	2.3674E-11	419.738	839.476	0.00E+00	9.94E-09	1.99E-08		
Ru-106	1.0255E-14	419.738	839.476	0.00E+00	4.30E-12	8.61E-12		
Se-79	1.6485E-05	419.738	839.476	0.00E+00	6.92E-03	1.38E-02		
Sn-126	3.7564E-05	419.738	839.476	0.00E+00	1.58E-02	3.15E-02		
Sr-90	8.4333E-01	419.738	839.476	0.00E+00	3.54E+02	7.08E+02		
Tc-99	4.4825E-04	419.738	839.476	0.00E+00	1.88E-01	3.76E-01		
Th-229	6.0880E-11	419.738	839.476	0.00E+00	2.56E-08	5.11E-08		
Th-230	2.8889E-09	419.738	839.476	0.00E+00	1.21E-06	2.43E-06		
Th-232	2.3708E-11	419.738	839.476	0.00E+00	9.95E-09	1.99E-08		
Ti-208	5.0432E-09	419.738	839.476	0.00E+00	2.12E-06	4.23E-06		
U-232	1.3640E-08	419.738	839.476	0.00E+00	5.73E-06	1.15E-05		
U-233	1.0327E-08	419.738	839.476	0.00E+00	4.33E-06	8.67E-06		
U-234	4.9103E-06	419.738	839.476	0.00E+00	2.06E-03	4.12E-03		
U-235	-2.3191E-06	419.738	0.000	1.01E-02	9.14E-03	1.01E-02		
U-236	1.2633E-05	419.738	839.476	0.00E+00	5.30E-03	1.06E-02		
U-238	-9.5407E-08	419.738	0.000	4.55E-03	4.51E-03	4.55E-03		
Y-90	8.4350E-01	419.738	839.476	0.00E+00	3.54E+02	7.08E+02		
Other Radionuclides					4.11E+02	8.23E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.61E+00	9.23E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	FAST	FAST	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U-Mo	U	
BOL Enrichment %:	25.69081404	10 to 40	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nomina:	29.137	419.738	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	50.352	839.476	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nomina:	7.38	14.41	1.01
Bounding:	14.75	16.67	

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: FERMI CORE 1 & 2 (CORE SHM)
 SNF ID #: 69
 Fuel Units & Descr: 280 - ROD
 Heavy Metal Mass: BOL=37.49kg ; EOL=36.82kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1972
 Estimates as of: 2030
 Template: FERMI (Fast, Zirc, 10 to 40%, U)
²Template Burnup(MWd): 58.6725048
 Template BOL Heavy Metal Mass (MT): 0.018774
 Template Decay Time: 50 years

Estimated
 Canister usage:
 18"x10"
 0.07

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	1.4291E-07	592.571	1,185.142	0.00E+00	8.47E-05	1.69E-04		
Am-241	6.7476E-07	592.571	1,185.142	0.00E+00	4.00E-04	8.00E-04	0.0150	5.486E+13
Am-242m	0.0000E+00	592.571	1,185.142	0.00E+00	0.00E+00	0.00E+00	0.0250	1.139E+13
Am-243	8.3651E-15	592.571	1,185.142	0.00E+00	4.96E-12	9.91E-12	0.0375	1.004E+13
C-14	2.1680E-05	592.571	1,185.142	0.00E+00	1.28E-02	2.57E-02	0.0575	1.061E+13
Cl-36	5.5188E-08	592.571	1,185.142	0.00E+00	3.27E-05	6.54E-05	0.0850	6.410E+12
Cm-243	1.0760E-14	592.571	1,185.142	0.00E+00	6.38E-12	1.28E-11	0.1250	4.151E+12
Cm-244	2.9486E-16	592.571	1,185.142	0.00E+00	1.75E-13	3.49E-13	0.2250	5.512E+12
Co-60	2.9128E-04	592.571	1,185.142	0.00E+00	1.73E-01	3.45E-01	0.3750	2.401E+12
Cs-134	4.0326E-09	592.571	1,185.142	0.00E+00	2.39E-06	4.78E-06	0.5750	4.288E+13
Cs-135	4.4996E-05	592.571	1,185.142	0.00E+00	2.67E-02	5.33E-02	0.8500	3.907E+11
Cs-137	9.7388E-01	592.571	1,185.142	0.00E+00	5.77E+02	1.15E+03	1.2500	1.553E+11
Eu-154	5.5290E-05	592.571	1,185.142	0.00E+00	3.28E-02	6.55E-02	1.7500	1.007E+10
Eu-155	1.7402E-04	592.571	1,185.142	0.00E+00	1.03E-01	2.06E-01	2.2500	1.239E+06
Fe-55	2.5992E-07	592.571	1,185.142	0.00E+00	1.54E-04	3.08E-04	2.7500	2.106E+05
H-3	1.5242E-03	592.571	1,185.142	0.00E+00	9.03E-01	1.81E+00	3.5000	2.570E+02
I-129	1.1426E-06	592.571	1,185.142	0.00E+00	6.77E-04	1.35E-03	5.0000	9.050E+01
Kr-85	1.4635E-02	592.571	1,185.142	0.00E+00	8.67E+00	1.73E+01	7.0000	8.137E+00
Np-237	3.3099E-06	592.571	1,185.142	0.00E+00	1.96E-03	3.92E-03	11.0000	7.839E-01
Pa-231	2.4492E-07	592.571	1,185.142	0.00E+00	1.45E-04	2.90E-04		
Pb-210	1.7794E-11	592.571	1,185.142	0.00E+00	1.05E-08	2.11E-08		
Pm-147	2.2021E-05	592.571	1,185.142	0.00E+00	1.30E-02	2.61E-02		
Pu-238	1.5235E-04	592.571	1,185.142	0.00E+00	9.03E-02	1.81E-01		
Pu-239	1.9464E-02	592.571	1,185.142	0.00E+00	1.15E+01	2.31E+01		
Pu-240	6.7817E-05	592.571	1,185.142	0.00E+00	4.02E-02	8.04E-02		
Pu-241	2.0282E-06	592.571	1,185.142	0.00E+00	1.20E-03	2.40E-03		
Pu-242	4.3751E-13	592.571	1,185.142	0.00E+00	2.59E-10	5.19E-10		
Ra-226	4.0632E-11	592.571	1,185.142	0.00E+00	2.41E-08	4.82E-08		
Ra-228	2.3674E-11	592.571	1,185.142	0.00E+00	1.40E-08	2.81E-08		
Ru-106	1.0255E-14	592.571	1,185.142	0.00E+00	6.08E-12	1.22E-11		
Se-79	1.6485E-05	592.571	1,185.142	0.00E+00	9.77E-03	1.95E-02		
Sn-126	3.7564E-05	592.571	1,185.142	0.00E+00	2.23E-02	4.45E-02		
Sr-90	8.4333E-01	592.571	1,185.142	0.00E+00	5.00E+02	9.99E+02		
Tc-99	4.4825E-04	592.571	1,185.142	0.00E+00	2.66E-01	5.31E-01		
Th-229	6.0880E-11	592.571	1,185.142	0.00E+00	3.61E-08	7.22E-08		
Th-230	2.8889E-09	592.571	1,185.142	0.00E+00	1.71E-06	3.42E-06		
Th-232	2.3708E-11	592.571	1,185.142	0.00E+00	1.40E-08	2.81E-08		
Tl-208	5.0432E-09	592.571	1,185.142	0.00E+00	2.99E-06	5.98E-06		
U-232	1.3640E-08	592.571	1,185.142	0.00E+00	8.08E-06	1.62E-05		
U-233	1.0327E-08	592.571	1,185.142	0.00E+00	6.12E-06	1.22E-05		
U-234	4.9103E-06	592.571	1,185.142	0.00E+00	2.91E-03	5.82E-03		
U-235	-2.3191E-06	592.571	0.000	1.10E-02	9.61E-03	1.10E-02		
U-236	1.2633E-05	592.571	1,185.142	0.00E+00	7.49E-03	1.50E-02		
U-238	-9.5407E-08	592.571	0.000	1.09E-02	1.08E-02	1.09E-02		
Y-90	8.4350E-01	592.571	1,185.142	0.00E+00	5.00E+02	1.00E+03		
Other Radionuclides					5.81E+02	1.16E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	FAST	FAST	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U-Mo	U	
BOL Enrichment %:	13.55265123	10 to 40	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	59.987	592.571	
Bounding:	103.665	1,185.142	

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:	5.06	9.88	
Bounding:	10.11	11.43	

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: FERMI CORE 1 & 2 (DECLAD)
 SNF ID #: 453
 Fuel Units & Descr: 976 - ROD
 Heavy Metal Mass: BOL=130.69kg ; EOL=110.97kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1972
 Estimates as of: 2030
 Template: FERMI (Fast, Zirc, 10 to 40%, U)
²Template Burnup(MWd): 58.6725048
 Template BOL Heavy Metal Mass (MT): 0.018774
 Template Decay Time: 50 years

Estimated
 Canister usage:
 18"x10"
 1.00

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	1.4291E-07	17,384.907	34,769.813	0.00E+00	2.48E-03	4.97E-03	0.0150	1.609E+15
Am-241	6.7476E-07	17,384.907	34,769.813	0.00E+00	1.17E-02	2.35E-02	0.0250	3.342E+14
Am-242m	0.0000E+00	17,384.907	34,769.813	0.00E+00	0.00E+00	0.00E+00	0.0375	2.946E+14
Am-243	8.3651E-15	17,384.907	34,769.813	0.00E+00	1.45E-10	2.91E-10	0.0575	3.114E+14
C-14	2.1680E-05	17,384.907	34,769.813	0.00E+00	3.77E-01	7.54E-01	0.0850	1.881E+14
Cl-36	5.5188E-08	17,384.907	34,769.813	0.00E+00	9.59E-04	1.92E-03	0.1250	1.218E+14
Co-243	1.0760E-14	17,384.907	34,769.813	0.00E+00	1.87E-10	3.74E-10	0.2250	1.617E+14
Co-244	2.9486E-16	17,384.907	34,769.813	0.00E+00	5.13E-12	1.03E-11	0.3750	7.045E+13
Co-60	2.9128E-04	17,384.907	34,769.813	0.00E+00	5.06E+00	1.01E+01	0.5750	1.258E+15
Cs-134	4.0326E-09	17,384.907	34,769.813	0.00E+00	7.01E-05	1.40E-04	0.8500	1.146E+13
Cs-135	4.4996E-05	17,384.907	34,769.813	0.00E+00	7.82E-01	1.56E+00	1.2500	4.556E+12
Cs-137	9.7388E-01	17,384.907	34,769.813	0.00E+00	1.69E+04	3.39E+04	1.7500	2.954E+11
Eu-154	5.5290E-05	17,384.907	34,769.813	0.00E+00	9.61E-01	1.92E+00	2.2500	3.634E+07
Eu-155	1.7402E-04	17,384.907	34,769.813	0.00E+00	3.03E+00	6.05E+00	2.7500	6.177E+06
Fe-55	2.5992E-07	17,384.907	34,769.813	0.00E+00	4.52E-03	9.04E-03	3.5000	6.003E+03
H-3	1.5242E-03	17,384.907	34,769.813	0.00E+00	2.65E+01	5.30E+01	5.0000	1.995E+03
I-129	1.1426E-06	17,384.907	34,769.813	0.00E+00	1.99E-02	3.97E-02	7.0000	1.627E+02
Kr-85	1.4635E-02	17,384.907	34,769.813	0.00E+00	2.54E+02	5.09E+02	11.0000	1.425E+01
Np-237	3.3099E-06	17,384.907	34,769.813	0.00E+00	5.75E-02	1.15E-01		
Pa-231	2.4492E-07	17,384.907	34,769.813	0.00E+00	4.26E-03	8.52E-03		
Pb-210	1.7794E-11	17,384.907	34,769.813	0.00E+00	3.09E-07	6.19E-07		
Pm-147	2.2021E-05	17,384.907	34,769.813	0.00E+00	3.83E-01	7.66E-01		
Pu-238	1.5235E-04	17,384.907	34,769.813	0.00E+00	2.65E+00	5.30E+00		
Pu-239	1.9464E-02	17,384.907	34,769.813	0.00E+00	3.38E+02	6.77E+02		
Pu-240	6.7817E-05	17,384.907	34,769.813	0.00E+00	1.18E+00	2.36E+00		
Pu-241	2.0282E-06	17,384.907	34,769.813	0.00E+00	3.53E-02	7.05E-02		
Pu-242	4.3751E-13	17,384.907	34,769.813	0.00E+00	7.61E-09	1.52E-08		
Ra-226	4.0632E-11	17,384.907	34,769.813	0.00E+00	7.06E-07	1.41E-06		
Ra-228	2.3674E-11	17,384.907	34,769.813	0.00E+00	4.12E-07	8.23E-07		
Ru-106	1.0255E-14	17,384.907	34,769.813	0.00E+00	1.78E-10	3.57E-10		
Se-79	1.6485E-05	17,384.907	34,769.813	0.00E+00	2.87E-01	5.73E-01		
Sn-126	3.7564E-05	17,384.907	34,769.813	0.00E+00	6.53E-01	1.31E+00		
Sr-90	8.4333E-01	17,384.907	34,769.813	0.00E+00	1.47E+04	2.93E+04		
Tc-99	4.4825E-04	17,384.907	34,769.813	0.00E+00	7.79E+00	1.56E+01		
Th-229	6.0880E-11	17,384.907	34,769.813	0.00E+00	1.06E-06	2.12E-06		
Th-230	2.8889E-09	17,384.907	34,769.813	0.00E+00	5.02E-05	1.00E-04		
Th-232	2.3708E-11	17,384.907	34,769.813	0.00E+00	4.12E-07	8.24E-07		
Th-208	5.0432E-09	17,384.907	34,769.813	0.00E+00	8.77E-05	1.75E-04		
U-232	1.3640E-08	17,384.907	34,769.813	0.00E+00	2.37E-04	4.74E-04		
U-233	1.0327E-08	17,384.907	34,769.813	0.00E+00	1.80E-04	3.59E-04		
U-234	4.9103E-06	17,384.907	34,769.813	0.00E+00	8.54E-02	1.71E-01		
U-235	-2.3191E-06	17,384.907	0.000	7.26E-02	3.22E-02	7.26E-02		
U-236	1.2633E-05	17,384.907	34,769.813	0.00E+00	2.20E-01	4.39E-01		
U-238	-9.5407E-08	17,384.907	0.000	3.26E-02	3.10E-02	3.26E-02		
Y-90	8.4350E-01	17,384.907	34,769.813	0.00E+00	1.47E+04	2.93E+04		
Other Radionuclides					1.70E+04	3.41E+04		

Thermal Power	
Nominal Heat	Bounding Heat Output
(Watts)	(Watts)
1.91E+02	3.82E+02
Total	Total

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.
	From SFD	Used	
Reactor Moderator:	FAST	FAST	
Fuel Cladding:	NONE	ZIRC	
BOL HM Constituents:	U-Mo	U	
BOL Enrichment %:	25.69081404	10 to 40	

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:	209.098	17,384.907	
Bounding:	361.348	34,769.813	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	42.57	83.14	1.04
Bounding:	85.13	96.22	

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: FERMI CORE I & 2 (SECTIONED)
 SNF ID #: 454
 Fuel Units & Descr: 980 - ROD
 Heavy Metal Mass: BOL=131.22kg ; EOL=125.05kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1972
 Estimates as of: 2030
 Template: FERMI (Fast, Zirc, 10 to 40%, U)
²Template Burnup(MWd): 58.6725048
 Template BOL Heavy Metal Mass (MT): 0.018774
 Template Decay Time: 50 years

