

INFORMATION ONLY

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Volume III

Source Term Estimates for DOE Spent Nuclear Fuels



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U.S. Department of Energy
Assistant Secretary for Environmental Management
Office of Nuclear Material and Spent Fuel

This document was developed and is controlled in accordance with NSNFP procedures. It has been reviewed and determined adequate for Beyond Category 2 consequence, TSPA, shielding, and decay heat analysis. For other uses, the information must be evaluated for adequacy if relied on to support design or decisions important to safety or waste isolation.

Appendix D
Source Term Estimates for the Year 2030

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name AMERICIUM TARGETS
 SNF ID # 776
 Fuel Units & Descr 12 - SCRAP
 Heavy Metal Mass BOL=0.078kg EOL=0.074kg
 ROD Storage Site HANFORD

¹Fuel decay start date: 1970
 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
 3 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	9.4369E-12	3.59	7.19	0.00E+00	3.39E-11	6.78E-11	Avg MeV	
Am-241	1.1078E-01	3.59	7.19	1.50E-01	5.48E-01	9.47E-01	0.0150	2.441E+11
Am-242m	1.7940E-03	3.59	7.19	0.00E+00	6.45E-03	1.29E-02	0.0250	3.065E+10
Am-243	1.0724E-04	3.59	7.19	9.57E+00	9.57E+00	9.57E+00	0.0375	5.783E+10
C-14	2.5942E-05	3.59	7.19	0.00E+00	9.32E-05	1.86E-04	0.0575	4.042E+10
Cl-36	3.4243E-10	3.59	7.19	0.00E+00	1.23E-09	2.46E-09	0.0850	2.228E+11
Cm-243	2.8217E-04	3.59	7.19	0.00E+00	1.01E-03	2.03E-03	0.1250	1.312E+10
Cm-244	7.7027E-04	3.59	7.19	0.00E+00	2.77E-03	5.54E-03	0.2250	1.359E+10
Co-60	1.3011E-04	3.59	7.19	0.00E+00	4.68E-04	9.35E-04	0.3750	5.783E+09
Cs-134	1.2951E-07	3.59	7.19	0.00E+00	4.65E-07	9.31E-07	0.5750	2.449E+11
Cs-135	4.7693E-05	3.59	7.19	0.00E+00	1.71E-04	3.43E-04	0.8500	1.280E+09
Cs-137	9.3351E-01	3.59	7.19	0.00E+00	3.35E+00	6.71E+00	1.2500	7.576E+08
Eu-154	2.6341E-03	3.59	7.19	0.00E+00	9.47E-03	1.89E-02	1.7500	3.488E+07
Eu-155	4.0968E-04	3.59	7.19	0.00E+00	1.47E-03	2.94E-03	2.2500	4.208E+03
Fe-55	2.5543E-07	3.59	7.19	0.00E+00	9.18E-07	1.84E-06	2.7500	1.026E+05
H-3	1.2053E-03	3.59	7.19	0.00E+00	4.33E-03	8.66E-03	3.5000	6.082E+02
I-129	1.2891E-06	3.59	7.19	0.00E+00	4.63E-06	9.26E-06	5.0000	2.503E+02
Kr-85	7.0043E-03	3.59	7.19	0.00E+00	2.52E-02	5.03E-02	7.0000	2.760E+01
Np-237	4.3622E-06	3.59	7.19	0.00E+00	1.57E-05	3.13E-05	11.0000	3.093E+00
Pa-231	1.6733E-11	3.59	7.19	0.00E+00	6.01E-11	1.20E-10		
Pb-210	6.0684E-12	3.59	7.19	0.00E+00	2.18E-11	4.36E-11		
Pm-147	1.1315E-05	3.59	7.19	0.00E+00	4.07E-05	8.13E-05		
Pu-238	6.1482E-03	3.59	7.19	0.00E+00	2.21E-02	4.42E-02		
Pu-239	-3.5520E-02	3.59	0.00	1.23E+00	1.11E+00	1.23E+00		
Pu-240	2.0590E-02	3.59	7.19	6.27E-01	7.01E-01	7.75E-01		
Pu-241	-2.0307E+00	3.59	0.00	2.82E+01	2.09E+01	2.82E+01		
Pu-242	1.1252E-05	3.59	7.19	1.67E-04	2.08E-04	2.48E-04		
Ra-226	1.6601E-11	3.59	7.19	0.00E+00	5.97E-11	1.19E-10		
Ra-228	3.7077E-16	3.59	7.19	0.00E+00	1.33E-15	2.66E-15		
Ru-106	3.3126E-14	3.59	7.19	0.00E+00	1.19E-13	2.38E-13		
Se-79	1.0117E-05	3.59	7.19	0.00E+00	3.64E-05	7.27E-05		
Sn-126	4.3902E-05	3.59	7.19	0.00E+00	1.58E-04	3.16E-04		
Sr-90	3.2926E-01	3.59	7.19	0.00E+00	1.18E+00	2.37E+00		
Tc-99	3.9412E-04	3.59	7.19	0.00E+00	1.42E-03	2.83E-03		
Th-229	3.6957E-12	3.59	7.19	0.00E+00	1.33E-11	2.66E-11		
Th-230	1.6942E-09	3.59	7.19	0.00E+00	6.09E-09	1.22E-08		
Th-232	4.6236E-16	3.59	7.19	0.00E+00	1.66E-15	3.32E-15		
Ti-208	4.0390E-07	3.59	7.19	0.00E+00	1.45E-06	2.90E-06		
U-232	1.0941E-06	3.59	7.19	0.00E+00	3.93E-06	7.86E-06		
U-233	8.1218E-10	3.59	7.19	0.00E+00	2.92E-09	5.84E-09		
U-234	5.3101E-06	3.59	7.19	0.00E+00	1.91E-05	3.82E-05		
U-235	-6.7647E-09	3.59	0.00	2.53E-07	2.29E-07	2.53E-07		
U-236	2.1272E-07	3.59	7.19	0.00E+00	7.64E-07	1.53E-06		
U-238	-1.7914E-07	3.59	0.00	1.85E-05	1.78E-05	1.85E-05		
Y-90	3.2926E-01	3.59	7.19	0.00E+00	1.18E+00	2.37E+00		
Other Radionuclides					3.46E+00	6.91E+00		

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) and cladding (SST is conservative)
Fuel Cladding	ALUM	SST	
BOL HM Constituents	Pu and U	Pu and U	
BOL Enrichment %:		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		3.59	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding		7.19	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.30		1.00
Bounding	0.61		