Estimated
 Canister usage:
 18"x10"
 0.26

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	1.4291E-07	5,444.247	10,888.494	0.00E+00	7.78E-04	1.56E-03	0.0150	5.040E+14
Am-241	6.7476E-07	5,444.247	10,888.494	0.00E+00	3.67E-03	7.35E-03	0.0250	1.046E+14
Am-242m	0.0000E+00	5,444.247	10,888.494	0.00E+00	0.00E+00	0.00E+00	0.0375	9.226E+13
Am-243	8.3651E-05	5,444.247	10,888.494	0.00E+00	4.55E-11	9.11E-11	0.0575	9.750E+13
C-14	2.1680E-15	5,444.247	10,888.494	0.00E+00	1.18E-01	2.36E-01	0.0850	5.889E+13
Cl-36	5.5188E-08	5,444.247	10,888.494	0.00E+00	3.00E-04	6.01E-04	0.1250	3.814E+13
Cm-243	1.0760E-14	5,444.247	10,888.494	0.00E+00	5.86E-11	1.17E-10	0.2250	5.064E+13
Cm-244	2.9486E-16	5,444.247	10,888.494	0.00E+00	1.61E-12	3.21E-12	0.3750	2.206E+13
Co-60	2.9128E-04	5,444.247	10,888.494	0.00E+00	1.59E+00	3.17E+00	0.5750	3.939E+14
Cs-134	4.0326E-09	5,444.247	10,888.494	0.00E+00	2.20E-05	4.39E-05	0.8500	3.590E+12
Cs-135	4.4996E-05	5,444.247	10,888.494	0.00E+00	2.45E-01	4.90E-01	1.2500	1.427E+12
Cs-137	9.7388E-01	5,444.247	10,888.494	0.00E+00	5.30E+03	1.06E+04	11.0000	5.154E+00
Eu-154	5.5290E-05	5,444.247	10,888.494	0.00E+00	3.01E-01	6.02E-01	2.2500	1.138E+07
Eu-155	1.7402E-04	5,444.247	10,888.494	0.00E+00	9.47E-01	1.89E+00	2.7500	1.934E+06
Fe-55	2.5992E-07	5,444.247	10,888.494	0.00E+00	1.42E-03	2.83E-03	3.5000	2.002E+03
H-3	1.5242E-03	5,444.247	10,888.494	0.00E+00	8.30E+00	1.66E+01	5.0000	6.789E+02
I-129	1.1426E-06	5,444.247	10,888.494	0.00E+00	6.22E-03	1.24E-02	7.0000	5.695E+01
Kr-85	1.4635E-02	5,444.247	10,888.494	0.00E+00	7.97E+01	1.59E+02		
Np-237	3.3099E-06	5,444.247	10,888.494	0.00E+00	1.80E+00	3.60E-02		
Pa-231	2.4492E-07	5,444.247	10,888.494	0.00E+00	1.33E-03	2.67E-03		
Pb-210	1.7794E-11	5,444.247	10,888.494	0.00E+00	9.69E-08	1.94E-07		
Pm-147	2.2021E-05	5,444.247	10,888.494	0.00E+00	1.20E-01	2.40E-01		
Pu-238	1.5235E-04	5,444.247	10,888.494	0.00E+00	8.29E-01	1.66E+00		
Pu-239	1.9464E-02	5,444.247	10,888.494	0.00E+00	1.06E+02	2.12E+02		
Pu-240	6.7817E-05	5,444.247	10,888.494	0.00E+00	3.69E-01	7.38E-01		
Pu-241	2.0282E-06	5,444.247	10,888.494	0.00E+00	1.10E-02	2.21E-02		
Pu-242	4.3751E-13	5,444.247	10,888.494	0.00E+00	2.38E-09	4.76E-09		
Ra-226	4.0632E-11	5,444.247	10,888.494	0.00E+00	2.21E-07	4.42E-07		
Ra-228	2.3674E-11	5,444.247	10,888.494	0.00E+00	1.29E-07	2.58E-07		
Ru-106	1.0255E-14	5,444.247	10,888.494	0.00E+00	5.58E-11	1.12E-10		
Se-79	1.6485E-05	5,444.247	10,888.494	0.00E+00	8.97E-02	1.79E-01		
Sn-126	3.7564E-05	5,444.247	10,888.494	0.00E+00	2.05E-01	4.09E-01		
Sr-90	8.4333E-01	5,444.247	10,888.494	0.00E+00	4.59E+03	9.18E+03		
Tc-99	4.4825E-04	5,444.247	10,888.494	0.00E+00	2.44E+00	4.88E+00		
Th-229	6.0880E-11	5,444.247	10,888.494	0.00E+00	3.31E-07	6.63E-07		
Th-230	2.8889E-09	5,444.247	10,888.494	0.00E+00	1.57E-05	3.15E-05		
Th-232	2.3708E-11	5,444.247	10,888.494	0.00E+00	1.29E-07	2.58E-07		
Th-208	5.0432E-09	5,444.247	10,888.494	0.00E+00	2.75E-05	5.49E-05		
U-232	1.3640E-08	5,444.247	10,888.494	0.00E+00	7.43E-05	1.49E-04		
U-233	1.0327E-08	5,444.247	10,888.494	0.00E+00	5.62E-05	1.12E-04		
U-234	4.9103E-06	5,444.247	10,888.494	0.00E+00	2.67E-02	5.35E-02		
U-235	-2.3191E-06	5,444.247	0.000	7.31E-02	6.04E-02	7.31E-02		
U-236	1.2633E-05	5,444.247	10,888.494	0.00E+00	6.88E-02	1.38E-01		
U-238	-9.5407E-08	5,444.247	0.000	3.27E-02	3.22E-02	3.27E-02		
Y-90	8.4350E-01	5,444.247	10,888.494	0.00E+00	4.59E+03	9.18E+03		
Other Radionuclides					5.34E+03	1.07E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.98E+01	1.20E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	FAST	FAST	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U-Mo	U	
BOL Enrichment %:	25.76549664	10 to 40	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	209.955	5,444.247	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	362.829	10,888.494	Bounding burnup assumed to be twice nominal burnup.

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	13.28	25.93	1.01
Bounding:	26.55	30.01	

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: FERMI CORE 1 & 2 (SODIUM WORTH)
 SNF ID #: 455
 Fuel Units & Descr: 420 - ROD
 Heavy Metal Mass: BOL=56.24kg ; EOL=55.40kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1972
 Estimates as of: 2030
 Template: FERMI (Fast, Zirc, 10 to 40%, U)
²Template Burnup(MWd): 58.6725048
 Template BOL Heavy Metal Mass (MT): 0.018774
 Template Decay Time: 50 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)		
Ac-227	1.4291E-07	740.714	1,481.428	0.00E+00	1.06E-04	2.12E-04	Avg. MeV	
Am-241	6.7476E-07	740.714	1,481.428	0.00E+00	5.00E-04	1.00E-03	0.0150	6.857E+13
Am-242m	0.0000E+00	740.714	1,481.428	0.00E+00	0.00E+00	0.00E+00	0.0250	1.424E+13
Am-243	8.3651E-15	740.714	1,481.428	0.00E+00	6.20E-12	1.24E-11	0.0375	1.255E+13
C-14	2.1680E-05	740.714	1,481.428	0.00E+00	1.61E-02	3.21E-02	0.0575	1.327E+13
Cl-36	5.5188E-08	740.714	1,481.428	0.00E+00	4.09E-05	8.18E-05	0.0850	8.013E+12
Cm-243	1.0760E-14	740.714	1,481.428	0.00E+00	7.97E-12	1.59E-11	0.1250	5.189E+12
Cm-244	2.9486E-16	740.714	1,481.428	0.00E+00	2.18E-13	4.37E-13	0.2250	6.899E+12
Co-60	2.9128E-04	740.714	1,481.428	0.00E+00	2.16E-01	4.32E-01	0.3750	3.002E+12
Cs-134	4.0326E-09	740.714	1,481.428	0.00E+00	2.99E-06	5.97E-06	0.5750	5.360E+13
Cs-135	4.4996E-05	740.714	1,481.428	0.00E+00	3.33E-02	6.67E-02	0.8500	4.884E+11
Cs-137	9.7388E-01	740.714	1,481.428	0.00E+00	7.21E+02	1.44E+03	1.2500	1.941E+11
Eu-154	5.5290E-05	740.714	1,481.428	0.00E+00	4.10E-02	8.19E-02	1.7500	1.259E+10
Eu-155	1.7402E-04	740.714	1,481.428	0.00E+00	1.29E-01	2.58E-01	2.2500	1.548E+06
Fe-55	2.5992E-07	740.714	1,481.428	0.00E+00	1.93E-04	3.85E-04	2.7500	2.632E+05
H-3	1.5242E-03	740.714	1,481.428	0.00E+00	1.13E+00	2.26E+00	3.5000	3.241E+02
I-129	1.1426E-06	740.714	1,481.428	0.00E+00	8.46E-04	1.69E-03	5.0000	1.144E+02
Kr-85	1.4635E-02	740.714	1,481.428	0.00E+00	1.08E+01	2.17E+01	7.0000	1.031E+01
Np-237	3.3099E-06	740.714	1,481.428	0.00E+00	2.45E-03	4.90E-03	11.0000	9.957E-01
Pa-231	2.4492E-07	740.714	1,481.428	0.00E+00	1.81E-04	3.63E-04		
Pb-210	1.7794E-11	740.714	1,481.428	0.00E+00	1.32E-08	2.64E-08		
Pm-147	2.2021E-05	740.714	1,481.428	0.00E+00	1.63E-02	3.26E-02		
Pu-238	1.5235E-04	740.714	1,481.428	0.00E+00	1.13E-01	2.26E-01		
Pu-239	1.9464E-02	740.714	1,481.428	0.00E+00	1.44E+01	2.88E+01		
Pu-240	6.7817E-05	740.714	1,481.428	0.00E+00	5.02E-02	1.00E-01		
Pu-241	2.0282E-06	740.714	1,481.428	0.00E+00	1.50E-03	3.00E-03		
Pu-242	4.3751E-13	740.714	1,481.428	0.00E+00	3.24E-10	6.48E-10		
Ra-226	4.0632E-11	740.714	1,481.428	0.00E+00	3.01E-08	6.02E-08		
Ra-228	2.3674E-11	740.714	1,481.428	0.00E+00	1.75E-08	3.51E-08		
Ru-106	1.0255E-14	740.714	1,481.428	0.00E+00	7.60E-12	1.52E-11		
Se-79	1.6485E-05	740.714	1,481.428	0.00E+00	1.22E-02	2.44E-02		
Sn-126	3.7564E-05	740.714	1,481.428	0.00E+00	2.78E-02	5.56E-02		
Sr-90	8.4333E-01	740.714	1,481.428	0.00E+00	6.25E+02	1.25E+03		
Tc-99	4.4825E-04	740.714	1,481.428	0.00E+00	3.32E-01	6.64E-01		
Th-229	6.0880E-11	740.714	1,481.428	0.00E+00	4.51E-08	9.02E-08		
Th-230	2.8889E-09	740.714	1,481.428	0.00E+00	2.14E-06	4.28E-06		
Th-232	2.3708E-11	740.714	1,481.428	0.00E+00	1.76E-08	3.51E-08		
Th-208	5.0432E-09	740.714	1,481.428	0.00E+00	3.74E-06	7.47E-06		
U-232	1.3640E-08	740.714	1,481.428	0.00E+00	1.01E-05	2.02E-05		
U-233	1.0327E-08	740.714	1,481.428	0.00E+00	7.65E-06	1.53E-05		
U-234	4.9103E-06	740.714	1,481.428	0.00E+00	3.64E-03	7.27E-03		
U-235	-2.3191E-06	740.714	0.000	3.12E-02	2.95E-02	3.12E-02		
U-236	1.2633E-05	740.714	1,481.428	0.00E+00	9.36E-03	1.87E-02		
U-238	-9.5407E-08	740.714	0.000	1.40E-02	1.40E-02	1.40E-02		
Y-90	8.4350E-01	740.714	1,481.428	0.00E+00	6.25E+02	1.25E+03		
Other Radionuclides					7.26E+02	1.45E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.14E+00	1.63E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	FAST	FAST	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U-Mo	U	
BOL Enrichment %:	25.69081404	10 to 40	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	99.981	740.714	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	155.498	1,481.428	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	4.21	8.23	1.00
Bounding:	8.43	9.53	

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: FERMI CORE 1 & 2 (STD FUEL SUBASSEMBLY)
 SNF ID #: 456
 Fuel Units & Descr: 27160 - ROD
 Heavy Metal Mass: BOL=3636.72kg ; EOL=3566.11kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1972
 Estimates as of: 2030
 Template: FERMI (Fast, Zirc. 10 to 40%, U)
²Template Burnup(MWd): 58.6725048
 Template BOL Heavy Metal Mass (MT): 0.018774
 Template Decay Time: 50 years

Estimated
 Canister usage:
 18"x10"
 7.07

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4291E-07	62,269.344	124,538.688	0.00E+00	8.90E-03	1.78E-02	Avg. MeV	
Am-241	6.7476E-07	62,269.344	124,538.688	0.00E+00	4.20E-02	8.40E-02	0.0150	5.764E+15
Am-242m	0.0000E+00	62,269.344	124,538.688	0.00E+00	0.00E+00	0.00E+00	0.0250	1.197E+15
Am-243	8.3651E-15	62,269.344	124,538.688	0.00E+00	5.21E-10	1.04E-09	0.0375	1.055E+15
C-14	2.1680E-05	62,269.344	124,538.688	0.00E+00	1.35E+00	2.70E+00	0.0575	1.115E+15
Cl-36	5.5188E-08	62,269.344	124,538.688	0.00E+00	3.44E-03	6.87E-03	0.0850	6.736E+14
Cm-243	1.0760E-14	62,269.344	124,538.688	0.00E+00	6.70E-10	1.34E-09	0.1250	4.362E+14
Cm-244	2.9486E-16	62,269.344	124,538.688	0.00E+00	1.84E-11	3.67E-11	0.2250	5.792E+14
Co-60	2.9128E-04	62,269.344	124,538.688	0.00E+00	1.81E+01	3.63E+01	0.3750	2.524E+14
Cs-134	4.0326E-09	62,269.344	124,538.688	0.00E+00	2.51E-04	5.02E-04	0.5750	4.506E+15
Cs-135	4.4996E-05	62,269.344	124,538.688	0.00E+00	2.80E+00	5.60E+00	0.8500	4.106E+13
Cs-137	9.7388E-01	62,269.344	124,538.688	0.00E+00	6.06E+04	1.21E+05	1.2500	1.632E+13
Eu-154	5.5290E-05	62,269.344	124,538.688	0.00E+00	3.44E+00	6.89E+00	1.7500	1.058E+12
Eu-155	1.7402E-04	62,269.344	124,538.688	0.00E+00	1.08E+01	2.17E+01	2.2500	1.302E+08
Fe-55	2.5992E-07	62,269.344	124,538.688	0.00E+00	1.62E-02	3.24E-02	2.7500	2.215E+07
H-3	1.5242E-03	62,269.344	124,538.688	0.00E+00	9.49E+01	1.90E+02	3.5000	2.578E+04
I-129	1.1426E-06	62,269.344	124,538.688	0.00E+00	7.11E-02	1.42E-01	5.0000	8.981E+03
Kr-85	1.4635E-02	62,269.344	124,538.688	0.00E+00	9.11E+02	1.82E+03	7.0000	7.940E+01
Np-237	3.3099E-06	62,269.344	124,538.688	0.00E+00	2.06E+01	4.12E+01	11.0000	7.534E+02
Pa-231	2.4492E-07	62,269.344	124,538.688	0.00E+00	1.53E-02	3.05E-02		
Pb-210	1.7794E-11	62,269.344	124,538.688	0.00E+00	1.11E-06	2.22E-06		
Pm-147	2.2021E-05	62,269.344	124,538.688	0.00E+00	1.37E+00	2.74E+00		
Pu-238	1.5235E-04	62,269.344	124,538.688	0.00E+00	9.49E+00	1.90E+01		
Pu-239	1.9464E-02	62,269.344	124,538.688	0.00E+00	1.21E+03	2.42E+03		
Pu-240	6.7817E-05	62,269.344	124,538.688	0.00E+00	4.22E+00	8.45E+00		
Pu-241	2.0282E-06	62,269.344	124,538.688	0.00E+00	1.26E-01	2.53E-01		
Pu-242	4.3751E-13	62,269.344	124,538.688	0.00E+00	2.72E-08	5.45E-08		
Ra-226	4.0632E-11	62,269.344	124,538.688	0.00E+00	2.53E-06	5.06E-06		
Ra-228	2.3674E-11	62,269.344	124,538.688	0.00E+00	1.47E-06	2.95E-06		
Ru-106	1.0255E-14	62,269.344	124,538.688	0.00E+00	6.39E-10	1.28E-09		
Se-79	1.6485E-05	62,269.344	124,538.688	0.00E+00	1.03E+00	2.05E+00		
Sn-126	3.7564E-05	62,269.344	124,538.688	0.00E+00	2.34E+00	4.68E+00		
Sr-90	8.4333E-01	62,269.344	124,538.688	0.00E+00	5.25E+04	1.05E+05		
Tc-99	4.4825E-04	62,269.344	124,538.688	0.00E+00	2.79E+01	5.58E+01		
Th-229	6.0880E-11	62,269.344	124,538.688	0.00E+00	3.79E-06	7.58E-06		
Th-230	2.8889E-09	62,269.344	124,538.688	0.00E+00	1.80E-04	3.60E-04		
Th-232	2.3708E-11	62,269.344	124,538.688	0.00E+00	1.48E-06	2.95E-06		
Ti-208	5.0432E-09	62,269.344	124,538.688	0.00E+00	3.14E-04	6.28E-04		
U-232	1.3640E-08	62,269.344	124,538.688	0.00E+00	8.49E-04	1.70E-03		
U-233	1.0327E-08	62,269.344	124,538.688	0.00E+00	6.43E-04	1.29E-03		
U-234	4.9103E-06	62,269.344	124,538.688	0.00E+00	3.06E-01	6.12E-01		
U-235	-2.3191E-06	62,269.344	0.000	2.02E+00	1.87E+00	2.02E+00		
U-236	1.2633E-05	62,269.344	124,538.688	0.00E+00	7.87E-01	1.57E+00		
U-238	-9.5407E-08	62,269.344	0.000	9.08E-01	9.02E-01	9.08E-01		
Y-90	8.4350E-01	62,269.344	124,538.688	0.00E+00	5.25E+04	1.05E+05		
Other Radionuclides					6.10E+04	1.22E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.85E+02	1.37E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	FAST	FAST	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U-Mo	U	
BOL Enrichment %:	25.69081404	10 to 40	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		62,269.344	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	5,818.758	124,538.688	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	5.48		1.01
Bounding:	10.96	21.40	

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: FFTF CARBIDE FUEL EXPR.
 SNF ID #: 347
 Fuel Units & Descr: 15 - ELEMENT
 Heavy Metal Mass: BOL= ; EOL=7.36kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1993
 Estimates as of: 2030
 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: 35 years

Estimated
 Canister usage:
 18"x10"
 0.31

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	6.1822E-12	525.780	652.692	0.00E+00	3.25E-09	4.04E-09		0.0150
Am-241	1.1066E-01	525.780	652.692	1.52E+01	7.34E+01	8.74E+01		2.179E+13
Am-242m	1.9247E-03	525.780	652.692	0.00E+00	1.01E+00	1.26E+00		0.0250
Am-243	1.0740E-04	525.780	652.692	0.00E+00	5.65E-02	7.01E-02		0.0375
C-14	2.6042E-05	525.780	652.692	0.00E+00	1.37E-02	1.70E-02		0.0575
Cl-36	3.4243E-10	525.780	652.692	0.00E+00	1.80E-07	2.24E-07		0.0850
Cm-243	4.0629E-04	525.780	652.692	0.00E+00	2.14E-01	2.65E-01		0.1250
Cm-244	1.6024E-03	525.780	652.692	0.00E+00	8.43E-01	1.05E+00		0.2250
Co-60	3.4283E-03	525.780	652.692	0.00E+00	1.80E+00	2.24E+00		0.3750
Cs-134	1.5585E-03	525.780	652.692	0.00E+00	8.18E-01	1.02E+00		0.5750
Cs-135	4.7693E-05	525.780	652.692	0.00E+00	2.51E-02	3.11E-02		0.8500
Cs-137	1.4007E+00	525.780	652.692	0.00E+00	7.36E+02	9.14E+02		1.2500
Eu-154	1.6184E-02	525.780	652.692	0.00E+00	8.51E+00	1.06E+01		1.7500
Eu-155	1.3775E-02	525.780	652.692	0.00E+00	7.24E+00	8.99E+00		2.2500
Fe-55	3.8035E-04	525.780	652.692	0.00E+00	2.00E-01	2.48E-01		2.7500
H-3	3.8454E-03	525.780	652.692	0.00E+00	2.02E+00	2.51E+00		3.5000
I-129	1.2891E-06	525.780	652.692	0.00E+00	6.78E-04	8.41E-04		5.0000
Kr-85	2.7858E-02	525.780	652.692	0.00E+00	1.46E+01	1.82E+01		7.0000
Np-237	3.7516E-06	525.780	652.692	0.00E+00	1.97E-03	2.45E-03		11.0000
Pa-231	1.2488E-11	525.780	652.692	0.00E+00	6.57E-09	8.15E-09		
Pb-210	2.4206E-12	525.780	652.692	0.00E+00	1.27E-09	1.58E-09		
Pm-147	1.5671E-02	525.780	652.692	0.00E+00	8.24E+00	1.02E+01		
Pu-238	1.4877E-02	525.780	652.692	0.00E+00	7.82E+00	9.71E+00		
Pu-239	-3.5520E-02	525.780	0.000	1.25E+02	1.06E+02	1.25E+02		
Pu-240	2.0690E-02	525.780	652.692	6.34E+01	7.43E+01	7.69E+01		
Pu-241	-1.4799E+00	525.780	0.000	2.85E+03	2.07E+03	2.85E+03		
Pu-242	1.1252E-05	525.780	652.692	1.69E-02	2.28E-02	2.43E-02		
Ra-226	7.8524E-12	525.780	652.692	0.00E+00	4.13E-09	5.13E-09		
Ra-228	2.4086E-16	525.780	652.692	0.00E+00	1.27E-13	1.57E-13		
Ru-106	1.5066E-05	525.780	652.692	0.00E+00	7.92E-03	9.83E-03		
Se-79	1.0127E-05	525.780	652.692	0.00E+00	5.32E-03	6.61E-03		
Sn-126	4.3902E-05	525.780	652.692	0.00E+00	2.31E-02	2.87E-02		
Sr-90	5.0088E-01	525.780	652.692	0.00E+00	2.63E+02	3.27E+02		
Tc-99	3.9412E-04	525.780	652.692	0.00E+00	2.07E-01	2.57E-01		
Th-229	2.7219E-12	525.780	652.692	0.00E+00	1.43E-09	1.78E-09		
Th-230	1.0441E-09	525.780	652.692	0.00E+00	5.49E-07	6.81E-07		
Th-232	3.1689E-16	525.780	652.692	0.00E+00	1.67E-13	2.07E-13		
Ti-208	4.6636E-07	525.780	652.692	0.00E+00	2.45E-04	3.04E-04		
U-232	1.2638E-06	525.780	652.692	0.00E+00	6.64E-04	8.25E-04		
U-233	5.7451E-10	525.780	652.692	0.00E+00	3.02E-07	3.75E-07		
U-234	4.3044E-06	525.780	652.692	0.00E+00	2.26E-03	2.81E-03		
U-235	-7.7765E-09	525.780	0.000	2.56E-05	2.15E-05	2.56E-05		
U-236	1.8050E-07	525.780	652.692	0.00E+00	9.49E-05	1.18E-04		
U-238	-1.7914E-07	525.780	0.000	1.86E-03	1.77E-03	1.86E-03		
Y-90	5.0088E-01	525.780	652.692	0.00E+00	2.63E+02	3.27E+02		
Other Radionuclides					7.45E+02	9.25E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.39E+01	1.64E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: FAST	Used: FAST	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	SST (D9)	SST	
BOL HM Constituents:	Pu/U CARB	Pu and U	
BOL Enrichment %:		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	Nominal burnup taken from SFD and converted to MWd using BOL=7.883kg Bounding burnup taken from SFD and converted to MWd using BOL=7.883kg
Bounding:		525.780 652.692	

Checks			
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Bounding:	0.44 0.54		
			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: FFTF OXIDE EXPERIMENTS
 SNF ID #: 349
 Fuel Units & Descr: 1 - HEX ARRAY 91 ROD
 Heavy Metal Mass: BOL= : EOL=.25kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1993
 Estimates as of: 2030
 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: 35 years

Estimated
 Canister usage:
 18"x10"
 0.02

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	6.1822E-12	33.977	62.291	0.00E+00	2.10E-10	3.85E-10	Avg. MeV	
Am-241	1.1066E-01	33.977	62.291	5.46E-01	4.31E+00	7.44E+00	0.0150	2.031E+12
Am-242m	1.9247E-03	33.977	62.291	0.00E+00	6.54E-02	1.20E-01	0.0250	4.051E+11
Am-243	1.0740E-04	33.977	62.291	0.00E+00	3.65E-03	6.69E-03	0.0375	4.707E+11
C-14	2.6042E-05	33.977	62.291	0.00E+00	8.85E-04	1.62E-03	0.0575	4.671E+11
Cl-36	3.4243E-10	33.977	62.291	0.00E+00	1.16E-08	2.13E-08	0.0850	2.254E+11
Co-243	4.0629E-04	33.977	62.291	0.00E+00	1.38E-02	2.53E-02	0.1250	1.586E+11
Co-244	1.6024E-03	33.977	62.291	0.00E+00	5.44E-02	9.98E-02	0.2250	1.819E+11
Co-60	3.4283E-03	33.977	62.291	0.00E+00	1.16E-01	2.14E-01	0.3750	7.886E+10
Cs-134	1.5565E-03	33.977	62.291	0.00E+00	5.29E-02	9.70E-02	0.5750	3.195E+12
Cs-135	4.7693E-05	33.977	62.291	0.00E+00	1.62E-03	2.97E-03	0.8500	3.338E+10
Cs-137	1.4007E+00	33.977	62.291	0.00E+00	4.76E+01	8.72E+01	1.2500	3.996E+10
Eu-154	1.6184E-02	33.977	62.291	0.00E+00	5.50E-01	1.01E+00	1.7500	9.040E+08
Eu-155	1.3775E-02	33.977	62.291	0.00E+00	4.68E-01	8.58E-01	2.2500	1.802E+05
Fe-55	3.8035E-04	33.977	62.291	0.00E+00	1.29E-02	2.37E-02	2.7500	1.032E+06
H-3	3.8454E-03	33.977	62.291	0.00E+00	1.31E-01	2.40E-01	3.5000	4.536E+03
I-129	1.2891E-06	33.977	62.291	0.00E+00	4.38E-05	8.03E-05	5.0000	1.512E+03
Kr-85	2.7858E-02	33.977	62.291	0.00E+00	9.47E-01	1.74E+00	7.0000	1.726E+02
Np-237	3.7516E-06	33.977	62.291	0.00E+00	1.27E-04	2.34E-04	11.0000	1.975E+01
Pa-231	1.2488E-11	33.977	62.291	0.00E+00	4.24E-10	7.78E-10		
Pb-210	2.4206E-12	33.977	62.291	0.00E+00	8.22E-11	1.51E-10		
Pm-147	1.5671E-02	33.977	62.291	0.00E+00	5.32E-01	9.76E-01		
Pu-238	1.4877E-02	33.977	62.291	0.00E+00	5.05E-01	9.27E-01		
Pu-239	-3.5520E-02	33.977	0.000	4.48E+00	3.27E+00	4.48E+00		
Pu-240	2.0690E-02	33.977	62.291	2.28E+00	2.98E+00	3.57E+00		
Pu-241	-1.4799E+00	33.977	0.000	1.02E+02	5.20E+01	1.02E+02		
Pu-242	1.1252E-05	33.977	62.291	6.07E-04	9.90E-04	1.31E-03		
Ra-226	7.8524E-12	33.977	62.291	0.00E+00	2.67E-10	4.89E-10		
Ra-228	2.4086E-16	33.977	62.291	0.00E+00	8.18E-15	1.50E-14		
Ru-106	1.5066E-05	33.977	62.291	0.00E+00	5.12E-04	9.38E-04		
Se-79	1.0127E-05	33.977	62.291	0.00E+00	3.44E-04	6.31E-04		
Sn-126	4.3902E-05	33.977	62.291	0.00E+00	1.49E-03	2.73E-03		
Sr-90	5.0088E-01	33.977	62.291	0.00E+00	1.70E+01	3.12E+01		
Tc-99	3.9412E-04	33.977	62.291	0.00E+00	1.34E-02	2.45E-02		
Th-229	2.2719E-12	33.977	62.291	0.00E+00	9.25E-11	1.70E-10		
Th-230	1.0441E-09	33.977	62.291	0.00E+00	3.55E-08	6.50E-08		
Th-232	3.1689E-16	33.977	62.291	0.00E+00	1.08E-14	1.97E-14		
Ti-208	4.6636E-07	33.977	62.291	0.00E+00	1.58E-05	2.90E-05		
U-232	1.2638E-06	33.977	62.291	0.00E+00	4.29E-05	7.87E-05		
U-233	5.7451E-10	33.977	62.291	0.00E+00	1.95E-08	3.58E-08		
U-234	4.3044E-06	33.977	62.291	0.00E+00	1.46E-04	2.68E-04		
U-235	-7.7765E-09	33.977	0.000	9.20E-07	6.56E-07	9.20E-07		
U-236	1.8050E-07	33.977	62.291	0.00E+00	6.13E-06	1.12E-05		
U-238	-1.7914E-07	33.977	0.000	6.70E-05	6.09E-05	6.70E-05		
Y-90	5.0088E-01	33.977	62.291	0.00E+00	1.70E+01	3.12E+01		
Other Radionuclides					4.81E+01	8.83E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.11E-01	1.18E+00
Total	Total

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:	FAST	FAST	
BOL HM Constituents:	SST	SST	
BOL Enrichment %:	PuO2-UO2	Pu and U	
		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup taken from SFD and converted to MWd using BOL=0.283kg Bounding burnup taken from SFD and converted to MWd using BOL=0.283kg
	From SFD	Estimated	
Nominal:		33.977	
Bounding:		62.291	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.79		1.00
Bounding:	1.45		

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: FFTF-DFA/TDFA
 SNF ID #: 71
 Fuel Units & Desc.: 261 - HEX ARRAY 217 ROD
 Heavy Metal Mass: BOL=9083.09kg ; EOL=8443.74kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1992
 Estimates as of: 2030
 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: 35 years

Estimated
 Canister usage:
 18"x15"
 52.20

Radionuclide	m	x _n	x _p	b	y _n	y _p	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-12	638,157.184	1,362,463.065	0.00E+00	3.95E-06	8.42E-06	Avg. MeV	
Am-241	1.1066E-01	638,157.184	1,362,463.065	1.75E+04	8.81E+04	1.68E+05	0.0150	4.472E+16
Am-242m	1.9247E-03	638,157.184	1,362,463.065	0.00E+00	1.23E+03	2.62E+03	0.0250	8.865E+15
Am-243	1.0740E-04	638,157.184	1,362,463.065	0.00E+00	6.85E+01	1.46E+02	0.0375	1.030E+16
C-14	2.6042E-05	638,157.184	1,362,463.065	0.00E+00	1.66E+01	3.55E+01	0.0575	1.029E+16
Cf-36	3.4243E-10	638,157.184	1,362,463.065	0.00E+00	2.19E-04	4.67E-04	0.0850	4.931E+15
Cm-243	4.0629E-04	638,157.184	1,362,463.065	0.00E+00	2.59E+02	5.54E+02	0.1250	3.470E+15
Cm-244	1.6024E-03	638,157.184	1,362,463.065	0.00E+00	1.02E+03	2.18E+03	0.2250	3.979E+15
Co-60	3.4283E-03	638,157.184	1,362,463.065	0.00E+00	2.19E+03	4.67E+03	0.3750	1.725E+15
Cs-134	1.5565E-03	638,157.184	1,362,463.065	0.00E+00	9.93E+02	2.12E+03	0.5750	6.989E+16
Cs-135	4.7693E-05	638,157.184	1,362,463.065	0.00E+00	3.04E+01	6.50E+01	0.8500	7.301E+14
Cs-137	1.4007E+00	638,157.184	1,362,463.065	0.00E+00	8.94E+05	1.91E+06	1.2500	8.741E+14
Eu-154	1.6184E-02	638,157.184	1,362,463.065	0.00E+00	1.03E+04	2.20E+04	1.7500	1.977E+13
Eu-155	1.3775E-02	638,157.184	1,362,463.065	0.00E+00	8.79E+03	1.88E+04	2.2500	3.969E+09
Fe-55	3.8035E-04	638,157.184	1,362,463.065	0.00E+00	2.43E+02	5.18E+02	2.7500	2.258E+10
H-3	3.8454E-03	638,157.184	1,362,463.065	0.00E+00	2.45E+03	5.24E+03	3.5000	1.122E+08
I-129	1.2891E-06	638,157.184	1,362,463.065	0.00E+00	8.23E-01	1.76E+00	5.0000	3.860E+07
Kr-85	2.7858E-02	638,157.184	1,362,463.065	0.00E+00	1.78E+04	3.80E+04	7.0000	4.404E+06
Np-237	3.7516E-06	638,157.184	1,362,463.065	0.00E+00	2.39E+00	5.11E+00	11.0000	5.038E+05
Pa-231	1.2488E-11	638,157.184	1,362,463.065	0.00E+00	7.97E-06	1.70E-05		
Pb-210	2.4206E-12	638,157.184	1,362,463.065	0.00E+00	1.54E-06	3.30E-06		
Pm-147	1.5671E-02	638,157.184	1,362,463.065	0.00E+00	1.00E+04	2.14E+04		
Pu-238	1.4877E-02	638,157.184	1,362,463.065	0.00E+00	9.49E+03	2.03E+04		
Pu-239	-3.5520E-02	638,157.184	0.000	1.44E+05	1.21E+05	1.44E+05		
Pu-240	2.0690E-02	638,157.184	1,362,463.065	7.31E+04	8.63E+04	1.01E+05		
Pu-241	-1.4799E+00	638,157.184	0.000	3.28E+06	2.34E+06	3.28E+06		
Pu-242	1.1252E-05	638,157.184	1,362,463.065	1.95E+01	2.67E+01	3.48E+01		
Ra-226	7.8524E-12	638,157.184	1,362,463.065	0.00E+00	5.01E-06	1.07E-05		
Ra-228	2.4086E-16	638,157.184	1,362,463.065	0.00E+00	1.54E-10	3.28E-10		
Ru-106	1.5066E-05	638,157.184	1,362,463.065	0.00E+00	9.61E+00	2.05E+01		
Se-79	1.0127E-05	638,157.184	1,362,463.065	0.00E+00	6.46E+00	1.38E+01		
Sn-126	4.3902E-05	638,157.184	1,362,463.065	0.00E+00	2.80E+01	5.98E+01		
Sr-90	5.0088E-01	638,157.184	1,362,463.065	0.00E+00	3.20E+05	6.82E+05		
Tc-99	3.9412E-04	638,157.184	1,362,463.065	0.00E+00	2.52E+02	5.37E+02		
Th-229	2.7219E-12	638,157.184	1,362,463.065	0.00E+00	1.74E-06	3.71E-06		
Th-230	1.0441E-09	638,157.184	1,362,463.065	0.00E+00	6.66E-04	1.42E-03		
Th-232	3.1689E-16	638,157.184	1,362,463.065	0.00E+00	2.02E-10	4.32E-10		
Tl-208	4.6636E-07	638,157.184	1,362,463.065	0.00E+00	2.98E-01	6.35E-01		
U-232	1.2638E-06	638,157.184	1,362,463.065	0.00E+00	8.06E-01	1.72E+00		
U-233	5.7451E-10	638,157.184	1,362,463.065	0.00E+00	3.67E-04	7.83E-04		
U-234	4.3044E-06	638,157.184	1,362,463.065	0.00E+00	2.75E+00	5.86E+00		
U-235	-7.7765E-09	638,157.184	0.000	2.95E-02	2.46E-02	2.95E-02		
U-236	1.8050E-07	638,157.184	1,362,463.065	0.00E+00	1.15E-01	2.46E-01		
U-238	-1.7914E-07	638,157.184	0.000	2.15E+00	2.03E+00	2.15E+00		
Y-90	5.0088E-01	638,157.184	1,362,463.065	0.00E+00	3.20E+05	6.82E+05		
Other Radionuclides					9.04E+05	1.93E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.84E+04	2.82E+04
Total	Total