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: CALVERT CLIFFS 1
 SNF ID #: 307
 Fuel Units & Descr: 2 - 14 X 14 ROD ARRAY
 Heavy Metal Mass BOL=772kg, EOL=675 9kg
 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	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	91,386 55	182,773 11	0 00E+00	9.81E-05	1 96E-04		
Am-241	1 4751E-01	91,386 55	182,773 11	0 00E+00	1.35E+04	2 70E+04	0 0150	6 955E+15
Am-242m	2 6809E-04	91,386 55	182,773 11	0 00E+00	2 45E+01	4 90E+01	0 0250	1.394E+15
Am-243	6 2484E-04	91,386 55	182,773 11	0 00E+00	5 71E+01	1 14E+02	0 0375	1 313E+15
C-14	4 7820E-05	91,386 55	182,773 11	0 00E+00	4 37E+00	8 74E+00	0.00575	1 643E+15
Cl-36	8 0297E-07	91,386 55	182,773 11	0 00E+00	7.34E-02	1 47E-01	0.0850	7 679E+14
Cm-243	1 7426E-04	91,386 55	182,773 11	0 00E+00	1.59E+01	3 18E+01	0 1250	5 109E+14
Cm-244	2 7616E-02	91,386 55	182,773 11	0 00E+00	2.52E+03	5 05E+03	0.2250	6 556E+14
Co-60	3 5610E-04	91,386 55	182,773 11	0 00E+00	3.25E+01	6 51E+01	0.3750	2 831E+14
Cs-134	2 6260E-07	91,386 55	182,773 11	0 00E+00	2 40E-02	4 80E-02	0 5750	6 667E+15
Cs-135	1 4433E-05	91,386 55	182,773 11	0 00E+00	1.32E+00	2 64E+00	0 8500	6 510E+15
Cs-137	9 8870E-01	91,386 55	182,773 11	0 00E+00	9 04E+04	1 81E+05	1.2500	4 143E+13
Eu-154	6 0320E-03	91,386 55	182,773 11	0 00E+00	5.51E+02	1 10E+03	1 7500	1 821E+12
Eu-155	2 1770E-04	91,386 55	182,773 11	0 00E+00	1.99E+01	3 98E+01	2.2500	2 993E+08
Fe-55	7 9296E-07	91,386 55	182,773 11	0 00E+00	7.25E-02	1.45E-01	2 7500	1 055E+09
H-3	8 9486E-03	91,386 55	182,773 11	0 00E+00	8 18E+02	1 64E+03	3 5000	7 527E+07
I-129	9 8288E-07	91,386 55	182,773 11	0 00E+00	8 98E-02	1.80E-01	5 0000	3 217E+07
Kr-85	1 0707E-02	91,386 55	182,773 11	0 00E+00	9 79E+02	1.96E+03	7 0000	3 706E+06
Np-237	1 1927E-05	91,386 55	182,773 11	0 00E+00	1 09E+00	2.18E+00	11 0000	4 255E+05
Pa-231	1 4703E-09	91,386 55	182,773 11	0 00E+00	1 34E-04	2 69E-04		
Pb-210	1 6828E-10	91,386 55	182,773 11	0 00E+00	1 54E-05	3 08E-05		
Pm-147	6 9606E-06	91,386 55	182,773 11	0 00E+00	6 36E-01	1.27E+00		
Pu-238	6 6263E-02	91,386 55	182,773 11	0 00E+00	6 06E+03	1.21E+04		
Pu-239	1 1618E-02	91,386 55	182,773 11	0 00E+00	1 06E+03	2.12E+03		
Pu-240	1 5142E-02	91,386 55	182,773 11	0 00E+00	1 38E+03	2 77E+03		
Pu-241	4 3766E-01	91,386 55	182,773 11	0 00E+00	4 00E+04	8 00E+04		
Pu-242	6 4260E-05	91,386 55	182,773 11	0 00E+00	5 87E+00	1 17E+01		
Ra-226	3 8501E-10	91,386 55	182,773 11	0 00E+00	3 52E-05	7 04E-05		
Ra-228	5 2955E-12	91,386 55	182,773 11	0 00E+00	4 84E-07	9 68E-07		
Ru-106	2 0413E-14	91,386 55	182,773 11	0 00E+00	1 87E-09	3 73E-09		
Se-79	1 2376E-05	91,386 55	182,773 11	0 00E+00	1 13E+00	2 26E+00		
Sn-126	2 5210E-05	91,386 55	182,773 11	0 00E+00	2 30E+00	4 61E+00		
Sr-90	6 4163E-01	91,386 55	182,773 11	0 00E+00	5 86E+04	1 17E+05		
Tc-99	3 9357E-04	91,386 55	182,773 11	0 00E+00	3 60E+01	7 19E+01		
Th-229	1 5644E-10	91,386 55	182,773 11	0 00E+00	1 43E-05	2 86E-05		
Th-230	2 7972E-08	91,386 55	182,773 11	0 00E+00	2 56E-03	5 11E-03		
Th-232	5 3036E-12	91,386 55	182,773 11	0 00E+00	4 85E-07	9 69E-07		
Ti-208	1 5136E-07	91,386 55	182,773 11	0 00E+00	1 38E-02	2 77E-02		
U-232	4.1005E-07	91,386 55	182,773 11	0 00E+00	3 75E-02	7 49E-02		
U-233	2.5856E-08	91,386 55	182,773 11	0 00E+00	2 36E-03	4 73E-03		
U-234	5.2665E-05	91,386 55	182,773 11	0 00E+00	4 81E+00	9 63E+00		
U-235	-1 4487E-06	91,386 55	0 00	5 00E-02	0 00E+00	5.00E-02		
U-236	7 5888E-06	91,386 55	182,773 11	0 00E+00	6.94E-01	1 39E+00		
U-238	-2 6129E-07	91,386 55	0 00	2.52E-01	2.28E-01	2.52E-01		
Y-90	6 4180E-01	91,386 55	182,773 11	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	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	3	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	32,848 60	91,386 55	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup.
Bounding	33 041 60	182,773 11	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	3.38	2.78	1 06
Bounding	6.76	5.53	

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 COOPER NUCLEAR
 SNF ID # 308
 Fuel Units & Descr. 2 - 7 X 7 ROD ARRAY
 Heavy Metal Mass BOL=370kg EOL=368 2kg
 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	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	10,273 05	10,378 50	0 00E+00	9 02E-06	9 11E-06	Avg MeV	
Am-241	1 4352E-01	10,273 05	10,378 50	0 00E+00	1 47E+03	1 49E+03	0 0150	5.584E+14
Am-242m	2 8698E-04	10,273 05	10,378 50	0 00E+00	2 95E+00	2 98E+00	0 0250	1 126E+14
Am-243	6.2565E-04	10,273 05	10,378 50	0 00E+00	6 43E+00	6 49E+00	0 0375	1.074E+14
C-14	4.7901E-05	10,273 05	10,378 50	0 00E+00	4 92E-01	4 97E-01	0 0575	1.241E+14
Cl-36	8 0297E-07	10,273 05	10,378 50	0 00E+00	8.25E-03	8 33E-03	0 0850	6.248E+13
Cm-243	2.5081E-04	10,273 05	10,378 50	0 00E+00	2 58E+00	2 60E+00	0 1250	4.336E+13
Cm-244	4 9015E-02	10,273 05	10,378 50	0 00E+00	5 04E+02	5 09E+02	0.2250	5.358E+13
Co-60	2.5581E-03	10,273 05	10,378 50	0 00E+00	2 63E+01	2 65E+01	0.3750	2.304E+13
Cs-134	4 0536E-05	10,273 05	10,378 50	0 00E+00	4.16E-01	4.21E-01	0.5750	5.359E+14
Cs-135	1.4433E-05	10,273 05	10,378 50	0 00E+00	1.48E-01	1.50E-01	0.8500	7.413E+12
Cs-137	1.3979E+00	10,273 05	10,378 50	0 00E+00	1 44E+04	1 45E+04	1.2500	7.282E+12
Eu-154	2 0203E-02	10,273 05	10,378 50	0 00E+00	2 08E+02	2 10E+02	1 7500	2 181E+11
Eu-155	1.7684E-03	10,273 05	10,378 50	0 00E+00	1 82E+01	1.84E+01	2.2500	3.511E+07
Fe-55	4.3136E-05	10,273 05	10,378 50	0 00E+00	4 43E-01	4 48E-01	2.7500	7 194E+07
H-3	2.0769E-02	10,273 05	10,378 50	0 00E+00	2 13E+02	2 16E+02	3.5000	7.408E+06
I-129	9 8288E-07	10,273 05	10,378 50	0 00E+00	1.01E-02	1 02E-02	5 0000	3 167E+06
Kr-85	2.8214E-02	10,273 05	10,378 50	0 00E+00	2 90E+02	2.93E+02	7.0000	3 651E+05
Np-237	1.1218E-05	10,273 05	10,378 50	0 00E+00	1.15E-01	1 16E-01	11.0000	4 193E+04
Pa-231	1.3036E-09	10,273 05	10,378 50	0 00E+00	1.34E-05	1.35E-05		
Pb-210	8.5078E-11	10,273 05	10,378 50	0 00E+00	8 74E-07	8 83E-07		
Pm-147	3.6531E-04	10,273 05	10,378 50	0 00E+00	3 75E+00	3 79E+00		
Pu-238	7.4564E-02	10,273 05	10,378 50	0 00E+00	7 66E+02	7.74E+02		
Pu-239	1 1623E-02	10,273 05	10,378 50	0 00E+00	1.19E+02	1.21E+02		
Pu-240	1.5132E-02	10,273 05	10,378 50	0 00E+00	1.55E+02	1.57E+02		
Pu-241	9 0036E-01	10,273 05	10,378 50	0 00E+00	9.25E+03	9.34E+03		
Pu-242	6 4260E-05	10,273 05	10,378 50	0 00E+00	6 60E-01	6 67E-01		
Ra-226	2.2804E-10	10,273 05	10,378 50	0 00E+00	2.34E-06	2 37E-06		
Ra-228	5.2713E-12	10,273 05	10,378 50	0 00E+00	5 42E-08	5 47E-08		
Ru-106	6 1160E-10	10,273 05	10,378 50	0 00E+00	6.28E-06	6 35E-06		
Se-79	1.2377E-05	10,273 05	10,378 50	0 00E+00	1.27E-01	1 28E-01		
Sn-126	2 5210E-05	10,273 05	10,378 50	0 00E+00	2.59E-01	2 62E-01		
Sr-90	9 1667E-01	10,273 05	10,378 50	0 00E+00	9 42E+03	9 51E+03		
Tc-99	3 9357E-04	10 273 05	10 378 50	0 00E+00	4 04E+00	4 08E+00		
Th-229	1.2057E-10	10,273 05	10,378 50	0 00E+00	1.24E-06	1 25E-06		
Th-230	2.1043E-08	10,273 05	10,378 50	0 00E+00	2 16E-04	2 18E-04		
Th-232	5.2972E-12	10,273 05	10,378 50	0 00E+00	5 44E-08	5 50E-08		
Tl-208	1.7474E-07	10,273 05	10,378 50	0 00E+00	1.80E-03	1 81E-03		
U-232	4.7368E-07	10,273 05	10,378 50	0 00E+00	4 87E-03	4 92E-03		
U-233	2.5097E-08	10,273 05	10,378 50	0 00E+00	2 58E-04	2 60E-04		
U-234	5 0000E-05	10,273 05	10,378 50	0 00E+00	5 14E-01	5 19E-01		
U-235	-1 4489E-06	10,273 05	0 00	1.28E-02	0 00E+00	1 28E-02		
U-236	7.5824E-06	10,273 05	10,378 50	0 00E+00	7.79E-02	7 87E-02		
U-238	-2 6129E-07	10,273 05	0 00	1.22E-01	1.20E-01	1 22E-01		
Y-90	9.1699E-01	10,273 05	10,378.50	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	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	16	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	10,273 05	1,711 71	
Bounding	10 378 50	3 423 43	