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:	FAST	FAST	
BOL HM Constituents:	SST (316)	SST	
BOL Enrichment %:	PuO ₂ -UO ₂	Pu and U	
	0.70999934	10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup taken directly from SFD (converted to MWd).
	From SFD	Estimated	
Nominal:	635,816.097	638,157.184	
Bounding:	1,362,463.065	1,276,314.369	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.46	1.00	1.00
Bounding:	0.99	0.94	

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: FFTF-DFA/TDFA PINS
 SNF ID #: 323
 Fuel Units & Descr: 2768 - ROD
 Heavy Metal Mass: BOL= : EOL=443.99kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1992
 Estimates as of: 2030
 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: 35 years

Estimated
 Canister usage:
 18"x15"
 41.94

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	6.1822E-12	31,146.436	69,045.345	0.00E+00	1.93E-07	4.27E-07	Avg. MeV	
Am-241	1.1066E-01	31,146.436	69,045.345	9.16E+02	4.36E+03	8.56E+03	0.0150	2.268E+15
Am-242m	1.9247E-03	31,146.436	69,045.345	0.00E+00	5.99E+01	1.33E+02	0.0250	4.493E+14
Am-243	1.0740E-04	31,146.436	69,045.345	0.00E+00	3.35E+00	7.42E+00	0.0375	5.218E+14
C-14	2.6042E-05	31,146.436	69,045.345	0.00E+00	8.11E-01	1.80E+00	0.0575	5.220E+14
Cl-36	3.4243E-10	31,146.436	69,045.345	0.00E+00	1.07E-05	2.36E-05	0.0850	2.499E+14
Cm-243	4.0629E-04	31,146.436	69,045.345	0.00E+00	1.27E+01	2.81E+01	0.1250	1.758E+14
Cm-244	1.6024E-03	31,146.436	69,045.345	0.00E+00	4.99E+01	1.11E+02	0.2250	2.017E+14
Co-60	3.4283E-03	31,146.436	69,045.345	0.00E+00	1.07E+02	2.37E+02	0.3750	8.741E+13
Cs-134	1.5565E-03	31,146.436	69,045.345	0.00E+00	4.85E+01	1.07E+02	0.5750	3.542E+15
Cs-135	4.7693E-05	31,146.436	69,045.345	0.00E+00	1.49E+00	3.29E+00	0.8500	3.700E+13
Cs-137	1.4007E+00	31,146.436	69,045.345	0.00E+00	4.36E+04	9.67E+04	1.2500	4.429E+13
Eu-154	1.6184E-02	31,146.436	69,045.345	0.00E+00	5.04E+02	1.12E+03	1.7500	1.002E+12
Eu-155	1.3775E-02	31,146.436	69,045.345	0.00E+00	4.29E+02	9.51E+02	2.2500	2.013E+08
Fe-55	3.8035E-04	31,146.436	69,045.345	0.00E+00	1.18E+01	2.63E+01	2.7500	1.144E+09
H-3	3.8454E-03	31,146.436	69,045.345	0.00E+00	1.20E+02	2.66E+02	3.5000	5.754E+06
I-129	1.2891E-06	31,146.436	69,045.345	0.00E+00	4.02E-02	8.90E-02	5.0000	1.985E+06
Kr-85	2.7858E-02	31,146.436	69,045.345	0.00E+00	8.68E+02	1.92E+03	7.0000	2.264E+05
Np-237	3.7516E-06	31,146.436	69,045.345	0.00E+00	1.17E-01	2.59E-01	11.0000	2.590E+04
Pa-231	1.2488E-11	31,146.436	69,045.345	0.00E+00	3.89E-07	8.62E-07		
Pb-210	2.4206E-12	31,146.436	69,045.345	0.00E+00	7.54E-08	1.67E-07		
Pm-147	1.5671E-02	31,146.436	69,045.345	0.00E+00	4.88E+02	1.08E+03		
Pu-238	1.4877E-02	31,146.436	69,045.345	0.00E+00	4.63E+02	1.03E+03		
Pu-239	-3.5520E-02	31,146.436	0.000	7.52E+03	6.41E+03	7.52E+03		
Pu-240	2.0690E-02	31,146.436	69,045.345	3.82E+03	4.47E+03	5.25E+03		
Pu-241	-1.4799E+00	31,146.436	0.000	1.72E+05	1.25E+05	1.72E+05		
Pu-242	1.1252E-05	31,146.436	69,045.345	1.02E+00	1.37E+00	1.80E+00		
Ra-226	7.8524E-12	31,146.436	69,045.345	0.00E+00	2.45E-07	5.42E-07		
Ra-228	2.4086E-16	31,146.436	69,045.345	0.00E+00	7.50E-12	1.66E-11		
Ru-106	1.5066E-05	31,146.436	69,045.345	0.00E+00	4.69E-01	1.04E+00		
Se-79	1.0127E-05	31,146.436	69,045.345	0.00E+00	3.15E-01	6.99E-01		
Sn-126	4.3902E-05	31,146.436	69,045.345	0.00E+00	1.37E+00	3.03E+00		
Sr-90	5.0088E-01	31,146.436	69,045.345	0.00E+00	1.56E+04	3.46E+04		
Tc-99	3.9412E-04	31,146.436	69,045.345	0.00E+00	1.23E+01	2.72E+01		
Th-229	2.7219E-12	31,146.436	69,045.345	0.00E+00	8.48E-08	1.88E-07		
Th-230	1.0441E-09	31,146.436	69,045.345	0.00E+00	3.25E-05	7.21E-05		
Th-232	3.1689E-16	31,146.436	69,045.345	0.00E+00	9.87E-12	2.19E-11		
Tl-208	4.6636E-07	31,146.436	69,045.345	0.00E+00	1.45E-02	3.22E-02		
U-232	1.2638E-06	31,146.436	69,045.345	0.00E+00	3.94E-02	8.73E-02		
U-233	5.7451E-10	31,146.436	69,045.345	0.00E+00	1.79E-05	3.97E-05		
U-234	4.3044E-06	31,146.436	69,045.345	0.00E+00	1.34E-01	2.97E-01		
U-235	-7.7765E-09	31,146.436	0.000	1.54E-03	1.30E-03	1.54E-03		
U-236	1.8050E-07	31,146.436	69,045.345	0.00E+00	5.62E-03	1.25E-02		
U-238	-1.7914E-07	31,146.436	0.000	1.12E-01	1.07E-01	1.12E-01		
Y-90	5.0088E-01	31,146.436	69,045.345	0.00E+00	1.56E+04	3.46E+04		
Other Radionuclides					4.41E+04	9.78E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.28E+02	1.44E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: FAST	Used: FAST	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	SST (316)	SST	
BOL HM Constituents:	PuO2-UO2	Pu and U	
BOL Enrichment %:		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	Nominal burnup taken from SFD and converted to MWd using BOL=475.192kg Bounding burnup taken from SFD and converted to MWd using BOL=475.192kg
Nominal:		31,146.436	
Bounding:		69,045.345	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.43		
Bounding:	0.95		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: FFTF-TFA PINS
 SNF ID #: 320
 Fuel Units & Desc: 1645 - ROD
 Heavy Metal Mass: BOL= : EOL=389.70kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1992
 Estimates as of: 2030
 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: 35 years

Estimated
 Canister usage:
 18"x15"
 24.92

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	6.1822E-12	27,338.134	60,603.111	0.00E+00	1.69E-07	3.75E-07	0.0150	1.990E+15
Am-241	1.1066E-01	27,338.134	60,603.111	8.04E+02	3.83E+03	7.51E+03	0.0250	3.943E+14
Am-242m	1.9247E-03	27,338.134	60,603.111	0.00E+00	5.26E+01	1.17E+02	0.0375	4.580E+14
Am-243	1.0740E-04	27,338.134	60,603.111	0.00E+00	2.94E+00	6.51E+00	0.0575	4.582E+14
C-14	2.6042E-05	27,338.134	60,603.111	0.00E+00	7.12E-01	1.58E+00	0.0850	2.193E+14
Cl-36	3.4243E-10	27,338.134	60,603.111	0.00E+00	9.36E-06	2.08E-05	0.1250	1.543E+14
Cm-243	4.0629E-04	27,338.134	60,603.111	0.00E+00	1.11E+01	2.46E+01	0.2250	1.770E+14
Cm-244	1.6024E-03	27,338.134	60,603.111	0.00E+00	4.38E+01	9.71E+01	0.3750	7.673E+13
Co-60	3.4283E-03	27,338.134	60,603.111	0.00E+00	9.37E+01	2.08E+02	0.5750	3.109E+15
Cs-134	1.5565E-03	27,338.134	60,603.111	0.00E+00	4.26E+01	9.43E+01	0.8500	3.248E+13
Cs-135	4.7693E-05	27,338.134	60,603.111	0.00E+00	1.30E+00	2.89E+00	1.2500	3.888E+13
Cs-137	1.4007E+00	27,338.134	60,603.111	0.00E+00	3.83E+04	8.49E+04	1.7500	8.795E+11
Eu-154	1.6184E-02	27,338.134	60,603.111	0.00E+00	4.42E+02	9.81E+02	2.2500	1.767E+08
Eu-155	1.3775E-02	27,338.134	60,603.111	0.00E+00	3.77E+02	8.35E+02	2.7500	1.004E+09
Fe-55	3.8035E-04	27,338.134	60,603.111	0.00E+00	1.04E+01	2.31E+01	3.5000	5.050E+06
H-3	3.8454E-03	27,338.134	60,603.111	0.00E+00	1.05E+02	2.33E+02	5.0000	1.742E+06
I-129	1.2891E-06	27,338.134	60,603.111	0.00E+00	3.52E-02	7.81E-02	7.0000	1.988E+05
Kr-85	2.7858E-02	27,338.134	60,603.111	0.00E+00	7.62E+02	1.69E+03	11.0000	2.273E+04
Np-237	3.7516E-06	27,338.134	60,603.111	0.00E+00	1.03E-01	2.27E-01		
Pa-231	1.2488E-11	27,338.134	60,603.111	0.00E+00	3.41E-07	7.57E-07		
Pb-210	2.4206E-12	27,338.134	60,603.111	0.00E+00	6.62E-08	1.47E-07		
Pm-147	1.5671E-02	27,338.134	60,603.111	0.00E+00	4.28E+02	9.50E+02		
Pu-238	1.4877E-02	27,338.134	60,603.111	0.00E+00	4.07E+02	9.02E+02		
Pu-239	-3.5520E-02	27,338.134	0.000	6.60E+03	5.63E+03	6.60E+03		
Pu-240	2.0690E-02	27,338.134	60,603.111	3.36E+03	3.92E+03	4.61E+03		
Pu-241	-1.4799E+00	27,338.134	0.000	1.51E+05	1.10E+05	1.51E+05		
Pu-242	1.1252E-05	27,338.134	60,603.111	8.95E-01	1.20E+00	1.58E+00		
Ra-226	7.8524E-12	27,338.134	60,603.111	0.00E+00	2.15E-07	4.76E-07		
Ra-228	2.4086E-16	27,338.134	60,603.111	0.00E+00	6.58E-12	1.46E-11		
Ru-106	1.5066E-05	27,338.134	60,603.111	0.00E+00	4.12E-01	9.13E-01		
Se-79	1.0127E-05	27,338.134	60,603.111	0.00E+00	2.77E-01	6.14E-01		
Sn-126	4.3902E-05	27,338.134	60,603.111	0.00E+00	1.20E+00	2.66E+00		
Sr-90	5.0088E-01	27,338.134	60,603.111	0.00E+00	1.37E+04	3.04E+04		
Tc-99	3.9412E-04	27,338.134	60,603.111	0.00E+00	1.08E+01	2.39E+01		
Th-229	2.7219E-12	27,338.134	60,603.111	0.00E+00	7.44E-08	1.65E-07		
Th-230	1.0441E-09	27,338.134	60,603.111	0.00E+00	2.85E-05	6.33E-05		
Th-232	3.1689E-16	27,338.134	60,603.111	0.00E+00	8.66E-12	1.92E-11		
Tl-208	4.6636E-07	27,338.134	60,603.111	0.00E+00	1.27E-02	2.83E-02		
U-232	1.2638E-06	27,338.134	60,603.111	0.00E+00	3.45E-02	7.66E-02		
U-233	5.7451E-10	27,338.134	60,603.111	0.00E+00	1.57E-05	3.48E-05		
U-234	4.3044E-06	27,338.134	60,603.111	0.00E+00	1.18E-01	2.61E-01		
U-235	-7.7765E-09	27,338.134	0.000	1.36E-03	1.14E-03	1.36E-03		
U-236	1.8050E-07	27,338.134	60,603.111	0.00E+00	4.93E-03	1.09E-02		
U-238	-1.7914E-07	27,338.134	0.000	9.87E-02	9.38E-02	9.87E-02		
Y-90	5.0088E-01	27,338.134	60,603.111	0.00E+00	1.37E+04	3.04E+04		
Other Radionuclides					3.87E+04	8.59E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.26E+02	1.27E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
FAST	FAST	FAST	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	SST (HT9)	SST	
BOL HM Constituents:	PuO2-UO2	Pu and U	
BOL Enrichment %:		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
27,338.134	27,338.134	27,338.134	Nominal burnup taken from SFD and converted to MWd using BOL=417.090kg Bounding burnup taken from SFD and converted to MWd using BOL=417.090kg
Bounding:		60,603.111	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup	
0.43	0.43		1.00
Bounding:	0.95		

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: FFTF-TFA PINS (AC-3)
 SNF ID #: 1046
 Fuel Units & Descr: 72 - ROD
 Heavy Metal Mass: BOL = : EOL=8.88kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1992
 Estimates as of: 2030
 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: 35 years