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: FFTF-DFA/TDFA
 SNF ID #: 71
 Fuel Units & Descr: 261 - HEX ARRAY 217 ROD
 Heavy Metal Mass: BOL=9083.087kg, EOL=8443.742kg
 ROD Storage Site: HANFORD

Fuel decay start date: 1992
 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"x15"
 52.20

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	638,157.18	1,276,314.37	0.00E+00	3.95E-06	7.89E-06	Avg MeV	
Am-241	1.1066E-01	638,157.18	1,276,314.37	1.75E+04	8.81E+04	1.59E+05	0.0150	4.195E+16
Am-242m	1.9247E-03	638,157.18	1,276,314.37	0.00E+00	1.23E+03	2.46E+03	0.0250	8.305E+15
Am-243	1.0740E-04	638,157.18	1,276,314.37	0.00E+00	6.85E+01	1.37E+02	0.0375	9.644E+15
C-14	2.6042E-05	638,157.18	1,276,314.37	0.00E+00	1.66E+01	3.32E+01	0.0575	9.658E+15
Cl-36	3.4243E-10	638,157.18	1,276,314.37	0.00E+00	2.19E-04	4.37E-04	0.0850	4.619E+15
Cm-243	4.0629E-04	638,157.18	1,276,314.37	0.00E+00	2.59E+02	5.19E+02	0.1250	3.251E+15
Cm-244	1.6024E-03	638,157.18	1,276,314.37	0.00E+00	1.02E+03	2.05E+03	0.2250	3.728E+15
Co-60	3.4275E-03	638,157.18	1,276,314.37	0.00E+00	2.19E+03	4.37E+03	0.3750	1.616E+15
Cs-134	1.5566E-03	638,157.18	1,276,314.37	0.00E+00	9.93E+02	1.99E+03	0.5750	6.547E+16
Cs-135	4.7693E-05	638,157.18	1,276,314.37	0.00E+00	3.04E+01	6.09E+01	0.8500	6.840E+14
Cs-137	1.4007E+00	638,157.18	1,276,314.37	0.00E+00	8.94E+05	1.79E+06	1.2500	8.187E+14
Eu-154	1.6184E-02	638,157.18	1,276,314.37	0.00E+00	1.03E+04	2.07E+04	1.7500	1.852E+13
Eu-155	1.3774E-02	638,157.18	1,276,314.37	0.00E+00	8.79E+03	1.76E+04	2.2500	3.722E+09
Fe-55	3.8028E-04	638,157.18	1,276,314.37	0.00E+00	2.43E+02	4.85E+02	2.7500	2.116E+10
H-3	3.8454E-03	638,157.18	1,276,314.37	0.00E+00	2.45E+03	4.91E+03	3.5000	1.077E+08
I-129	1.2891E-06	638,157.18	1,276,314.37	0.00E+00	8.23E-01	1.65E+00	5.0000	3.726E+07
Kr-85	2.7848E-02	638,157.18	1,276,314.37	0.00E+00	1.78E+04	3.55E+04	7.0000	4.251E+06
Np-237	3.7516E-06	638,157.18	1,276,314.37	0.00E+00	2.39E+00	4.79E+00	11.0000	4.862E+05
Pa-231	1.2488E-11	638,157.18	1,276,314.37	0.00E+00	7.97E-06	1.59E-05		
Pb-210	2.4206E-12	638,157.18	1,276,314.37	0.00E+00	1.54E-06	3.09E-06		
Pm-147	1.5671E-02	638,157.18	1,276,314.37	0.00E+00	1.00E+04	2.00E+04		
Pu-238	1.4877E-02	638,157.18	1,276,314.37	0.00E+00	9.49E+03	1.90E+04		
Pu-239	-3.5520E-02	638,157.18	0.00	1.44E+05	1.21E+05	1.44E+05		
Pu-240	2.0690E-02	638,157.18	1,276,314.37	7.31E+04	8.63E+04	9.95E+04		
Pu-241	-1.4799E+00	638,157.18	0.00	3.28E+06	2.34E+06	3.28E+06		
Pu-242	1.1252E-05	638,157.18	1,276,314.37	1.95E+01	2.67E+01	3.38E+01		
Ra-226	7.8524E-12	638,157.18	1,276,314.37	0.00E+00	5.01E-06	1.00E-05		
Ra-228	2.4086E-16	638,157.18	1,276,314.37	0.00E+00	1.54E-10	3.07E-10		
Ru-106	1.5066E-05	638,157.18	1,276,314.37	0.00E+00	9.61E+00	1.92E+01		
Se-79	1.0127E-05	638,157.18	1,276,314.37	0.00E+00	6.46E+00	1.29E+01		
Sn-126	4.3902E-05	638,157.18	1,276,314.37	0.00E+00	2.80E+01	5.60E+01		
Sr-90	5.0088E-01	638,157.18	1,276,314.37	0.00E+00	3.20E+05	6.39E+05		
Tc-99	3.9412E-04	638,157.18	1,276,314.37	0.00E+00	2.52E+02	5.03E+02		
Th-229	2.7219E-12	638,157.18	1,276,314.37	0.00E+00	1.74E-06	3.47E-06		
Th-230	1.0441E-09	638,157.18	1,276,314.37	0.00E+00	6.66E-04	1.33E-03		
Th-232	3.1689E-16	638,157.18	1,276,314.37	0.00E+00	2.02E-10	4.04E-10		
Tl-208	4.6636E-07	638,157.18	1,276,314.37	0.00E+00	2.98E-01	5.95E-01		
U-232	1.2638E-06	638,157.18	1,276,314.37	0.00E+00	8.06E-01	1.61E+00		
U-233	5.7451E-10	638,157.18	1,276,314.37	0.00E+00	3.67E-04	7.33E-04		
U-234	4.3044E-06	638,157.18	1,276,314.37	0.00E+00	2.75E+00	5.49E+00		
U-235	-7.7765E-09	638,157.18	0.00	2.95E-02	2.46E-02	2.95E-02		
U-236	1.8050E-07	638,157.18	1,276,314.37	0.00E+00	1.15E-01	2.30E-01		
U-238	-1.7914E-07	638,157.18	0.00	2.15E+00	2.03E+00	2.15E+00		
Y-90	5.0088E-01	638,157.18	1,276,314.37	0.00E+00	3.20E+05	6.39E+05		
Other Radionuclides					9.04E+05	1.81E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.64E+04	2.69E+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.
	From SFD	Used	
Reactor Moderator	FAST	FAST	
Fuel Cladding	SST	SST	
BOL HM Constituents	Pu and U	Pu and U	
BOL Enrichment %	0.71	10 to 30	

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	635.816.10	638.157.18	
Bounding	1,362.463.07	1,276.314.37	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.46	1.00	1.00
Bounding	0.92	0.94	