Estimated
 Canister usage:
 18"x15"
 1.09

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-12	634.538	787.703	0.00E+00	3.92E-09	4.87E-09	Avg. MeV	
Am-241	1.1066E-01	634.538	787.703	1.83E+01	8.86E+01	1.06E+02	0.0150	2.630E+13
Am-242m	1.9247E-03	634.538	787.703	0.00E+00	1.22E+00	1.52E+00	0.0250	5.133E+12
Am-243	1.0740E-04	634.538	787.703	0.00E+00	6.81E-02	8.46E-02	0.0375	5.953E+12
C-14	2.6042E-05	634.538	787.703	0.00E+00	1.65E-02	2.05E-02	0.0575	6.065E+12
Cl-36	3.4243E-10	634.538	787.703	0.00E+00	2.17E-07	2.70E-07	0.0850	2.851E+12
Cm-243	4.0629E-04	634.538	787.703	0.00E+00	2.58E-01	3.20E-01	0.1250	2.006E+12
Cm-244	1.6024E-03	634.538	787.703	0.00E+00	1.02E+00	1.26E+00	0.2250	2.301E+12
Co-60	3.4283E-03	634.538	787.703	0.00E+00	2.18E+00	2.70E+00	0.3750	9.974E+11
Cs-134	1.5565E-03	634.538	787.703	0.00E+00	9.88E-01	1.23E+00	0.5750	4.041E+13
Cs-135	4.7693E-05	634.538	787.703	0.00E+00	3.03E-02	3.76E-02	0.8500	4.221E+11
Cs-137	1.4007E+00	634.538	787.703	0.00E+00	8.89E+02	1.10E+03	1.2500	5.053E+11
Eu-154	1.6184E-02	634.538	787.703	0.00E+00	1.03E+01	1.27E+01	1.7500	1.143E+10
Eu-155	1.3775E-02	634.538	787.703	0.00E+00	8.74E+00	1.09E+01	2.2500	2.332E+06
Fe-55	3.8035E-04	634.538	787.703	0.00E+00	2.41E-01	3.00E-01	2.7500	1.308E+07
H-3	3.8454E-03	634.538	787.703	0.00E+00	2.44E+00	3.03E+00	3.5000	8.405E+04
I-129	1.2891E-06	634.538	787.703	0.00E+00	8.18E-04	1.02E-03	5.0000	3.046E+04
Kr-85	2.7858E-02	634.538	787.703	0.00E+00	1.77E+01	2.19E+01	7.0000	3.473E+03
Np-237	3.7516E-06	634.538	787.703	0.00E+00	2.38E-03	2.96E-03	11.0000	3.972E+02
Pa-231	1.2488E-11	634.538	787.703	0.00E+00	7.92E-09	9.84E-09		
Pb-210	2.4206E-12	634.538	787.703	0.00E+00	1.54E-09	1.91E-09		
Pm-147	1.5671E-02	634.538	787.703	0.00E+00	9.94E+00	1.23E+01		
Pu-238	1.4877E-02	634.538	787.703	0.00E+00	9.44E+00	1.17E+01		
Pu-239	-3.5520E-02	634.538	0.000	1.51E+02	1.28E+02	1.51E+02		
Pu-240	2.0690E-02	634.538	787.703	7.65E+01	8.97E+01	9.28E+01		
Pu-241	-1.4799E+00	634.538	0.000	3.44E+03	2.50E+03	3.44E+03		
Pu-242	1.1252E-05	634.538	787.703	2.04E-02	2.75E-02	2.93E-02		
Ra-226	7.8524E-12	634.538	787.703	0.00E+00	4.98E-09	6.19E-09		
Ra-228	2.4086E-16	634.538	787.703	0.00E+00	1.53E-13	1.90E-13		
Ru-106	1.5066E-05	634.538	787.703	0.00E+00	9.56E-03	1.19E-02		
Se-79	1.0127E-05	634.538	787.703	0.00E+00	6.43E-03	7.98E-03		
Sn-126	4.3902E-05	634.538	787.703	0.00E+00	2.79E-02	3.46E-02		
Sr-90	5.0088E-01	634.538	787.703	0.00E+00	3.18E+02	3.95E+02		
Tc-99	3.9412E-04	634.538	787.703	0.00E+00	2.50E-01	3.10E-01		
Th-229	2.7219E-12	634.538	787.703	0.00E+00	1.73E-09	2.14E-09		
Th-230	1.0441E-09	634.538	787.703	0.00E+00	6.62E-07	8.22E-07		
Th-232	3.1689E-16	634.538	787.703	0.00E+00	2.01E-13	2.50E-13		
Tl-208	4.6636E-07	634.538	787.703	0.00E+00	2.96E-04	3.67E-04		
U-232	1.2638E-06	634.538	787.703	0.00E+00	8.02E-04	9.95E-04		
U-233	5.7451E-10	634.538	787.703	0.00E+00	3.65E-07	4.53E-07		
U-234	4.3044E-06	634.538	787.703	0.00E+00	2.73E-03	3.39E-03		
U-235	-7.7765E-09	634.538	0.000	3.09E-05	2.60E-05	3.09E-05		
U-236	1.8050E-07	634.538	787.703	0.00E+00	1.15E-04	1.42E-04		
U-238	-1.7914E-07	634.538	0.000	2.25E-03	2.14E-03	2.25E-03		
Y-90	5.0088E-01	634.538	787.703	0.00E+00	3.18E+02	3.95E+02		
Other Radionuclides					8.99E+02	1.12E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.67E+01	1.98E+01
Total	Total

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:	FAST	FAST	
BOL HM Constituents:	SST (HT9)	SST	
BOL Enrichment %:	Pu/U CARB	Pu and U	
		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup taken from SFD and converted to MWd using BOL=9.513kg Bounding burnup taken from SFD and converted to MWd using BOL=9.513kg
	From SFD	Estimated	
Nominal:		634.538	
Bounding:		787.703	

Checks			Estimated EOL HM/Given EOL HM 1.00
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.44		
Bounding:	0.54		

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: FFTF-TFA-AB-1
 SNF ID #: 317
 Fuel Units & Descr: 1 - HEX ARRAY 217 ROD
 Heavy Metal Mass: BOL= : EOL=34.65kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1992
 Estimates as of: 2030
 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: 35 years

Estimated
 Canister usage:
 18"x15"
 0.20

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	6.1822E-12	251.327	502.655	0.00E+00	1.55E-09	3.11E-09	0.0150	1.978E+13
Am-241	1.1066E-01	251.327	502.655	6.73E+01	9.51E+01	1.23E+02	0.0250	3.328E+12
Am-242m	1.9247E-03	251.327	502.655	0.00E+00	4.84E-01	9.67E-01	0.0375	3.804E+12
Am-243	1.0740E-04	251.327	502.655	0.00E+00	2.70E-02	5.40E-02	0.0575	4.642E+12
C-14	2.6042E-05	251.327	502.655	0.00E+00	6.54E-03	1.31E-02	0.0850	1.820E+12
Cl-36	3.4243E-10	251.327	502.655	0.00E+00	8.61E-08	1.72E-07	0.1250	1.283E+12
Cm-243	4.0629E-04	251.327	502.655	0.00E+00	1.02E-01	2.04E-01	0.2250	1.468E+12
Cm-244	1.6024E-03	251.327	502.655	0.00E+00	4.03E-01	8.05E-01	0.3750	6.376E+11
Co-60	3.4283E-03	251.327	502.655	0.00E+00	8.62E-01	1.72E+00	0.5750	2.579E+13
Cs-134	1.5565E-03	251.327	502.655	0.00E+00	3.91E-01	7.82E-01	0.8500	2.694E+11
Cs-135	4.7693E-05	251.327	502.655	0.00E+00	1.20E-02	2.40E-02	1.2500	3.225E+11
Cs-137	1.4007E+00	251.327	502.655	0.00E+00	3.52E+02	7.04E+02	1.7500	7.295E+09
Eu-154	1.6184E-02	251.327	502.655	0.00E+00	4.07E+00	8.13E+00	2.2500	1.741E+06
Eu-155	1.3775E-02	251.327	502.655	0.00E+00	3.46E+00	6.92E+00	2.7500	8.490E+06
Fe-55	3.8035E-04	251.327	502.655	0.00E+00	9.56E-02	1.91E-01	3.5000	1.834E+05
H-3	3.8454E-03	251.327	502.655	0.00E+00	9.66E-01	1.93E+00	5.0000	7.451E+04
I-129	1.2891E-06	251.327	502.655	0.00E+00	3.24E-04	6.48E-04	7.0000	8.485E+03
Kr-85	2.7856E-02	251.327	502.655	0.00E+00	7.00E+00	1.40E+01	11.0000	9.700E+02
Np-237	3.7516E-06	251.327	502.655	0.00E+00	9.43E-04	1.89E-03		
Pa-231	1.2488E-11	251.327	502.655	0.00E+00	3.14E-09	6.28E-09		
Pb-210	2.4206E-12	251.327	502.655	0.00E+00	6.08E-10	1.22E-09		
Pm-147	1.5671E-02	251.327	502.655	0.00E+00	3.94E+00	7.88E+00		
Pu-238	1.4877E-02	251.327	502.655	0.00E+00	3.74E+00	7.48E+00		
Pu-239	-3.5520E-02	251.327	0.000	5.52E+02	5.44E+02	5.52E+02		
Pu-240	2.0690E-02	251.327	502.655	2.81E+02	2.86E+02	2.91E+02		
Pu-241	-1.4799E+00	251.327	0.000	1.26E+04	1.22E+04	1.26E+04		
Pu-242	1.1252E-05	251.327	502.655	7.49E-02	7.77E-02	8.05E-02		
Ra-226	7.8524E-12	251.327	502.655	0.00E+00	1.97E-09	3.95E-09		
Ra-228	2.4086E-16	251.327	502.655	0.00E+00	6.05E-14	1.21E-13		
Ru-106	1.5066E-05	251.327	502.655	0.00E+00	3.79E-03	7.57E-03		
Se-79	1.0127E-05	251.327	502.655	0.00E+00	2.55E-03	5.09E-03		
Sn-126	4.3902E-05	251.327	502.655	0.00E+00	1.10E-02	2.21E-02		
Sr-90	5.0088E-01	251.327	502.655	0.00E+00	1.26E+02	2.52E+02		
Tc-99	3.9412E-04	251.327	502.655	0.00E+00	9.91E-02	1.98E-01		
Th-229	2.7219E-12	251.327	502.655	0.00E+00	6.84E-10	1.37E-09		
Th-230	1.0441E-09	251.327	502.655	0.00E+00	2.62E-07	5.25E-07		
Th-232	3.1689E-16	251.327	502.655	0.00E+00	7.96E-14	1.59E-13		
Tl-208	4.6636E-07	251.327	502.655	0.00E+00	1.17E-04	2.34E-04		
U-232	1.2638E-06	251.327	502.655	0.00E+00	3.18E-04	6.35E-04		
U-233	5.7451E-10	251.327	502.655	0.00E+00	1.44E-07	2.89E-07		
U-234	4.3044E-06	251.327	502.655	0.00E+00	1.08E-03	2.16E-03		
U-235	-7.7765E-09	251.327	0.000	1.13E-04	1.11E-04	1.13E-04		
U-236	1.8050E-07	251.327	502.655	0.00E+00	4.54E-05	9.07E-05		
U-238	-1.7914E-07	251.327	0.000	8.26E-03	8.21E-03	8.26E-03		
Y-90	5.0088E-01	251.327	502.655	0.00E+00	1.26E+02	2.52E+02		
Other Radionuclides					3.56E+02	7.12E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.20E+01	3.61E+01
Total	Total

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).
	From SFD	Used	
Reactor Moderator:	FAST	FAST	
Fuel Cladding:	SST (316)	SST	
BOL HM Constituents:	PuO2-UO2	Pu and U	
BOL Enrichment %:		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup taken from SFD and converted to MWd using BOL=34.907kg Bounding burnup assumed to be twice nominal burnup.
	From SFD	Estimated	
Nominal:		251.327	
Bounding:		502.655	

Checks			Estimated EOL HM/Given EOL HM 1.00
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.05		
Bounding:	0.09		

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: FFTF-TFA-ABA-1 THRU 6
 SNF ID #: 318
 Fuel Units & Descr: 6 - HEX ARRAY 91 ROD
 Heavy Metal Mass: BOL= : EOL=257.43kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1992
 Estimates as of: 2030
 Template: FERMI (Fast, Zirc. 10 to 40%, U)
²Template Burnup(MWd): 58.6725048
 Template BOL Heavy Metal Mass (MT): 0.018774
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x15"
 1.20

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	9.6110E-08	5,934.579	8,479.480	0.00E+00	5.70E-04	8.15E-04	0.0150	5.611E+14
Am-241	6.5601E-07	5,934.579	8,479.480	0.00E+00	3.89E-03	5.56E-03	0.0250	1.166E+14
Am-242m	0.0000E+00	5,934.579	8,479.480	0.00E+00	0.00E+00	0.00E+00	0.0375	1.025E+14
Am-243	8.3770E-15	5,934.579	8,479.480	0.00E+00	4.97E-11	7.10E-11	0.0575	1.086E+14
C-14	2.1714E-05	5,934.579	8,479.480	0.00E+00	1.29E-01	1.84E-01	0.0850	6.569E+13
Cl-36	5.5188E-08	5,934.579	8,479.480	0.00E+00	3.28E-04	4.68E-04	0.1250	4.254E+13
Cm-243	1.5496E-14	5,934.579	8,479.480	0.00E+00	9.20E-11	1.31E-10	0.2250	5.638E+13
Cm-244	5.2375E-16	5,934.579	8,479.480	0.00E+00	3.11E-12	4.44E-12	0.3750	2.457E+13
Co-60	2.0947E-03	5,934.579	8,479.480	0.00E+00	1.24E+01	1.78E+01	0.5750	4.340E+14
Cs-134	6.2448E-07	5,934.579	8,479.480	0.00E+00	3.71E-03	5.30E-03	0.8500	4.008E+12
Cs-135	4.4996E-05	5,934.579	8,479.480	0.00E+00	2.67E-01	3.82E-01	1.2500	2.659E+12
Cs-137	1.3775E+00	5,934.579	8,479.480	0.00E+00	8.17E+03	1.17E+04	1.7500	1.035E+11
Eu-154	1.8510E-04	5,934.579	8,479.480	0.00E+00	1.10E+00	1.57E+00	2.2500	1.824E+07
Eu-155	1.4163E-03	5,934.579	8,479.480	0.00E+00	8.41E+00	1.20E+01	2.7500	1.758E+06
Fe-55	1.4179E-05	5,934.579	8,479.480	0.00E+00	8.41E-02	1.20E-01	3.5000	1.785E+03
H-3	3.5383E-03	5,934.579	8,479.480	0.00E+00	2.10E+01	3.00E+01	5.0000	6.231E+02
I-129	1.1426E-06	5,934.579	8,479.480	0.00E+00	6.78E-03	9.69E-03	7.0000	5.538E+01
Kr-85	3.8604E-02	5,934.579	8,479.480	0.00E+00	2.29E+02	3.27E+02	11.0000	5.281E+00
Np-237	3.3099E-06	5,934.579	8,479.480	0.00E+00	1.96E-02	2.81E-02		
Pa-231	1.8953E-07	5,934.579	8,479.480	0.00E+00	1.12E-03	1.61E-03		
Pb-210	8.9531E-12	5,934.579	8,479.480	0.00E+00	5.31E-08	7.59E-08		
Pm-147	1.1588E-03	5,934.579	8,479.480	0.00E+00	6.88E+00	9.83E+00		
Pu-238	1.7146E-04	5,934.579	8,479.480	0.00E+00	1.02E+00	1.45E+00		
Pu-239	1.9464E-02	5,934.579	8,479.480	0.00E+00	1.16E+02	1.65E+02		
Pu-240	6.7919E-05	5,934.579	8,479.480	0.00E+00	4.03E-01	5.76E-01		
Pu-241	4.1774E-06	5,934.579	8,479.480	0.00E+00	2.48E-02	3.54E-02		
Pu-242	4.3751E-13	5,934.579	8,479.480	0.00E+00	2.60E-09	3.71E-09		
Ra-226	2.4219E-11	5,934.579	8,479.480	0.00E+00	1.44E-07	2.05E-07		
Ra-228	2.3572E-11	5,934.579	8,479.480	0.00E+00	1.40E-07	2.00E-07		
Ru-106	3.0951E-10	5,934.579	8,479.480	0.00E+00	1.84E-06	2.62E-06		
Se-79	1.6488E-05	5,934.579	8,479.480	0.00E+00	9.79E-02	1.40E-01		
Sn-126	3.7564E-05	5,934.579	8,479.480	0.00E+00	2.23E-01	3.19E-01		
Sr-90	1.2052E+00	5,934.579	8,479.480	0.00E+00	7.15E+03	1.02E+04		
Tc-99	4.4825E-04	5,934.579	8,479.480	0.00E+00	2.66E+00	3.80E+00		
Th-229	4.6478E-11	5,934.579	8,479.480	0.00E+00	2.76E-07	3.94E-07		
Th-230	2.2259E-09	5,934.579	8,479.480	0.00E+00	1.32E-05	1.89E-05		
Th-232	2.3691E-11	5,934.579	8,479.480	0.00E+00	1.41E-07	2.01E-07		
Tl-208	5.8256E-09	5,934.579	8,479.480	0.00E+00	3.46E-05	4.94E-05		
U-232	1.5759E-08	5,934.579	8,479.480	0.00E+00	9.35E-05	1.34E-04		
U-233	1.0110E-08	5,934.579	8,479.480	0.00E+00	6.00E-05	8.57E-05		
U-234	4.9001E-06	5,934.579	8,479.480	0.00E+00	2.91E-02	4.16E-02		
U-235	-2.3191E-06	5,934.579	0.000	1.46E-01	1.32E-01	1.46E-01		
U-236	1.2633E-05	5,934.579	8,479.480	0.00E+00	7.50E-02	1.07E-01		
U-238	-9.5407E-08	5,934.579	0.000	6.61E-02	6.55E-02	6.61E-02		
Y-90	1.2053E+00	5,934.579	8,479.480	0.00E+00	7.15E+03	1.02E+04		
Other Radionuclides					8.13E+03	1.16E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: FAST	Used: FAST	This Template was used for the following reasons: This template is a good approximation since it is a FAST, Uranium fuel
Fuel Cladding:	SST (HT9)	ZIRC	
BOL HM Constituents:	UO2	U	
BOL Enrichment %:		10 to 40	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD: 5,934.579	Estimated: 5,934.579	Nominal burnup taken from SFD and converted to MWd using BOL=264.158kg Bounding burnup taken from SFD and converted to MWd using BOL=264.158kg
Bounding:		8,479.480	

Checks		
Nominal:	Burnup Multiplier: 7.19	Estimated Burnup/ Given Burnup: 1.01
Bounding:	10.27	