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: FFTF-TFA PINS
 SNF ID #: 320
 Fuel Units & Descr: 1645 - ROD
 Heavy Metal Mass: BOL = , EOL=389 701kg
 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 _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	6 1822E-12	27,338.13	60,603.11	0 00E+00	1 69E-07	3 75E-07	Avg MeV	
Am-241	1 1066E-01	27,338.13	60,603.11	8 04E+02	3 83E+03	7 51E+03	0 0150	1 990E+15
Am-242m	1 9247E-03	27,338.13	60,603.11	0 00E+00	5 26E+01	1 17E+02	0 0250	3 943E+14
Am-243	1 0740E-04	27,338.13	60,603.11	0 00E+00	2 94E+00	6 51E+00	0 0375	4 579E+14
C-14	2 6042E-05	27,338.13	60,603.11	0 00E+00	7 12E-01	1 58E+00	0 0575	4 582E+14
Cl-36	3 4243E-10	27,338.13	60,603.11	0 00E+00	9 36E-06	2 08E-05	0 0850	2 193E+14
Cm-243	4 0629E-04	27,338.13	60,603.11	0 00E+00	1 11E+01	2 46E+01	0 1250	1 543E+14
Cm-244	1 6024E-03	27,338.13	60,603.11	0 00E+00	4 38E+01	9 71E+01	0 2250	1 770E+14
Co-60	3 4275E-03	27,338.13	60,603.11	0 00E+00	9 37E+01	2 08E+02	0 3750	7 673E+13
Cs-134	1 5566E-03	27,338.13	60,603.11	0 00E+00	4 26E+01	9 43E+01	0 5750	3 109E+15
Cs-135	4 7693E-05	27,338.13	60,603.11	0 00E+00	1 30E+00	2 89E+00	0 8500	3 248E+13
Cs-137	1 4007E+00	27,338.13	60,603.11	0 00E+00	3 83E+04	8 49E+04	1 2500	3 887E+13
Eu-154	1 6184E-02	27,338.13	60,603.11	0 00E+00	4 42E+02	9 81E+02	1 7500	8 794E+11
Eu-155	1 3774E-02	27,338.13	60,603.11	0 00E+00	3 77E+02	8 35E+02	2 2500	1 766E+08
Fe-55	3 8028E-04	27,338.13	60,603.11	0 00E+00	1 04E+01	2 30E+01	2 7500	1 005E+09
H-3	3 8454E-03	27,338.13	60,603.11	0 00E+00	1 05E+02	2 33E+02	3 5000	5 050E+06
I-129	1 2891E-06	27,338.13	60,603.11	0 00E+00	3 52E-02	7 81E-02	5 0000	1 742E+06
Kr-85	2 7848E-02	27,338.13	60,603.11	0 00E+00	7 61E+02	1 69E+03	7 0000	1 988E+05
Np-237	3 7516E-06	27,338.13	60,603.11	0 00E+00	1 03E-01	2 27E-01	11 0000	2 273E+04
Pa-231	1 2488E-11	27,338.13	60,603.11	0 00E+00	3 41E-07	7 57E-07		
Pb-210	2 4206E-12	27,338.13	60,603.11	0 00E+00	6 62E-08	1 47E-07		
Pm-147	1 5671E-02	27,338.13	60,603.11	0 00E+00	4 28E+02	9 50E+02		
Pu-238	1 4877E-02	27,338.13	60,603.11	0 00E+00	4 07E+02	9 02E+02		
Pu-239	-3 5520E-02	27,338.13	0 00	6 60E+03	5 63E+03	6 60E+03		
Pu-240	2 0690E-02	27,338.13	60,603.11	3 36E+03	3 92E+03	4 61E+03		
Pu-241	-1 4799E+00	27,338.13	0 00	1 51E+05	1 10E+05	1 51E+05		
Pu-242	1 1252E-05	27,338.13	60,603.11	8 95E-01	1 20E+00	1 58E+00		
Ra-226	7 8524E-12	27,338.13	60,603.11	0 00E+00	2 15E-07	4 76E-07		
Ra-228	2 4086E-16	27,338.13	60,603.11	0 00E+00	6 58E-12	1 46E-11		
Ru-106	1 5066E-05	27,338.13	60,603.11	0 00E+00	4 12E-01	9 13E-01		
Se-79	1 0127E-05	27,338.13	60,603.11	0 00E+00	2 77E-01	6 14E-01		
Sn-126	4 3902E-05	27,338.13	60,603.11	0 00E+00	1 20E+00	2 66E+00		
Sr-90	5 0088E-01	27,338.13	60,603.11	0 00E+00	1 37E+04	3 04E+04		
Tc-99	3 9412E-04	27,338.13	60,603.11	0 00E+00	1 08E+01	2 39E+01		
Th-229	2 7219E-12	27,338.13	60,603.11	0 00E+00	7 44E-08	1 65E-07		
Th-230	1 0441E-09	27,338.13	60,603.11	0 00E+00	2 85E-05	6 33E-05		
Th-232	3 1689E-16	27,338.13	60,603.11	0 00E+00	8 66E-12	1 92E-11		
Tl-208	4 6636E-07	27,338.13	60,603.11	0 00E+00	1 27E-02	2 83E-02		
U-232	1 2638E-06	27,338.13	60,603.11	0 00E+00	3 45E-02	7 66E-02		
U-233	5 7451E-10	27,338.13	60,603.11	0 00E+00	1 57E-05	3 48E-05		
U-234	4 3044E-06	27,338.13	60,603.11	0 00E+00	1 18E-01	2 61E-01		
U-235	-7 7765E-09	27,338.13	0 00	1 36E-03	1 14E-03	1 36E-03		
U-236	1 8050E-07	27,338.13	60,603.11	0 00E+00	4 93E-03	1 09E-02		
U-238	-1 7914E-07	27,338.13	0 00	9 87E-02	9 38E-02	9 87E-02		
Y-90	5 0088E-01	27,338.13	60,603.11	0 00E+00	1 37E+04	3 04E+04		
Other Radionuclides					3 87E+04	8 59E+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	FAST	FAST	
Fuel Cladding	SST	SST	
BOL HM Constituents	Pu and U	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=417.09kg Bounding burnup taken from SFD and converted to MWd using BOL=417.09kg
	From SFD	Estimated	
Nominal		27,338.13	
Bounding		60,603.11	

Checks			Estimated EOL HM/Given EOL HM 1 00
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0 43		
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)	Fuel decay start date	1992
SNF ID #	1046	Estimates as of:	2030
Fuel Units & Descr	72 - ROD	Template:	FFTF (FAST, SST, 10 to 30%, Pu & U)
Heavy Metal Mass	BOL= , EOL=8 878kg	Template Burnup(MWd)	5011 2
ROD Storage Site	HANFORD	Template BOL Heavy Metal Mass (MT):	0.0329181
		Template Decay Time	35 years

Estimated
Canister usage
18"x15"
1.09

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	6.1822E-12	634.54	787.70	0.00E+00	3.92E-09	4.87E-09	Avg MeV		
Am-241	1.1066E-01	634.54	787.70	1.83E+01	8.86E+01	1.06E+02	0.0150	2.630E+13	
Am-242m	1.9247E-03	634.54	787.70	0.00E+00	1.22E+00	1.52E+00	0.0250	5.133E+12	
Am-243	1.0740E-04	634.54	787.70	0.00E+00	6.81E-02	8.46E-02	0.0375	5.953E+12	
C-14	2.6042E-05	634.54	787.70	0.00E+00	1.65E-02	2.05E-02	0.0575	6.066E+12	
Cl-36	3.4243E-10	634.54	787.70	0.00E+00	2.17E-07	2.70E-07	0.0850	2.851E+12	
Cm-243	4.0629E-04	634.54	787.70	0.00E+00	2.58E-01	3.20E-01	0.1250	2.007E+12	
Cm-244	1.6024E-03	634.54	787.70	0.00E+00	1.02E+00	1.26E+00	0.2250	2.301E+12	
Co-60	3.4275E-03	634.54	787.70	0.00E+00	2.17E+00	2.70E+00	0.3750	9.975E+11	
Cs-134	1.5566E-03	634.54	787.70	0.00E+00	9.88E-01	1.23E+00	0.5750	4.040E+13	
Cs-135	4.7693E-05	634.54	787.70	0.00E+00	3.03E-02	3.76E-02	0.8500	4.222E+11	
Cs-137	1.4007E+00	634.54	787.70	0.00E+00	8.89E+02	1.10E+03	1.2500	5.053E+11	
Eu-154	1.6184E-02	634.54	787.70	0.00E+00	1.03E+01	1.27E+01	1.7500	1.143E+10	
Eu-155	1.3774E-02	634.54	787.70	0.00E+00	8.74E+00	1.09E+01	2.2500	2.332E+06	
Fe-55	3.8028E-04	634.54	787.70	0.00E+00	2.41E-01	3.00E-01	2.7500	1.308E+07	
H-3	3.8454E-03	634.54	787.70	0.00E+00	2.44E+00	3.03E+00	3.5000	8.405E+04	
I-129	1.2891E-06	634.54	787.70	0.00E+00	8.18E-04	1.02E-03	5.0000	3.046E+04	
Kr-85	2.7848E-02	634.54	787.70	0.00E+00	1.77E+01	2.19E+01	7.0000	3.473E+03	
Np-237	3.7516E-06	634.54	787.70	0.00E+00	2.38E-03	2.96E-03	11.0000	3.972E+02	
Pa-231	1.2488E-11	634.54	787.70	0.00E+00	7.92E-09	9.84E-09			
Pb-210	2.4206E-12	634.54	787.70	0.00E+00	1.54E-09	1.91E-09			
Pm-147	1.5671E-02	634.54	787.70	0.00E+00	9.94E+00	1.23E+01			
Pu-238	1.4877E-02	634.54	787.70	0.00E+00	9.44E+00	1.17E+01			
Pu-239	-3.5520E-02	634.54	0.00	1.51E+02	1.28E+02	1.51E+02			
Pu-240	2.0690E-02	634.54	787.70	7.65E+01	8.97E+01	9.28E+01			
Pu-241	-1.4799E+00	634.54	0.00	3.44E+03	2.50E+03	3.44E+03			
Pu-242	1.1252E-05	634.54	787.70	2.04E-02	2.75E-02	2.93E-02			
Ra-226	7.8524E-12	634.54	787.70	0.00E+00	4.98E-09	6.19E-09			
Ra-228	2.4086E-16	634.54	787.70	0.00E+00	1.53E-13	1.90E-13			
Ru-106	1.5066E-05	634.54	787.70	0.00E+00	9.56E-03	1.19E-02			
Se-79	1.0127E-05	634.54	787.70	0.00E+00	6.43E-03	7.98E-03			
Sn-126	4.3902E-05	634.54	787.70	0.00E+00	2.79E-02	3.46E-02			
Sr-90	5.0088E-01	634.54	787.70	0.00E+00	3.18E+02	3.95E+02			
Tc-99	3.9412E-04	634.54	787.70	0.00E+00	2.50E-01	3.10E-01			
Th-229	2.7219E-12	634.54	787.70	0.00E+00	1.73E-09	2.14E-09			
Th-230	1.0441E-09	634.54	787.70	0.00E+00	6.62E-07	8.22E-07			
Th-232	3.1689E-16	634.54	787.70	0.00E+00	2.01E-13	2.50E-13			
Th-208	4.6636E-07	634.54	787.70	0.00E+00	2.96E-04	3.67E-04			
U-232	1.2638E-06	634.54	787.70	0.00E+00	8.02E-04	9.95E-04			
U-233	5.7451E-10	634.54	787.70	0.00E+00	3.65E-07	4.53E-07			
U-234	4.3044E-06	634.54	787.70	0.00E+00	2.73E-03	3.39E-03			
U-235	-7.7765E-09	634.54	0.00	3.09E-05	2.60E-05	3.09E-05			
U-236	1.8050E-07	634.54	787.70	0.00E+00	1.15E-04	1.42E-04			
U-238	-1.7914E-07	634.54	0.00	2.25E-03	2.14E-03	2.25E-03			
Y-90	5.0088E-01	634.54	787.70	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:
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 %	Pu and U	Pu and U	
		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate.
	From SFD	Estimated	
Nominal		634.54	Nominal burnup taken from SFD and converted to MWd using BOL=9.513kg
Bounding		787.70	Bounding burnup taken from SFD and converted to MWd using BOL=9.513kg

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.44		1.00
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 655kg
 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	CvMWd From Template	Nominal 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	251.33	502.65	0.00E+00	1.55E-09	3.11E-09		
Am-241	1.1066E-01	251.33	502.65	6.73E+01	9.51E+01	1.23E+02	0.0150	1.978E+13
Am-242m	1.9247E-03	251.33	502.65	0.00E+00	4.84E-01	9.67E-01	0.0250	3.328E+12
Am-243	1.0740E-04	251.33	502.65	0.00E+00	2.70E-02	5.40E-02	0.0375	3.804E+12
C-14	2.6042E-05	251.33	502.65	0.00E+00	6.54E-03	1.31E-02	0.0575	4.642E+12
Cl-36	3.4243E-10	251.33	502.65	0.00E+00	8.61E-08	1.72E-07	0.0850	1.820E+12
Cm-243	4.0629E-04	251.33	502.65	0.00E+00	1.02E-01	2.04E-01	0.1250	1.283E+12
Cm-244	1.6024E-03	251.33	502.65	0.00E+00	4.03E-01	8.05E-01	0.2250	1.468E+12
Co-60	3.4275E-03	251.33	502.65	0.00E+00	8.61E-01	1.72E+00	0.3750	6.376E+11
Cs-134	1.5566E-03	251.33	502.65	0.00E+00	3.91E-01	7.82E-01	0.5750	2.578E+13
Cs-135	4.7693E-05	251.33	502.65	0.00E+00	1.20E-02	2.40E-02	0.8500	2.694E+11
Cs-137	1.4007E+00	251.33	502.65	0.00E+00	3.52E+02	7.04E+02	1.2500	3.224E+11
Eu-154	1.6184E-02	251.33	502.65	0.00E+00	4.07E+00	8.13E+00	1.7500	7.294E+09
Eu-155	1.3774E-02	251.33	502.65	0.00E+00	3.46E+00	6.92E+00	2.2500	1.741E+06
Fe-55	3.8028E-04	251.33	502.65	0.00E+00	9.56E-02	1.91E-01	2.7500	8.491E+06
H-3	3.8454E-03	251.33	502.65	0.00E+00	9.66E-01	1.93E+00	3.5000	1.834E+05
I-129	1.2891E-06	251.33	502.65	0.00E+00	3.24E-04	6.48E-04	5.0000	7.453E+04
Kr-85	2.7848E-02	251.33	502.65	0.00E+00	7.00E+00	1.40E+01	7.0000	8.487E+03
Np-237	3.7516E-06	251.33	502.65	0.00E+00	9.43E-04	1.89E-03	11.0000	9.701E+02
Pa-231	1.2488E-11	251.33	502.65	0.00E+00	3.14E-09	6.28E-09		
Pb-210	2.4206E-12	251.33	502.65	0.00E+00	6.08E-10	1.22E-09		
Pm-147	1.5671E-02	251.33	502.65	0.00E+00	3.94E+00	7.88E+00		
Pu-238	1.4877E-02	251.33	502.65	0.00E+00	3.74E+00	7.48E+00		
Pu-239	-3.5520E-02	251.33	0.00	5.52E+02	5.44E+02	5.52E+02		
Pu-240	2.0690E-02	251.33	502.65	2.81E+02	2.86E+02	2.91E+02		
Pu-241	-1.4799E+00	251.33	0.00	1.26E+04	1.22E+04	1.26E+04		
Pu-242	1.1252E-05	251.33	502.65	7.49E-02	7.77E-02	8.05E-02		
Ra-226	7.8524E-12	251.33	502.65	0.00E+00	1.97E-09	3.95E-09		
Ra-228	2.4086E-16	251.33	502.65	0.00E+00	6.05E-14	1.21E-13		
Ru-106	1.5066E-05	251.33	502.65	0.00E+00	3.79E-03	7.57E-03		
Se-79	1.0127E-05	251.33	502.65	0.00E+00	2.55E-03	5.09E-03		
Sn-126	4.3902E-05	251.33	502.65	0.00E+00	1.10E-02	2.21E-02		
Sr-90	5.0088E-01	251.33	502.65	0.00E+00	1.26E+02	2.52E+02		
Tc-99	3.9412E-04	251.33	502.65	0.00E+00	9.91E-02	1.98E-01		
Th-229	2.7219E-12	251.33	502.65	0.00E+00	6.84E-10	1.37E-09		
Th-230	1.0441E-09	251.33	502.65	0.00E+00	2.62E-07	5.25E-07		
Th-232	3.1689E-16	251.33	502.65	0.00E+00	7.96E-14	1.59E-13		
Th-208	4.6636E-07	251.33	502.65	0.00E+00	1.17E-04	2.34E-04		
U-232	1.2638E-06	251.33	502.65	0.00E+00	3.18E-04	6.35E-04		
U-233	5.7451E-10	251.33	502.65	0.00E+00	1.44E-07	2.89E-07		
U-234	4.3044E-06	251.33	502.65	0.00E+00	1.08E-03	2.16E-03		
U-235	-7.7765E-09	251.33	0.00	1.13E-04	1.11E-04	1.13E-04		
U-236	1.8050E-07	251.33	502.65	0.00E+00	4.54E-05	9.07E-05		
U-238	-1.7914E-07	251.33	0.00	8.26E-03	8.21E-03	8.26E-03		
Y-90	5.0088E-01	251.33	502.65	0.00E+00	1.26E+02	2.52E+02		
Other Radionuclides					3.56E+02	7.12E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons This fuel matches on all parameters except enrichment (unknown)
	From SFD	Used	
Reactor Moderator:	FAST	FAST	
Fuel Cladding	SST	SST	
BOL HM Constituents	Pu and U	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		251.33	
Bounding		502.65	