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: FFTF-TFA-ACN-1 PINS
 SNF ID #: 321
 Fuel Units & Desc: 90 - ROD
 Heavy Metal Mass: BOL= ; EOL=14.35kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1992
 Estimates as of: 2030
 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: 35 years

Estimated
 Canister usage:
 18"x15"
 0.02

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	6.1822E-12	1,038.590	2,077.181	0.00E+00	6.42E-09	1.28E-08	0.0150	6.839E+13
Am-241	1.1066E-01	1,038.590	2,077.181	2.97E+01	1.45E+02	2.60E+02	0.0250	1.352E+13
Am-242m	1.9247E-03	1,038.590	2,077.181	0.00E+00	2.00E+00	4.00E+00	0.0375	1.570E+13
Am-243	1.0740E-04	1,038.590	2,077.181	0.00E+00	1.12E-01	2.23E-01	0.0575	1.573E+13
C-14	2.6042E-05	1,038.590	2,077.181	0.00E+00	2.70E-02	5.41E-02	0.0850	7.518E+12
Cl-36	3.4243E-10	1,038.590	2,077.181	0.00E+00	3.56E-07	7.11E-07	0.1250	5.290E+12
Cm-243	4.0629E-04	1,038.590	2,077.181	0.00E+00	4.22E-01	8.44E-01	0.2250	6.067E+12
Cm-244	1.6024E-03	1,038.590	2,077.181	0.00E+00	1.66E+00	3.33E+00	0.3750	2.630E+12
Co-60	3.4283E-03	1,038.590	2,077.181	0.00E+00	3.56E+00	7.12E+00	0.5750	1.066E+14
Cs-134	1.5565E-03	1,038.590	2,077.181	0.00E+00	1.62E+00	3.23E+00	0.8500	1.113E+12
Cs-135	4.7693E-05	1,038.590	2,077.181	0.00E+00	4.95E-02	9.91E-02	1.2500	1.333E+12
Cs-137	1.4007E+00	1,038.590	2,077.181	0.00E+00	1.45E+03	2.91E+03	1.7500	3.014E+10
Eu-154	1.6184E-02	1,038.590	2,077.181	0.00E+00	1.68E+01	3.36E+01	2.2500	6.064E+06
Eu-155	1.3775E-02	1,038.590	2,077.181	0.00E+00	1.43E+01	2.86E+01	2.7500	3.443E+07
Fe-55	3.8035E-04	1,038.590	2,077.181	0.00E+00	3.95E-01	7.90E-01	3.5000	1.780E+05
H-3	3.8454E-03	1,038.590	2,077.181	0.00E+00	3.99E+00	7.99E+00	5.0000	6.179E+04
I-129	1.2891E-06	1,038.590	2,077.181	0.00E+00	1.34E-03	2.68E-03	7.0000	7.049E+03
Kr-85	2.7858E-02	1,038.590	2,077.181	0.00E+00	2.89E+01	5.79E+01	11.0000	8.069E+02
Np-237	3.7516E-06	1,038.590	2,077.181	0.00E+00	3.90E-03	7.79E-03		
Pa-231	1.2488E-11	1,038.590	2,077.181	0.00E+00	1.30E-08	2.59E-08		
Pb-210	2.4206E-12	1,038.590	2,077.181	0.00E+00	2.51E-09	5.03E-09		
Pm-147	1.5671E-02	1,038.590	2,077.181	0.00E+00	1.63E+01	3.26E+01		
Pu-238	1.4877E-02	1,038.590	2,077.181	0.00E+00	1.55E+01	3.09E+01		
Pu-239	-3.5520E-02	1,038.590	0.000	2.44E+02	2.07E+02	2.44E+02		
Pu-240	2.0690E-02	1,038.590	2,077.181	1.24E+02	1.45E+02	1.67E+02		
Pu-241	-1.4799E+00	1,038.590	0.000	5.56E+03	4.02E+03	5.56E+03		
Pu-242	1.1252E-05	1,038.590	2,077.181	3.30E-02	4.47E-02	5.64E-02		
Ra-226	7.8524E-12	1,038.590	2,077.181	0.00E+00	8.16E-09	1.63E-08		
Ra-228	2.4086E-16	1,038.590	2,077.181	0.00E+00	2.50E-13	5.00E-13		
Ru-106	1.5066E-05	1,038.590	2,077.181	0.00E+00	1.56E-02	3.13E-02		
Se-79	1.0127E-05	1,038.590	2,077.181	0.00E+00	1.05E-02	2.10E-02		
Sn-126	4.3902E-05	1,038.590	2,077.181	0.00E+00	4.56E-02	9.12E-02		
Sr-90	5.0088E-01	1,038.590	2,077.181	0.00E+00	5.20E+02	1.04E+03		
Tc-99	3.9412E-04	1,038.590	2,077.181	0.00E+00	4.09E-01	8.19E-01		
Th-229	2.7219E-12	1,038.590	2,077.181	0.00E+00	2.83E-09	5.65E-09		
Th-230	1.0441E-09	1,038.590	2,077.181	0.00E+00	1.08E-06	2.17E-06		
Th-232	3.1689E-16	1,038.590	2,077.181	0.00E+00	3.29E-13	6.58E-13		
Ti-208	4.6636E-07	1,038.590	2,077.181	0.00E+00	4.84E-04	9.69E-04		
U-232	1.2638E-06	1,038.590	2,077.181	0.00E+00	1.31E-03	2.63E-03		
U-233	5.7451E-10	1,038.590	2,077.181	0.00E+00	5.97E-07	1.19E-06		
U-234	4.3044E-06	1,038.590	2,077.181	0.00E+00	4.47E-03	8.94E-03		
U-235	-7.7765E-09	1,038.590	0.000	5.00E-05	4.19E-05	5.00E-05		
U-236	1.8050E-07	1,038.590	2,077.181	0.00E+00	1.87E-04	3.75E-04		
U-238	-1.7914E-07	1,038.590	0.000	3.64E-03	3.45E-03	3.64E-03		
Y-90	5.0088E-01	1,038.590	2,077.181	0.00E+00	5.20E+02	1.04E+03		
Other Radionuclides					1.47E+03	2.94E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.72E+01	4.43E+01
Total	Total

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:	FAST	FAST	
BOL HM Constituents:	SST (D9)	SST	
BOL Enrichment %:	PuO2-UO2	Pu and U	
		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup taken from SFD and converted to MWd using BOL=15.387kg Bounding burnup assumed to be twice nominal burnup.
	From SFD	Estimated	
Nominal:		1,038.590	
Bounding:		2,077.181	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.44		
Bounding:	0.89		
			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: FFTF-TFA-ACN-1 RODS
 SNF ID #: 865
 Fuel Units & Descr: 16 - ROD
 Heavy Metal Mass: BOL= ; EOL=2.56kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1992
 Estimates as of: 2030
 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: 35 years

Estimated
 Canister usage:
 18"x15"
 1.00

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	6.1822E-12	185.217	370.435	0.00E+00	1.15E-09	2.29E-09	Avg. MeV	
Am-241	1.1066E-01	185.217	370.435	5.29E+00	2.58E+01	4.63E+01	0.0150	1.219E+13
Am-242m	1.9247E-03	185.217	370.435	0.00E+00	3.56E-01	7.13E-01	0.0250	2.411E+12
Am-243	1.0740E-04	185.217	370.435	0.00E+00	1.99E-02	3.98E-02	0.0375	2.799E+12
C-14	2.6042E-05	185.217	370.435	0.00E+00	4.82E-03	9.65E-03	0.0575	2.806E+12
Cl-36	3.4243E-10	185.217	370.435	0.00E+00	6.34E-08	1.27E-07	0.0850	1.341E+12
Cm-243	4.0629E-04	185.217	370.435	0.00E+00	7.53E-02	1.51E-01	0.1250	9.434E+11
Cm-244	1.6024E-03	185.217	370.435	0.00E+00	2.97E-01	5.94E-01	0.2250	1.082E+12
Co-60	3.4283E-03	185.217	370.435	0.00E+00	6.35E-01	1.27E+00	0.3750	4.690E+11
Cs-134	1.5565E-03	185.217	370.435	0.00E+00	2.88E-01	5.77E-01	0.5750	1.900E+13
Cs-135	4.7693E-05	185.217	370.435	0.00E+00	8.83E-03	1.77E-02	0.8500	1.985E+11
Cs-137	1.4007E+00	185.217	370.435	0.00E+00	2.59E+02	5.19E+02	1.2500	2.376E+11
Eu-154	1.6184E-02	185.217	370.435	0.00E+00	3.00E+00	6.00E+00	1.7500	5.376E+09
Eu-155	1.3775E-02	185.217	370.435	0.00E+00	2.55E+00	5.10E+00	2.2500	1.081E+06
Fe-55	3.8035E-04	185.217	370.435	0.00E+00	7.04E-02	1.41E-01	2.7500	6.140E+06
H-3	3.8454E-03	185.217	370.435	0.00E+00	7.12E-01	1.42E+00	3.5000	3.175E+04
I-129	1.2891E-06	185.217	370.435	0.00E+00	2.39E-04	4.78E-04	5.0000	1.102E+04
Kr-85	2.7858E-02	185.217	370.435	0.00E+00	5.16E+00	1.03E+01	7.0000	1.257E+03
Np-237	3.7516E-06	185.217	370.435	0.00E+00	6.95E-04	1.39E-03	11.0000	1.438E+02
Pa-231	1.2488E-11	185.217	370.435	0.00E+00	2.31E-09	4.63E-09		
Pb-210	2.4206E-12	185.217	370.435	0.00E+00	4.48E-10	8.97E-10		
Pm-147	1.5671E-02	185.217	370.435	0.00E+00	2.90E+00	5.81E+00		
Pu-238	1.4877E-02	185.217	370.435	0.00E+00	2.76E+00	5.51E+00		
Pu-239	-3.5520E-02	185.217	0.000	4.34E+01	3.68E+01	4.34E+01		
Pu-240	2.0690E-02	185.217	370.435	2.21E+01	2.59E+01	2.97E+01		
Pu-241	-1.4799E+00	185.217	0.000	9.91E+02	7.17E+02	9.91E+02		
Pu-242	1.1252E-05	185.217	370.435	5.89E-03	7.97E-03	1.01E-02		
Ra-226	7.8524E-12	185.217	370.435	0.00E+00	1.45E-09	2.91E-09		
Ra-228	2.4086E-16	185.217	370.435	0.00E+00	4.46E-14	8.92E-14		
Ru-106	1.5066E-05	185.217	370.435	0.00E+00	2.79E-03	5.58E-03		
Se-79	1.0127E-05	185.217	370.435	0.00E+00	1.88E-03	3.75E-03		
Sn-126	4.3902E-05	185.217	370.435	0.00E+00	8.13E-03	1.63E-02		
Sr-90	5.0088E-01	185.217	370.435	0.00E+00	9.28E+01	1.86E+02		
Tc-99	3.9412E-04	185.217	370.435	0.00E+00	7.30E-02	1.46E-01		
Th-229	2.7219E-12	185.217	370.435	0.00E+00	5.04E-10	1.01E-09		
Th-230	1.0441E-09	185.217	370.435	0.00E+00	1.93E-07	3.87E-07		
Th-232	3.1689E-16	185.217	370.435	0.00E+00	5.87E-14	1.17E-13		
Ti-208	4.6636E-07	185.217	370.435	0.00E+00	8.64E-05	1.73E-04		
U-232	1.2638E-06	185.217	370.435	0.00E+00	2.34E-04	4.68E-04		
U-233	5.7451E-10	185.217	370.435	0.00E+00	1.06E-07	2.13E-07		
U-234	4.3044E-06	185.217	370.435	0.00E+00	7.97E-04	1.59E-03		
U-235	-7.7765E-09	185.217	0.000	8.92E-06	7.48E-06	8.92E-06		
U-236	1.8050E-07	185.217	370.435	0.00E+00	3.34E-05	6.69E-05		
U-238	-1.7914E-07	185.217	0.000	6.49E-04	6.16E-04	6.49E-04		
Y-90	5.0088E-01	185.217	370.435	0.00E+00	9.28E+01	1.86E+02		
Other Radionuclides					2.62E+02	5.25E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.85E+00	7.90E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary		
	From SFD	Used
Reactor Moderator:	FAST	FAST
Fuel Cladding:	SST	SST
BOL HM Constituents:	Pu/U CARB	Pu and U
BOL Enrichment %:		10 to 30

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

Burnup Summary (MWd) ²		
	From SFD	Estimated
Nominal:		185.217
Bounding:		370.435

Nominal burnup taken from SFD and converted to MWd using BOL=2.744kg
 Bounding burnup assumed to be twice nominal burnup.

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.44	
Bounding:	0.89	

Estimated EOL HM/ Given EOL HM: 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: FFTF-TFA-ACO-2, 4 THRU 16
 SNF ID #: 329
 Fuel Units & Descr: 14 - HEX ARRAY 169 ROD
 Heavy Metal Mass: BOL= ; EOL=605.98kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1992
 Estimates as of: 2030
 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: 35 years

Estimated
 Canister usage:
 18"x15"
 2.80

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-12	96,319.972	140,074.700	0.00E+00	5.95E-07	8.66E-07	Avg. MeV	
Am-241	1.1066E-01	96,319.972	140,074.700	1.35E+03	1.20E+04	1.69E+04	0.0150	4.573E+15
Am-242m	1.9247E-03	96,319.972	140,074.700	0.00E+00	1.85E+02	2.70E+02	0.0250	9.110E+14
Am-243	1.0740E-04	96,319.972	140,074.700	0.00E+00	1.03E+01	1.50E+01	0.0375	1.058E+15
C-14	2.6042E-05	96,319.972	140,074.700	0.00E+00	2.51E+00	3.65E+00	0.0575	1.052E+15
Cl-36	3.4243E-10	96,319.972	140,074.700	0.00E+00	3.30E-05	4.80E-05	0.0850	5.070E+14
Cm-243	4.0629E-04	96,319.972	140,074.700	0.00E+00	3.91E+01	5.69E+01	0.1250	3.567E+14
Cm-244	1.6024E-03	96,319.972	140,074.700	0.00E+00	1.54E+02	2.24E+02	0.2250	4.091E+14
Co-60	3.4283E-03	96,319.972	140,074.700	0.00E+00	3.30E+02	4.80E+02	0.3750	1.773E+14
Cs-134	1.5565E-03	96,319.972	140,074.700	0.00E+00	1.50E+02	2.18E+02	0.5750	7.186E+15
Cs-135	4.7693E-05	96,319.972	140,074.700	0.00E+00	4.59E+00	6.68E+00	0.8500	7.506E+13
Cs-137	1.4007E+00	96,319.972	140,074.700	0.00E+00	1.35E+05	1.96E+05	1.2500	8.986E+13
Eu-154	1.6184E-02	96,319.972	140,074.700	0.00E+00	1.56E+03	2.27E+03	1.7500	2.033E+12
Eu-155	1.3775E-02	96,319.972	140,074.700	0.00E+00	1.33E+03	1.93E+03	2.2500	4.060E+08
Fe-55	3.8035E-04	96,319.972	140,074.700	0.00E+00	3.66E+01	5.33E+01	2.7500	2.320E+09
H-3	3.8454E-03	96,319.972	140,074.700	0.00E+00	3.70E+02	5.39E+02	3.5000	1.050E+07
I-129	1.2891E-06	96,319.972	140,074.700	0.00E+00	1.24E-01	1.81E-01	5.0000	3.527E+06
Kr-85	2.7858E-02	96,319.972	140,074.700	0.00E+00	2.68E+03	3.90E+03	7.0000	4.025E+05
Np-237	3.7516E-06	96,319.972	140,074.700	0.00E+00	3.61E-01	5.26E-01	11.0000	4.604E+04
Pa-231	1.2488E-11	96,319.972	140,074.700	0.00E+00	1.20E-06	1.75E-06		
Pb-210	2.4206E-12	96,319.972	140,074.700	0.00E+00	2.33E-07	3.39E-07		
Pm-147	1.5671E-02	96,319.972	140,074.700	0.00E+00	1.51E+03	2.20E+03		
Pu-238	1.4877E-02	96,319.972	140,074.700	0.00E+00	1.43E+03	2.08E+03		
Pu-239	-3.5520E-02	96,319.972	0.000	1.11E+04	7.70E+03	1.11E+04		
Pu-240	2.0690E-02	96,319.972	140,074.700	5.65E+03	7.64E+03	8.55E+03		
Pu-241	-1.4799E+00	96,319.972	0.000	2.54E+05	1.11E+05	2.54E+05		
Pu-242	1.1252E-05	96,319.972	140,074.700	1.51E+00	2.59E+00	3.08E+00		
Ra-226	7.8524E-12	96,319.972	140,074.700	0.00E+00	7.56E-07	1.10E-06		
Ra-228	2.4086E-16	96,319.972	140,074.700	0.00E+00	2.32E-11	3.37E-11		
Ru-106	1.5066E-05	96,319.972	140,074.700	0.00E+00	1.45E+00	2.11E+00		
Se-79	1.0127E-05	96,319.972	140,074.700	0.00E+00	9.75E-01	1.42E+00		
Sn-126	4.3902E-05	96,319.972	140,074.700	0.00E+00	4.23E+00	6.15E+00		
Sr-90	5.0088E-01	96,319.972	140,074.700	0.00E+00	4.82E+04	7.02E+04		
Tc-99	3.9412E-04	96,319.972	140,074.700	0.00E+00	3.80E+01	5.52E+01		
Th-229	2.7219E-12	96,319.972	140,074.700	0.00E+00	2.62E-07	3.81E-07		
Th-230	1.0441E-09	96,319.972	140,074.700	0.00E+00	1.01E-04	1.46E-04		
Th-232	3.1689E-16	96,319.972	140,074.700	0.00E+00	3.05E-11	4.44E-11		
Tl-208	4.6636E-07	96,319.972	140,074.700	0.00E+00	4.49E-02	6.53E-02		
U-232	1.2638E-06	96,319.972	140,074.700	0.00E+00	1.22E-01	1.77E-01		
U-233	5.7451E-10	96,319.972	140,074.700	0.00E+00	5.53E-05	8.05E-05		
U-234	4.3044E-06	96,319.972	140,074.700	0.00E+00	4.15E-01	6.03E-01		
U-235	-7.7765E-09	96,319.972	0.000	2.28E-03	1.53E-03	2.28E-03		
U-236	1.8050E-07	96,319.972	140,074.700	0.00E+00	1.74E-02	2.53E-02		
U-238	-1.7914E-07	96,319.972	0.000	1.66E-01	1.49E-01	1.66E-01		
Y-90	5.0088E-01	96,319.972	140,074.700	0.00E+00	4.82E+04	7.02E+04		
Other Radionuclides					1.36E+05	1.98E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.94E+03	2.71E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Reactor Moderator:	FAST	FAST	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	SST (316)	SST	
BOL HM Constituents:	PuO2-UO2	Pu and U	
BOL Enrichment %:		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Nominal:		96,319.972	Nominal burnup taken from SFD and converted to MWd using BOL=702.481kg Bounding burnup taken from SFD and converted to MWd using BOL=702.481kg
Bounding:		140,074.700	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.90		1.00
Bounding:	1.31		

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: FFTF-TFA-CRBR-3 & CRBR-5
 SNF ID #: 322
 Fuel Units & Descr: 2 - HEX ARRAY 217 ROD
 Heavy Metal Mass: BOL= ; EOL=69.40kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1992
 Estimates as of: 2030
 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: 35 years

Estimated
 Canister usage:
 18"x15"
 0.40

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-12	5,116.338	5,738.646	0.00E+00	3.16E-08	3.55E-08	Avg. MeV	
Am-241	1.1066E-01	5,116.338	5,738.646	1.44E+02	7.10E+02	7.79E+02	0.0150	1.921E+14
Am-242m	1.9247E-03	5,116.338	5,738.646	0.00E+00	9.85E+00	1.10E+01	0.0250	3.740E+13
Am-243	1.0740E-04	5,116.338	5,738.646	0.00E+00	5.49E-01	6.16E-01	0.0375	4.433E+13
C-14	2.6042E-05	5,116.338	5,738.646	0.00E+00	1.33E-01	1.49E-01	0.0575	4.433E+13
Cl-36	3.4243E-10	5,116.338	5,738.646	0.00E+00	1.75E-06	1.97E-06	0.0850	2.077E+13
Cm-243	4.0629E-04	5,116.338	5,738.646	0.00E+00	2.08E+00	2.33E+00	0.1250	1.462E+13
Cm-244	1.6024E-03	5,116.338	5,738.646	0.00E+00	8.20E+00	9.20E+00	0.2250	1.676E+13
Co-60	3.4283E-03	5,116.338	5,738.646	0.00E+00	1.75E+01	1.97E+01	0.3750	7.267E+12
Cs-134	1.5565E-03	5,116.338	5,738.646	0.00E+00	7.96E+00	8.93E+00	0.5750	2.944E+14
Cs-135	4.7693E-05	5,116.338	5,738.646	0.00E+00	2.44E-01	2.74E-01	0.8500	3.075E+12
Cs-137	1.4007E+00	5,116.338	5,738.646	0.00E+00	7.17E+03	8.04E+03	1.2500	3.682E+12
Eu-154	1.6184E-02	5,116.338	5,738.646	0.00E+00	8.28E+01	9.29E+01	1.7500	8.328E+10
Eu-155	1.3775E-02	5,116.338	5,738.646	0.00E+00	7.05E+01	7.91E+01	2.2500	1.703E+07
Fe-55	3.8035E-04	5,116.338	5,738.646	0.00E+00	1.95E+00	2.18E+00	2.7500	9.529E-07
H-3	3.8454E-03	5,116.338	5,738.646	0.00E+00	1.97E+01	2.21E+01	3.5000	6.358E+05
I-129	1.2891E-06	5,116.338	5,738.646	0.00E+00	6.60E-03	7.40E-03	5.0000	2.319E+05
Kr-85	2.7858E-02	5,116.338	5,738.646	0.00E+00	1.43E+02	1.60E+02	7.0000	2.644E+04
Np-237	3.7516E-06	5,116.338	5,738.646	0.00E+00	1.92E-02	2.15E-02	11.0000	3.023E+03
Pa-231	1.2488E-11	5,116.338	5,738.646	0.00E+00	6.39E-08	7.17E-08		
Pb-210	2.4206E-12	5,116.338	5,738.646	0.00E+00	1.24E-08	1.39E-08		
Pm-147	1.5671E-02	5,116.338	5,738.646	0.00E+00	8.02E+01	8.99E+01		
Pu-238	1.4877E-02	5,116.338	5,738.646	0.00E+00	7.61E+01	8.54E+01		
Pu-239	-3.5520E-02	5,116.338	0.000	1.18E+03	9.98E+02	1.18E+03		
Pu-240	2.0690E-02	5,116.338	5,738.646	6.00E+02	7.05E+02	7.18E+02		
Pu-241	-1.4799E+00	5,116.338	0.000	2.69E+04	1.93E+04	2.69E+04		
Pu-242	1.1252E-05	5,116.338	5,738.646	1.60E-01	2.17E-01	2.24E-01		
Ra-226	7.8524E-12	5,116.338	5,738.646	0.00E+00	4.02E-08	4.51E-08		
Ra-228	2.4086E-16	5,116.338	5,738.646	0.00E+00	1.23E-12	1.38E-12		
Ru-106	1.5066E-05	5,116.338	5,738.646	0.00E+00	7.71E-02	8.65E-02		
Se-79	1.0127E-05	5,116.338	5,738.646	0.00E+00	5.18E-02	5.81E-02		
Sn-126	4.3902E-05	5,116.338	5,738.646	0.00E+00	2.25E-01	2.52E-01		
Sr-90	5.0088E-01	5,116.338	5,738.646	0.00E+00	2.56E+03	2.87E+03		
Tc-99	3.9412E-04	5,116.338	5,738.646	0.00E+00	2.02E+00	2.26E+00		
Th-229	2.7219E-12	5,116.338	5,738.646	0.00E+00	1.39E-08	1.56E-08		
Th-230	1.0441E-09	5,116.338	5,738.646	0.00E+00	5.34E-06	5.99E-06		
Th-232	3.1689E-16	5,116.338	5,738.646	0.00E+00	1.62E-12	1.82E-12		
Tl-208	4.6636E-07	5,116.338	5,738.646	0.00E+00	2.39E-03	2.68E-03		
U-232	1.2638E-06	5,116.338	5,738.646	0.00E+00	6.47E-03	7.25E-03		
U-233	5.7451E-10	5,116.338	5,738.646	0.00E+00	2.94E-06	3.30E-06		
U-234	4.3044E-06	5,116.338	5,738.646	0.00E+00	2.20E-02	2.47E-02		
U-235	-7.7765E-09	5,116.338	0.000	2.42E-04	2.02E-04	2.42E-04		
U-236	1.8050E-07	5,116.338	5,738.646	0.00E+00	9.23E-04	1.04E-03		
U-238	-1.7914E-07	5,116.338	0.000	1.76E-02	1.67E-02	1.76E-02		
Y-90	5.0088E-01	5,116.338	5,738.646	0.00E+00	2.56E+03	2.87E+03		
Other Radionuclides					7.25E+03	8.13E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.33E+02	1.48E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Reactor Moderator:	FAST	FAST	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	SST	SST	
BOL HM Constituents:	PuO2-UO2	Pu and U	
BOL Enrichment %:		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Nominal:		5,116.338	Nominal burnup taken from SFD and converted to MWd using BOL=74.528kg Bounding burnup taken from SFD and converted to MWd using BOL=74.528kg
Bounding:		5,738.646	

Checks			
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.45		
Bounding:	0.51		

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: FFTF-TFA-DEA-2
 SNF ID #: 324
 Fuel Units & Desc: 1 - HEX ARRAY 217 ROD
 Heavy Metal Mass: BOL= ; EOL=34.61kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1992
 Estimates as of: 2030
 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: 35 years

Estimated
 Canister usage:
 18"x15"
 0.20

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							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	6.1822E-12	3.461	6.922	0.00E+00	2.14E-11	4.28E-11	0.0150	3.823E+12
Am-241	1.1066E-01	3.461	6.922	6.67E+01	6.71E+01	6.75E+01	0.0250	1.074E+11
Am-242m	1.9247E-03	3.461	6.922	0.00E+00	6.66E-03	1.33E-02	0.0375	5.868E+10
Am-243	1.0740E-04	3.461	6.922	0.00E+00	3.72E-04	7.43E-04	0.0575	9.773E+11
C-14	2.6042E-05	3.461	6.922	0.00E+00	9.01E-05	1.80E-04	0.0850	2.608E+10
Cl-36	3.4243E-10	3.461	6.922	0.00E+00	1.19E-09	2.37E-09	0.1250	2.051E+10
Cm-243	4.0629E-04	3.461	6.922	0.00E+00	1.41E-03	2.81E-03	0.2250	2.059E+10
Cm-244	1.6024E-03	3.461	6.922	0.00E+00	5.55E-03	1.11E-02	0.3750	1.009E+10
Co-60	3.4283E-03	3.461	6.922	0.00E+00	1.19E-02	2.37E-02	0.5750	3.551E+11
Cs-134	1.5565E-03	3.461	6.922	0.00E+00	5.39E-03	1.08E-02	0.8500	3.721E+09
Cs-135	4.7693E-05	3.461	6.922	0.00E+00	1.65E-04	3.30E-04	1.2500	4.442E+09
Cs-137	1.4007E+00	3.461	6.922	0.00E+00	4.85E+00	9.70E+00	1.7500	1.010E+08
Eu-154	1.6184E-02	3.461	6.922	0.00E+00	5.60E-02	1.12E-01	2.2500	3.233E+05
Eu-155	1.3775E-02	3.461	6.922	0.00E+00	4.77E-02	9.54E-02	2.7500	2.896E+05
Fe-55	3.8035E-04	3.461	6.922	0.00E+00	1.32E-03	2.63E-03	3.5000	1.561E+05
H-3	3.8454E-03	3.461	6.922	0.00E+00	1.33E-02	2.66E-02	5.0000	6.622E+04
I-129	1.2891E-06	3.461	6.922	0.00E+00	4.46E-06	8.92E-06	7.0000	7.537E+03
Kr-85	2.7858E-02	3.461	6.922	0.00E+00	9.64E-02	1.93E-01	11.0000	8.615E+02
Np-237	3.7516E-06	3.461	6.922	0.00E+00	1.30E-05	2.60E-05		
Pa-231	1.2488E-11	3.461	6.922	0.00E+00	4.32E-11	8.64E-11		
Pb-210	2.4206E-12	3.461	6.922	0.00E+00	8.38E-12	1.68E-11		
Pm-147	1.5671E-02	3.461	6.922	0.00E+00	5.42E-02	1.08E-01		
Pu-238	1.4877E-02	3.461	6.922	0.00E+00	5.15E-02	1.03E-01		
Pu-239	-3.5520E-02	3.461	0.000	5.48E+02	5.48E+02	5.48E+02		
Pu-240	2.0690E-02	3.461	6.922	2.78E+02	2.78E+02	2.79E+02		
Pu-241	-1.4799E+00	3.461	0.000	1.25E+04	1.25E+04	1.25E+04		
Pu-242	1.1252E-05	3.461	6.922	7.42E-02	7.43E-02	7.43E-02		
Ra-226	7.8524E-12	3.461	6.922	0.00E+00	2.72E-11	5.44E-11		
Ra-228	2.4086E-16	3.461	6.922	0.00E+00	8.34E-16	1.67E-15		
Ru-106	1.5066E-05	3.461	6.922	0.00E+00	5.21E-05	1.04E-04		
Se-79	1.0127E-05	3.461	6.922	0.00E+00	3.51E-05	7.01E-05		
Sn-126	4.3902E-05	3.461	6.922	0.00E+00	1.52E-04	3.04E-04		
Sr-90	5.0088E-01	3.461	6.922	0.00E+00	1.73E+00	3.47E+00		
Tc-99	3.9412E-04	3.461	6.922	0.00E+00	1.36E-03	2.73E-03		
Th-229	2.7219E-12	3.461	6.922	0.00E+00	9.42E-12	1.88E-11		
Th-230	1.0441E-09	3.461	6.922	0.00E+00	3.61E-09	7.23E-09		
Th-232	3.1689E-16	3.461	6.922	0.00E+00	1.10E-15	2.19E-15		
Th-2308	4.6636E-07	3.461	6.922	0.00E+00	1.61E-06	3.23E-06		
U-232	1.2638E-06	3.461	6.922	0.00E+00	4.37E-06	8.75E-06		
U-233	5.7451E-10	3.461	6.922	0.00E+00	1.99E-09	3.98E-09		
U-234	4.3044E-06	3.461	6.922	0.00E+00	1.49E-05	2.98E-05		
U-235	-7.7765E-09	3.461	0.000	1.12E-04	1.12E-04	1.12E-04		
U-236	1.8050E-07	3.461	6.922	0.00E+00	6.25E-07	1.25E-06		
U-238	-1.7914E-07	3.461	0.000	8.19E-03	8.19E-03	8.19E-03		
Y-90	5.0088E-01	3.461	6.922	0.00E+00	1.73E+00	3.47E+00		
Other Radionuclides					4.90E+00	9.81E+00		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.82E+01	2.83E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary		Basis for Parameter Differences:
From SFD	Used	
Reactor Moderator:	FAST	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	SST (316)	
BOL HM Constituents:	PuO2-UO2	
BOL Enrichment %:	10 to 30	

Burnup Summary (MWd) ²		Basis for burnup used in estimate:
From SFD	Estimated	
Nominal:	3.461	Nominal burnup taken from SFD and converted to MWd using BOL=34.610kg Bounding burnup assumed to be twice nominal burnup.
Bounding:	6.922	

Checks		Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	
	0.00	1.00
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: FFTF-TFA-FC-1
 SNF ID #: 325
 Fuel Units & Descr: 1 - HEX ARRAY 91 ROD
 Heavy Metal Mass: BOL= ; EOL=42.58kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1992
 Estimates as of: 2030
 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: 35 years