Checks			Estimated EOL HM/Given EOL HM 1.00
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.05		
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: FFTF-TFA-ABA-1 THRU 6
 SNF ID #: 318
 Fuel Units & Descr: 6 - HEX ARRAY 91 ROD
 Heavy Metal Mass BOL= , EOL=257 428kg
 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	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	9 6110E-08	5,934 58	8,479 48	0 00E+00	5 70E-04	8 15E-04	0 0150	5 611E+14
Am-241	6 5601E-07	5,934 58	8,479 48	0 00E+00	3 89E-03	5 56E-03	0 0250	1 166E+14
Am-242m	0 0000E+00	5,934 58	8,479 48	0 00E+00	0 00E+00	0 00E+00	0 0375	1 025E+14
Am-243	8 3770E-15	5,934 58	8,479 48	0 00E+00	4 97E-11	7 10E-11	0 0575	1 086E+14
C-14	2 1714E-05	5,934 58	8,479 48	0 00E+00	1 29E-01	1 84E-01	0 0850	6 569E+13
Cl-36	5 5188E-08	5,934 58	8,479 48	0 00E+00	3 28E-04	4 68E-04	0 1250	4 255E+13
Cm-243	1 5496E-14	5,934 58	8,479 48	0 00E+00	9 20E-11	1 31E-10	0 2250	5 838E+13
Cm-244	5 2375E-16	5,934 58	8,479 48	0 00E+00	3 11E-12	4 44E-12	0 3750	2 457E+13
Co-60	2 0947E-03	5,934 58	8,479 48	0 00E+00	1 24E+01	1 78E+01	0 5750	4 340E+14
Cs-134	6 2448E-07	5,934 58	8,479 48	0 00E+00	3 71E-03	5 30E-03	0 8500	4 008E+12
Cs-135	4 4996E-05	5,934 58	8,479 48	0 00E+00	2 67E-01	3 82E-01	1 2500	2 659E+12
Cs-137	1 3775E+00	5,934 58	8,479 48	0 00E+00	8 17E+03	1 17E+04	1 7500	1 034E+11
Eu-154	1 8510E-04	5,934 58	8,479 48	0 00E+00	1 10E+00	1 57E+00	2 2500	1 824E+07
Eu-155	1 4163E-03	5,934 58	8,479 48	0 00E+00	8 41E+00	1 20E+01	2 7500	1 758E+06
Fe-55	1 4179E-05	5,934 58	8,479 48	0 00E+00	8 41E-02	1 20E-01	3 5000	1 785E+03
H-3	3 5383E-03	5,934 58	8,479 48	0 00E+00	2 10E+01	3 00E+01	5 0000	6 231E+02
I-129	1 1426E-06	5,934 58	8,479 48	0 00E+00	6 78E-03	9 69E-03	7 0000	5 538E+01
Kr-85	3 8604E-02	5,934 58	8,479 48	0 00E+00	2 29E+02	3 27E+02	11 0000	5 281E+00
Np-237	3 3099E-06	5,934 58	8,479 48	0 00E+00	1 96E-02	2 81E-02		
Pa-231	1 8953E-07	5,934 58	8,479 48	0 00E+00	1 12E-03	1 61E-03		
Pb-210	8 9531E-12	5,934 58	8,479 48	0 00E+00	5 31E-08	7 59E-08		
Pm-147	1 1588E-03	5,934 58	8,479 48	0 00E+00	6 88E+00	9 83E+00		
Pu-238	1 7146E-04	5,934 58	8,479 48	0 00E+00	1 02E+00	1 45E+00		
Pu-239	1 9464E-02	5,934 58	8,479 48	0 00E+00	1 16E+02	1 65E+02		
Pu-240	6 7919E-05	5,934 58	8,479 48	0 00E+00	4 03E-01	5 76E-01		
Pu-241	4 1774E-06	5,934 58	8,479 48	0 00E+00	2 48E-02	3 54E-02		
Pu-242	4 3751E-13	5,934 58	8,479 48	0 00E+00	2 60E-09	3 71E-09		
Ra-226	2 4219E-11	5,934 58	8,479 48	0 00E+00	1 44E-07	2 05E-07		
Ra-228	2 3572E-11	5,934 58	8,479 48	0 00E+00	1 40E-07	2 00E-07		
Ru-106	3 0951E-10	5,934 58	8,479 48	0 00E+00	1 84E-06	2 62E-06		
Se-79	1 6488E-05	5,934 58	8,479 48	0 00E+00	9 79E-02	1 40E-01		
Sn-126	3 7564E-05	5,934 58	8,479 48	0 00E+00	2 23E-01	3 19E-01		
Sr-90	1 2052E+00	5,934 58	8,479 48	0 00E+00	7 15E+03	1 02E+04		
Tc-99	4 4825E-04	5,934 58	8,479 48	0 00E+00	2 66E+00	3 80E+00		
Th-229	4 6478E-11	5,934 58	8,479 48	0 00E+00	2 76E-07	3 94E-07		
Th-230	2 2259E-09	5,934 58	8,479 48	0 00E+00	1 32E-05	1 89E-05		
Th-232	2 3691E-11	5,934 58	8,479 48	0 00E+00	1 41E-07	2 01E-07		
Tl-208	5 8256E-09	5,934 58	8,479 48	0 00E+00	3 46E-05	4 94E-05		
U-232	1 5759E-08	5,934 58	8,479 48	0 00E+00	9 35E-05	1 34E-04		
U-233	1 0110E-08	5,934 58	8,479 48	0 00E+00	6 00E-05	8 57E-05		
U-234	4 9001E-06	5,934 58	8,479 48	0 00E+00	2 91E-02	4 16E-02		
U-235	-2 3191E-06	5,934 58	0.00	1 46E-01	1 32E-01	1 46E-01		
U-236	1 2633E-05	5,934 58	8,479 48	0 00E+00	7 50E-02	1 07E-01		
U-238	-9 5407E-08	5,934 58	0 00	6 61E-02	6 55E-02	6 61E-02		
Y-90	1 2053E+00	5,934 58	8,479 48	0 00E+00	7 15E+03	1 02E+04		
Other Radionuclides					8 13E+03	1 16E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9 16E+01	1 31E+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 template is a good approximation since it is a FAST, Uranium fuel
Fuel Cladding	SST	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %		10 to 40	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	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
Nominal		5 934.58	
Bounding		8 479.48	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	1.01
Nominal	7.19		
Bounding	10.27		

*Reactor shutdown, core removal storage, shipping or other date confirming that irradiation ceased for fuel
²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FFTF-TFA-ACN-1 (MOX) PINS
 SNF ID #: 321
 Fuel Units & Descr: 90 - ROD
 Heavy Metal Mass: BOL= ; EOL=14.346kg
 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	II. Estimates		Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Actvty (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
	m	x _a						Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6 1822E-12	1,038 59	2,077 18	0 00E+00	6 42E-09	1 28E-08	Avg MeV		
Am-241	1 1066E-01	1,038 59	2,077 18	2 97E+01	1 45E+02	2 60E+02	0 0150	6 834E+13	
Am-242m	1 9247E-03	1,038 59	2,077 18	0 00E+00	2 00E+00	4 00E+00	0 0250	1 352E+13	
Am-243	1 0740E-04	1,038 59	2,077 18	0 00E+00	1 12E-01	2 23E-01	0 0375	1 570E+13	
C-14	2 6042E-05	1,038 59	2,077 18	0 00E+00	2 70E-02	5 41E-02	0 0575	1 574E+13	
Cl-36	3 4243E-10	1,038 59	2,077 18	0 00E+00	3 56E-07	7 11E-07	0 0850	7 518E+12	
Cm-243	4 0629E-04	1,038 59	2,077 18	0 00E+00	4 22E-01	8 44E-01	0 1250	5 290E+12	
Cm-244	1 6024E-03	1,038 59	2,077 18	0 00E+00	1 66E+00	3 33E+00	0 2250	6 067E+12	
Co-60	3 4275E-03	1,038 59	2,077 18	0 00E+00	3 56E+00	7 12E+00	0 3750	2 630E+12	
Cs-134	1 5566E-03	1,038 59	2,077 18	0 00E+00	1 62E+00	3 23E+00	0 5750	1 065E+14	
Cs-135	4 7893E-05	1,038 59	2,077 18	0 00E+00	4 95E-02	9 91E-02	0 8500	1 113E+12	
Cs-137	1 4007E+00	1,038 59	2,077 18	0 00E+00	1 45E+03	2 91E+03	1 2500	1 332E+12	
Eu-154	1 6184E-02	1,038 59	2,077 18	0 00E+00	1 68E+01	3 36E+01	1 7500	3 014E+10	
Eu-155	1 3774E-02	1,038 59	2,077 18	0 00E+00	1 43E+01	2 86E+01	2 2500	6 063E+06	
Fe-55	3 8028E-04	1,038 59	2,077 18	0 00E+00	3 95E-01	7 90E-01	2 7500	3 443E+07	
H-3	3 8454E-03	1,038 59	2,077 18	0 00E+00	3 99E+00	7 99E+00	3 5000	1 780E+05	
I-129	1 2891E-06	1,038 59	2,077 18	0 00E+00	1 34E-03	2 68E-03	5 0000	6 179E+04	
Kr-85	2 7848E-02	1,038 59	2,077 18	0 00E+00	2 89E+01	5 78E+01	7 0000	7 050E+03	
Np-237	3 7516E-06	1,038 59	2,077 18	0 00E+00	3 90E-03	7 79E-03	11 0000	8 063E+02	
Pa-231	1 2488E-11	1,038 59	2,077 18	0 00E+00	1 30E-08	2 59E-08			
Pb-210	2 4206E-12	1,038 59	2,077 18	0 00E+00	2 51E-09	5 03E-09			
Pm-147	1 5671E-02	1,038 59	2,077 18	0 00E+00	1 63E+01	3 26E+01			
Pu-238	1 4877E-02	1,038 59	2,077 18	0 00E+00	1 55E+01	3 09E+01			
Pu-239	-3 5520E-02	1,038 59	0 00	2 44E+02	2 07E+02	2 44E+02			
Pu-240	2 0690E-02	1,038 59	2,077 18	1 24E+02	1 45E+02	1 67E+02			
Pu-241	-1 4799E+00	1,038 59	0 00	5 56E+03	4 02E+03	5 56E+03			
Pu-242	1 1252E-05	1,038 59	2,077 18	3 30E-02	4 47E-02	5 64E-02			
Ra-226	7 8524E-12	1,038 59	2,077 18	0 00E+00	8 16E-09	1 63E-08			
Ra-228	2 4086E-16	1,038 59	2,077 18	0 00E+00	2 50E-13	5 00E-13			
Ru-106	1 5066E-05	1,038 59	2,077 18	0 00E+00	1 56E-02	3 13E-02			
Se-79	1 0127E-05	1,038 59	2,077 18	0 00E+00	1 05E-02	2 10E-02			
Sn-126	4 3902E-05	1,038 59	2,077 18	0 00E+00	4 56E-02	9 12E-02			
Sr-90	5 0088E-01	1,038 59	2,077 18	0 00E+00	5 20E+02	1 04E+03			
Tc-99	3 9412E-04	1,038 59	2,077 18	0 00E+00	4 09E-01	8 19E-01			
Th-229	2 7219E-12	1,038 59	2,077 18	0 00E+00	2 83E-09	5 65E-09			
Th-230	1 0441E-09	1,038 59	2,077 18	0 00E+00	1 08E-06	2 17E-06			
Th-232	3 1689E-16	1,038 59	2,077 18	0 00E+00	3 29E-13	6 58E-13			
Tl-208	4 6636E-07	1,038 59	2,077 18	0 00E+00	4 84E-04	9 69E-04			
U-232	1 2638E-06	1,038 59	2,077 18	0 00E+00	1 31E-03	2 63E-03			
U-233	5 7451E-10	1,038 59	2,077 18	0 00E+00	5 97E-07	1 19E-06			
U-234	4 3044E-06	1,038 59	2,077 18	0 00E+00	4 47E-03	8 94E-03			
U-235	-7 7765E-09	1,038 59	0 00	5 00E-05	4 19E-05	5 00E-05			
U-236	1 8050E-07	1,038 59	2,077 18	0 00E+00	1 87E-04	3 75E-04			
U-238	-1 7914E-07	1,038 59	0 00	3 64E-03	3 45E-03	3 64E-03			
Y-90	5 0088E-01	1,038 59	2,077 18	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:
Reactor Moderator	From SFD	Used	
Fuel Cladding <td>FAST</td> <td>FAST</td> <td rowspan="4">This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown)</td>	FAST	FAST	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown)
BOL HM Constituents <td>SST</td> <td>SST</td>	SST	SST	
BOL Enrichment % <td>Pu and U</td> <td>Pu and U</td>	Pu and U	Pu and U	
		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
Bounding		1 038 59	Nominal burnup taken from SFD and converted to MWd using BOL=15.387kg Bounding burnup assumed to be twice nominal burnup.
		2 077 18	

Checks		
Nominal	Burnup Multiplier	Estimated Burnup/ Given Burnup
Bounding	0 44	
	0 89	
		Estimated EOL HM/Given EOL HM
		1 00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel
²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FTF-TFA-ACN-1 (PU/UC) PINS
 SNF ID # 865
 Fuel Units & Descr 16 - ROD
 Heavy Metal Mass BOL= , EOL=2.558kg
 ROD Storage Site: HANFORD

¹Fuel decay start date 1992
 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"x15"
 1 00