Estimated
 Canister usage:
 18"x15"
 0.20

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	6.1822E-12	2,694.342	5,388.684	0.00E+00	1.67E-08	3.33E-08		
Am-241	1.1066E-01	2,694.342	5,388.684	8.73E+01	3.85E+02	6.84E+02	0.0150	1.778E+14
Am-242m	1.9247E-03	2,694.342	5,388.684	0.00E+00	5.19E+00	1.04E+01	0.0250	3.508E+13
Am-243	1.0740E-04	2,694.342	5,388.684	0.00E+00	2.89E-01	5.79E-01	0.0375	4.072E+13
C-14	2.6042E-05	2,694.342	5,388.684	0.00E+00	7.02E-02	1.40E-01	0.0575	4.096E+13
Cl-36	3.4243E-10	2,694.342	5,388.684	0.00E+00	9.23E-07	1.85E-06	0.0850	1.950E+13
Cm-243	4.0629E-04	2,694.342	5,388.684	0.00E+00	1.09E+00	2.19E+00	0.1250	1.372E+13
Cm-244	1.6024E-03	2,694.342	5,388.684	0.00E+00	4.32E+00	8.63E+00	0.2250	1.574E+13
Co-60	3.4283E-03	2,694.342	5,388.684	0.00E+00	9.24E+00	1.85E+01	0.3750	6.823E+12
Cs-134	1.5565E-03	2,694.342	5,388.684	0.00E+00	4.19E+00	8.39E+00	0.5750	2.764E+14
Cs-135	4.7693E-05	2,694.342	5,388.684	0.00E+00	1.29E-01	2.57E-01	0.8500	2.888E+12
Cs-137	1.4007E+00	2,694.342	5,388.684	0.00E+00	3.77E+03	7.55E+03	1.2500	3.457E+12
Eu-154	1.6184E-02	2,694.342	5,388.684	0.00E+00	4.36E+01	8.72E+01	1.7500	7.820E+10
Eu-155	1.3775E-02	2,694.342	5,388.684	0.00E+00	3.71E+01	7.42E+01	2.2500	1.578E+07
Fe-55	3.8035E-04	2,694.342	5,388.684	0.00E+00	1.02E+00	2.05E+00	2.7500	8.935E+07
H-3	3.8454E-03	2,694.342	5,388.684	0.00E+00	1.04E+01	2.07E+01	3.5000	4.859E+05
I-129	1.2891E-06	2,694.342	5,388.684	0.00E+00	3.47E-03	6.95E-03	5.0000	1.705E+05
Kr-85	2.7858E-02	2,694.342	5,388.684	0.00E+00	7.51E+01	1.50E+02	7.0000	1.945E+04
Np-237	3.7516E-06	2,694.342	5,388.684	0.00E+00	1.01E-02	2.02E-02	11.0000	2.225E+03
Pa-231	1.2488E-11	2,694.342	5,388.684	0.00E+00	3.36E-08	6.73E-08		
Pb-210	2.4206E-12	2,694.342	5,388.684	0.00E+00	6.52E-09	1.30E-08		
Pm-147	1.5671E-02	2,694.342	5,388.684	0.00E+00	4.22E+01	8.44E+01		
Pu-238	1.4877E-02	2,694.342	5,388.684	0.00E+00	4.01E+01	8.02E+01		
Pu-239	-3.5520E-02	2,694.342	0.000	7.17E+02	6.21E+02	7.17E+02		
Pu-240	2.0690E-02	2,694.342	5,388.684	3.64E+02	4.20E+02	4.76E+02		
Pu-241	-1.4799E+00	2,694.342	0.000	1.64E+04	1.24E+04	1.64E+04		
Pu-242	1.1252E-05	2,694.342	5,388.684	9.71E-02	1.27E-01	1.58E-01		
Ra-226	7.8524E-12	2,694.342	5,388.684	0.00E+00	2.12E-08	4.23E-08		
Ra-228	2.4086E-16	2,694.342	5,388.684	0.00E+00	6.49E-13	1.30E-12		
Ru-106	1.5066E-05	2,694.342	5,388.684	0.00E+00	4.06E-02	8.12E-02		
Se-79	1.0127E-05	2,694.342	5,388.684	0.00E+00	2.73E-02	5.46E-02		
Sn-126	4.3902E-05	2,694.342	5,388.684	0.00E+00	1.18E-01	2.37E-01		
Sr-90	5.0088E-01	2,694.342	5,388.684	0.00E+00	1.35E+03	2.70E+03		
Tc-99	3.9412E-04	2,694.342	5,388.684	0.00E+00	1.06E+00	2.12E+00		
Th-229	2.7219E-12	2,694.342	5,388.684	0.00E+00	7.33E-09	1.47E-08		
Th-230	1.0441E-09	2,694.342	5,388.684	0.00E+00	2.81E-06	5.63E-06		
Th-232	3.1689E-16	2,694.342	5,388.684	0.00E+00	8.54E-13	1.71E-12		
Th-208	4.6636E-07	2,694.342	5,388.684	0.00E+00	1.26E-03	2.51E-03		
U-232	1.2638E-06	2,694.342	5,388.684	0.00E+00	3.41E-03	6.81E-03		
U-233	5.7451E-10	2,694.342	5,388.684	0.00E+00	1.55E-06	3.10E-06		
U-234	4.3044E-06	2,694.342	5,388.684	0.00E+00	1.16E-02	2.32E-02		
U-235	-7.7765E-09	2,694.342	0.000	1.47E-04	1.26E-04	1.47E-04		
U-236	1.8050E-07	2,694.342	5,388.684	0.00E+00	4.86E-04	9.73E-04		
U-238	-1.7914E-07	2,694.342	0.000	1.07E-02	1.02E-02	1.07E-02		
Y-90	5.0088E-01	2,694.342	5,388.684	0.00E+00	1.35E+03	2.70E+03		
Other Radionuclides					3.82E+03	7.64E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.50E+01	1.19E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	FAST	FAST	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	SST (D9)	SST	
BOL HM Constituents:	Pu/U CARB	Pu and U	
BOL Enrichment %:		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		2,694.342	Nominal burnup taken from SFD and converted to MWd using BOL=45.283kg Bounding burnup assumed to be twice nominal burnup.
Bounding:		5,388.684	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.39		1.00
Bounding:	0.78		

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: FFTF-TFA-MFF-1 & 1A (CDE)
 SNF ID #: 330
 Fuel Units & Desc: 2 - HEX ARRAY 169 ROD
 Heavy Metal Mass: BOL = ; EOL=88.11kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1992
 Estimates as of: 2030
 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: 35 years

Estimated
 Canister usage:
 18"x15"
 0.40

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-12	10,382.823	20,765.646	0.00E+00	6.42E-08	1.28E-07	Avg. MeV	
Am-241	1.1066E-01	10,382.823	20,765.646	1.90E+02	1.34E+03	2.49E+03	0.0150	6.774E+14
Am-242m	1.9247E-03	10,382.823	20,765.646	0.00E+00	2.00E+01	4.00E+01	0.0250	1.350E+14
Am-243	1.0740E-04	10,382.823	20,765.646	0.00E+00	1.12E+00	2.23E+00	0.0375	1.569E+14
C-14	2.6042E-05	10,382.823	20,765.646	0.00E+00	2.70E-01	5.41E-01	0.0575	1.558E+14
Cl-36	3.4243E-10	10,382.823	20,765.646	0.00E+00	3.56E-06	7.11E-06	0.0850	7.516E+13
Cm-243	4.0629E-04	10,382.823	20,765.646	0.00E+00	4.22E+00	8.44E+00	0.1250	5.288E+13
Cm-244	1.6024E-03	10,382.823	20,765.646	0.00E+00	1.66E+01	3.33E+01	0.2250	6.065E+13
Co-60	3.4283E-03	10,382.823	20,765.646	0.00E+00	3.56E+01	7.12E+01	0.3750	6.629E+13
Cs-134	1.5565E-03	10,382.823	20,765.646	0.00E+00	1.62E+01	3.23E+01	0.5750	1.065E+15
Cs-135	4.7693E-05	10,382.823	20,765.646	0.00E+00	4.95E-01	9.90E-01	0.8500	1.113E+13
Cs-137	1.4007E+00	10,382.823	20,765.646	0.00E+00	1.45E+04	2.91E+04	1.2500	1.332E+13
Eu-154	1.6184E-02	10,382.823	20,765.646	0.00E+00	1.68E+02	3.36E+02	1.7500	3.014E+11
Eu-155	1.3775E-02	10,382.823	20,765.646	0.00E+00	1.43E+02	2.86E+02	2.2500	6.014E+07
Fe-55	3.8035E-04	10,382.823	20,765.646	0.00E+00	3.95E+00	7.90E+00	2.7500	3.439E+08
H-3	3.8454E-03	10,382.823	20,765.646	0.00E+00	3.99E+01	7.99E+01	3.5000	1.531E+06
I-129	1.2891E-06	10,382.823	20,765.646	0.00E+00	1.34E-02	2.68E-02	5.0000	5.120E+05
Kr-85	2.7858E-02	10,382.823	20,765.646	0.00E+00	2.89E+02	5.78E+02	7.0000	5.845E+04
Np-237	3.7516E-06	10,382.823	20,765.646	0.00E+00	3.90E-02	7.79E-02	11.0000	6.686E+03
Pa-231	1.2488E-11	10,382.823	20,765.646	0.00E+00	1.30E-07	2.59E-07		
Pb-210	2.4206E-12	10,382.823	20,765.646	0.00E+00	2.51E-08	5.03E-08		
Pm-147	1.5671E-02	10,382.823	20,765.646	0.00E+00	1.63E+02	3.25E+02		
Pu-238	1.4877E-02	10,382.823	20,765.646	0.00E+00	1.54E+02	3.09E+02		
Pu-239	-3.520E-02	10,382.823	0.000	1.56E+03	1.19E+03	1.56E+03		
Pu-240	2.0690E-02	10,382.823	20,765.646	7.92E+02	1.01E+03	1.22E+03		
Pu-241	-1.4799E+00	10,382.823	0.000	3.56E+04	2.02E+04	3.56E+04		
Pu-242	1.1252E-05	10,382.823	20,765.646	2.11E-01	3.28E-01	4.45E-01		
Ra-226	7.8524E-12	10,382.823	20,765.646	0.00E+00	8.15E-08	1.63E-07		
Ra-228	2.4086E-16	10,382.823	20,765.646	0.00E+00	2.50E-12	5.00E-12		
Ru-106	1.5066E-05	10,382.823	20,765.646	0.00E+00	1.56E-01	3.13E-01		
Se-79	1.0127E-05	10,382.823	20,765.646	0.00E+00	1.05E-01	2.10E-01		
Sn-126	4.3902E-05	10,382.823	20,765.646	0.00E+00	4.56E-01	9.12E-01		
Sr-90	5.0088E-01	10,382.823	20,765.646	0.00E+00	5.20E+03	1.04E+04		
Tc-99	3.9412E-04	10,382.823	20,765.646	0.00E+00	4.09E+00	8.18E+00		
Th-229	2.7219E-12	10,382.823	20,765.646	0.00E+00	2.83E-08	5.65E-08		
Th-230	1.0441E-09	10,382.823	20,765.646	0.00E+00	1.08E-05	2.17E-05		
Th-232	3.1689E-16	10,382.823	20,765.646	0.00E+00	3.29E-12	6.58E-12		
Tl-208	4.6636E-07	10,382.823	20,765.646	0.00E+00	4.84E-03	9.68E-03		
U-232	1.2638E-06	10,382.823	20,765.646	0.00E+00	1.31E-02	2.62E-02		
U-233	5.7451E-10	10,382.823	20,765.646	0.00E+00	5.97E-06	1.19E-05		
U-234	4.3044E-06	10,382.823	20,765.646	0.00E+00	4.47E-02	8.94E-02		
U-235	-7.7765E-09	10,382.823	0.000	3.20E-04	2.39E-04	3.20E-04		
U-236	1.8050E-07	10,382.823	20,765.646	0.00E+00	1.87E-03	3.75E-03		
U-238	-1.7914E-07	10,382.823	0.000	2.33E-02	2.14E-02	2.33E-02	2.27E+02	3.98E+02
Y-90	5.0088E-01	10,382.823	20,765.646	0.00E+00	5.20E+03	1.04E+04	Total	Total
Other Radionuclides					1.47E+04	2.94E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	FAST	FAST	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	SST (HT9)	SST	
BOL HM Constituents:	PuO ₂ -UO ₂	Pu and U	
BOL Enrichment %:		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		10,382.823	Nominal burnup taken from SFD and converted to MWd using BOL=98.509kg Bounding burnup assumed to be twice nominal burnup.
Bounding:		20,765.646	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.69		
Bounding:	1.38		

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: FFTF-TFA-PO-2.4 & 5
 SNF ID #: 333
 Fuel Units & Descr: 3 - HEX ARRAY 169 ROD
 Heavy Metal Mass: BOL= ; EOL=131.25kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1992
 Estimates as of: 2030
 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: 35 years

Estimated
 Canister usage:
 18"x15"
 0.60

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-12	10,725.307	11,359.598	0.00E+00	6.63E-08	7.02E-08	Avg. MeV	
Am-241	1.1066E-01	10,725.307	11,359.598	2.74E+02	1.46E+03	1.53E+03	0.0150	3.797E+14
Am-242m	1.9247E-03	10,725.307	11,359.598	0.00E+00	2.06E+01	2.19E+01	0.0250	7.403E+13
Am-243	1.0740E-04	10,725.307	11,359.598	0.00E+00	1.15E+00	1.22E+00	0.0375	8.586E+13
C-14	2.6042E-05	10,725.307	11,359.598	0.00E+00	2.79E-01	2.96E-01	0.0575	8.760E+13
Cl-36	3.4243E-10	10,725.307	11,359.598	0.00E+00	3.67E-06	3.89E-06	0.0850	4.112E+13
Cm-243	4.0629E-04	10,725.307	11,359.598	0.00E+00	4.36E+00	4.62E+00	0.1250	2.894E+13
Cm-244	1.6024E-03	10,725.307	11,359.598	0.00E+00	1.72E+01	1.82E+01	0.2250	3.318E+13
Co-60	3.4283E-03	10,725.307	11,359.598	0.00E+00	3.68E+01	3.89E+01	0.3750	1.438E+13
Cs-134	1.5565E-03	10,725.307	11,359.598	0.00E+00	1.67E+01	1.77E+01	0.5750	5.827E+14
Cs-135	4.7693E-05	10,725.307	11,359.598	0.00E+00	5.12E-01	5.42E-01	0.8500	6.088E+12
Cs-137	1.4007E+00	10,725.307	11,359.598	0.00E+00	1.50E+04	1.59E+04	1.2500	7.288E+12
Eu-154	1.6184E-02	10,725.307	11,359.598	0.00E+00	1.74E+02	1.84E+02	1.7500	1.649E+11
Eu-155	1.3775E-02	10,725.307	11,359.598	0.00E+00	1.48E+02	1.56E+02	2.2500	3.367E+07
Fe-55	3.8035E-04	10,725.307	11,359.598	0.00E+00	4.08E+00	4.32E+00	2.7500	1.886E+08
H-3	3.8454E-03	10,725.307	11,359.598	0.00E+00	4.12E+01	4.37E+01	3.5000	1.234E+06
I-129	1.2891E-06	10,725.307	11,359.598	0.00E+00	1.38E-02	1.46E-02	5.0000	4.484E+05
Kr-85	2.7858E-02	10,725.307	11,359.598	0.00E+00	2.99E+02	3.16E+02	7.0000	5.113E+04
Np-237	3.7516E-06	10,725.307	11,359.598	0.00E+00	4.02E-02	4.26E-02	11.0000	5.847E+03
Pa-231	1.2488E-11	10,725.307	11,359.598	0.00E+00	1.34E-07	1.42E-07		
Pb-210	2.4206E-12	10,725.307	11,359.598	0.00E+00	2.60E-08	2.75E-08		
Pm-147	1.5671E-02	10,725.307	11,359.598	0.00E+00	1.68E+02	1.78E+02		
Pu-238	1.4877E-02	10,725.307	11,359.598	0.00E+00	1.60E+02	1.69E+02		
Pu-239	-3.5520E-02	10,725.307	0.000	2.25E+03	1.87E+03	2.25E+03		
Pu-240	2.0690E-02	10,725.307	11,359.598	1.14E+03	1.36E+03	1.38E+03		
Pu-241	-1.4799E+00	10,725.307	0.000	5.13E+04	3.54E+04	5.13E+04		
Pu-242	1.1252E-05	10,725.307	11,359.598	3.05E-01	4.25E-01	4.32E-01		
Ra-226	7.8524E-12	10,725.307	11,359.598	0.00E+00	8.42E-08	8.92E-08		
Ra-228	2.4086E-16	10,725.307	11,359.598	0.00E+00	2.58E-12	2.74E-12		
Ru-106	1.5066E-05	10,725.307	11,359.598	0.00E+00	1.62E-01	1.71E-01		
Se-79	1.0127E-05	10,725.307	11,359.598	0.00E+00	1.09E-01	1.15E-01		
Sn-126	4.3902E-05	10,725.307	11,359.598	0.00E+00	4.71E-01	4.99E-01		
Sr-90	5.0088E-01	10,725.307	11,359.598	0.00E+00	5.37E+03	5.69E+03		
Tc-99	3.9412E-04	10,725.307	11,359.598	0.00E+00	4.23E+00	4.48E+00		
Th-229	2.7219E-12	10,725.307	11,359.598	0.00E+00	2.92E-08	3.09E-08		
Th-230	1.0441E-09	10,725.307	11,359.598	0.00E+00	1.12E-05	1.19E-05		
Th-232	3.1689E-16	10,725.307	11,359.598	0.00E+00	3.40E-12	3.60E-12		
Ti-208	4.6636E-07	10,725.307	11,359.598	0.00E+00	5.00E-03	5.30E-03		
U-232	1.2638E-06	10,725.307	11,359.598	0.00E+00	1.36E-02	1.44E-02		
U-233	5.7451E-10	10,725.307	11,359.598	0.00E+00	6.16E-06	6.53E-06		
U-234	4.3044E-06	10,725.307	11,359.598	0.00E+00	4.62E-02	4.89E-02		
U-235	-7.7765E-09	10,725.307	0.000	4.61E-04	3.78E-04	4.61E-04		
U-236	1.8050E-07	10,725.307	11,359.598	0.00E+00	1.94E-03	2.05E-03		
U-238	-1.7914E-07	10,725.307	0.000	3.36E-02	3.17E-02	3.36E-02		
Y-90	5.0088E-01	10,725.307	11,359.598	0.00E+00	5.37E+03	5.69E+03		
Other Radionuclides					1.52E+04	1.61E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.67E+02	2.89E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	FAST	FAST	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Fuel Cladding:	SST (D9)	SST	
BOL HM Constituents:	PuO2-UO2	Pu and U	
BOL Enrichment %:		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		10,725.307	Nominal burnup taken from SFD and converted to MWd using BOL=141.995kg Bounding burnup taken from SFD and converted to MWd using BOL=141.995kg
Bounding:		11,359.598	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.50		
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).