Radionuclide	II. Estimates						Gamma Sources	
	m	x _n	x _b	b	y _n	y _b	Photon Energy Group	Total Photons/sec (bounding)
	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	6.1822E-12	185.22	370.43	0.00E+00	1.15E-09	2.29E-09	0.0150	1.219E+13
Am-241	1.1066E-01	185.22	370.43	5.29E+00	2.58E+01	4.63E+01	0.0250	2.411E+12
Am-242m	1.9247E-03	185.22	370.43	0.00E+00	3.56E-01	7.13E-01	0.0375	2.799E+12
Am-243	1.0740E-04	185.22	370.43	0.00E+00	1.99E-02	3.98E-02	0.0575	2.806E+12
C-14	2.6042E-05	185.22	370.43	0.00E+00	4.82E-03	9.65E-03	0.0850	1.341E+12
Cf-252	3.4243E-10	185.22	370.43	0.00E+00	6.34E-08	1.27E-07	0.1250	9.435E+11
Cm-243	4.0629E-04	185.22	370.43	0.00E+00	7.53E-02	1.51E-01	0.2250	1.082E+12
Cm-244	1.6024E-03	185.22	370.43	0.00E+00	2.97E-01	5.94E-01	0.3750	4.690E+11
Co-60	3.4275E-03	185.22	370.43	0.00E+00	6.35E-01	1.27E+00	0.5750	1.900E+13
Cs-134	1.5566E-03	185.22	370.43	0.00E+00	2.88E-01	5.77E-01	0.8500	1.985E+11
Cs-135	4.7693E-05	185.22	370.43	0.00E+00	8.83E-03	1.77E-02	1.2500	2.376E+11
Cs-137	1.4007E+00	185.22	370.43	0.00E+00	2.59E+02	5.19E+02	1.7500	5.375E+09
Eu-154	1.6184E-02	185.22	370.43	0.00E+00	3.00E+00	6.00E+00	2.2500	1.081E+06
Eu-155	1.3774E-02	185.22	370.43	0.00E+00	2.55E+00	5.10E+00	2.7500	6.141E+06
Fe-55	3.8028E-04	185.22	370.43	0.00E+00	7.04E-02	1.41E-01	3.5000	3.174E+04
H-3	3.8454E-03	185.22	370.43	0.00E+00	7.12E-01	1.42E+00	5.0000	1.102E+04
I-129	1.2891E-06	185.22	370.43	0.00E+00	2.39E-04	4.78E-04	7.0000	1.257E+03
Kr-85	2.7848E-02	185.22	370.43	0.00E+00	5.16E+00	1.03E+01	11.0000	1.438E+02
Np-237	3.7516E-06	185.22	370.43	0.00E+00	6.95E-04	1.39E-03		
Pa-231	1.2488E-11	185.22	370.43	0.00E+00	2.31E-09	4.63E-09		
Pb-210	2.4206E-12	185.22	370.43	0.00E+00	4.48E-10	8.97E-10		
Pm-147	1.5671E-02	185.22	370.43	0.00E+00	2.90E+00	5.80E+00		
Pu-238	1.4877E-02	185.22	370.43	0.00E+00	2.76E+00	5.51E+00		
Pu-239	-3.5520E-02	185.22	0.00	4.34E+01	3.68E+01	4.34E+01		
Pu-240	2.0690E-02	185.22	370.43	2.21E+01	2.59E+01	2.97E+01		
Pu-241	-1.4799E+00	185.22	0.00	9.91E+02	7.17E+02	9.91E+02		
Pu-242	1.1252E-05	185.22	370.43	5.89E-03	7.97E-03	1.01E-02		
Ra-226	7.8524E-12	185.22	370.43	0.00E+00	1.45E-09	2.91E-09		
Ra-228	2.4086E-16	185.22	370.43	0.00E+00	4.46E-14	8.92E-14		
Ru-106	1.5066E-05	185.22	370.43	0.00E+00	2.79E-03	5.58E-03		
Se-79	1.0127E-05	185.22	370.43	0.00E+00	1.88E-03	3.75E-03		
Sn-126	4.3902E-05	185.22	370.43	0.00E+00	8.13E-03	1.63E-02		
Sr-90	5.0088E-01	185.22	370.43	0.00E+00	9.28E+01	1.86E+02		
Tc-99	3.9412E-04	185.22	370.43	0.00E+00	7.30E-02	1.46E-01		
Th-229	2.7219E-12	185.22	370.43	0.00E+00	5.04E-10	1.01E-09		
Th-230	1.0441E-09	185.22	370.43	0.00E+00	1.93E-07	3.87E-07		
Th-232	3.1689E-16	185.22	370.43	0.00E+00	5.87E-14	1.17E-13		
Th-208	4.6636E-07	185.22	370.43	0.00E+00	8.64E-05	1.73E-04		
U-232	1.2638E-06	185.22	370.43	0.00E+00	2.34E-04	4.68E-04		
U-233	5.7451E-10	185.22	370.43	0.00E+00	1.06E-07	2.13E-07		
U-234	4.3044E-06	185.22	370.43	0.00E+00	7.97E-04	1.59E-03		
U-235	-7.7765E-09	185.22	0.00	8.92E-06	7.48E-06	8.92E-06		
U-236	1.8050E-07	185.22	370.43	0.00E+00	3.34E-05	6.69E-05		
U-238	-1.7914E-07	185.22	0.00	6.49E-04	6.16E-04	6.49E-04		
Y-90	5.0088E-01	185.22	370.43	0.00E+00	9.28E+01	1.86E+02		
Other Radionuclides					2.62E+02	5.25E+02		

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:	Pu and U	Pu and U	
BOL Enrichment %:		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		185.22	Nominal burnup taken from SFD and converted to MWd using BOL=2.744kg Bounding burnup assumed to be twice nominal burnup
Bounding		370.43	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.44		1.00
Bounding	0.89		

¹Reactor shutdown, core removal storage, shipping or other date confirming that irradiation ceased for fuel
²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FFTF-TFA-ACO-2, 4 THRU 16
 SNF ID #: 329
 Fuel Units & Descr: 14 - HEX ARRAY 169 ROD
 Heavy Metal Mass: BOL= , EOL=605 982kg
 ROD Storage Site HANFORD

Fuel decay start date: 1992
 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"x15"
 2 80

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-12	96,319.97	140,074.70	0.00E+00	5.95E-07	8.66E-07	Avg. MeV	
Am-241	1.1066E-01	96,319.97	140,074.70	1.35E+03	1.20E+04	1.69E+04	0.0150	4.573E+15
Am-242m	1.9247E-03	96,319.97	140,074.70	0.00E+00	1.85E+02	2.70E+02	0.0250	9.110E+14
Am-243	1.0740E-04	96,319.97	140,074.70	0.00E+00	1.03E+01	1.50E+01	0.0375	1.058E+15
C-14	2.6042E-05	96,319.97	140,074.70	0.00E+00	2.51E+00	3.65E+00	0.0575	1.052E+15
Cl-36	3.4243E-10	96,319.97	140,074.70	0.00E+00	3.30E-05	4.80E-05	0.0850	5.070E+14
Cm-243	4.0629E-04	96,319.97	140,074.70	0.00E+00	3.91E+01	5.69E+01	0.1250	3.567E+14
Cm-244	1.6024E-03	96,319.97	140,074.70	0.00E+00	1.54E+02	2.24E+02	0.2250	4.091E+14
Co-60	3.4275E-03	96,319.97	140,074.70	0.00E+00	3.30E+02	4.80E+02	0.3750	1.773E+14
Cs-134	1.5566E-03	96,319.97	140,074.70	0.00E+00	1.50E+02	2.18E+02	0.5750	7.185E+15
Cs-135	4.7693E-05	96,319.97	140,074.70	0.00E+00	4.59E+00	6.68E+00	0.8500	7.507E+13
Cs-137	1.4007E+00	96,319.97	140,074.70	0.00E+00	1.35E+05	1.96E+05	1.2500	8.985E+13
Eu-154	1.6184E-02	96,319.97	140,074.70	0.00E+00	1.56E+03	2.27E+03	1.7500	2.033E+12
Eu-155	1.3774E-02	96,319.97	140,074.70	0.00E+00	1.33E+03	1.93E+03	2.2500	4.059E+08
Fe-55	3.8028E-04	96,319.97	140,074.70	0.00E+00	3.66E+01	5.33E+01	2.7500	2.320E+09
H-3	3.8454E-03	96,319.97	140,074.70	0.00E+00	3.70E+02	5.39E+02	3.5000	1.050E+07
I-129	1.2891E-06	96,319.97	140,074.70	0.00E+00	1.24E-01	1.81E-01	5.0000	3.527E+06
Kr-85	2.7848E-02	96,319.97	140,074.70	0.00E+00	2.68E+03	3.90E+03	7.0000	4.026E+05
Np-237	3.7516E-06	96,319.97	140,074.70	0.00E+00	3.61E-01	5.26E-01	11.0000	4.604E+04
Pa-231	1.2488E-11	96,319.97	140,074.70	0.00E+00	1.20E-06	1.75E-06		
Pb-210	2.4206E-12	96,319.97	140,074.70	0.00E+00	2.33E-07	3.39E-07		
Pm-147	1.5671E-02	96,319.97	140,074.70	0.00E+00	1.51E+03	2.20E+03		
Pu-238	1.4877E-02	96,319.97	140,074.70	0.00E+00	1.43E+03	2.08E+03		
Pu-239	-3.5520E-02	96,319.97	0.00	1.11E+04	7.70E+03	1.11E+04		
Pu-240	2.0690E-02	96,319.97	140,074.70	5.65E+03	7.64E+03	8.55E+03		
Pu-241	-1.4799E+00	96,319.97	0.00	2.54E+05	1.11E+05	2.54E+05		
Pu-242	1.1252E-05	96,319.97	140,074.70	1.51E+00	2.59E+00	3.08E+00		
Ra-226	7.8524E-12	96,319.97	140,074.70	0.00E+00	7.56E-07	1.10E-06		
Ra-228	2.4086E-16	96,319.97	140,074.70	0.00E+00	2.32E-11	3.37E-11		
Ru-106	1.5066E-05	96,319.97	140,074.70	0.00E+00	1.45E+00	2.11E+00		
Se-79	1.0127E-05	96,319.97	140,074.70	0.00E+00	9.75E-01	1.42E+00		
Sn-126	4.3902E-05	96,319.97	140,074.70	0.00E+00	4.23E+00	6.15E+00		
Sr-90	5.0088E-01	96,319.97	140,074.70	0.00E+00	4.82E+04	7.02E+04		
Tc-99	3.9412E-04	96,319.97	140,074.70	0.00E+00	3.80E+01	5.52E+01		
Th-229	2.7219E-12	96,319.97	140,074.70	0.00E+00	2.62E-07	3.81E-07		
Th-230	1.0441E-09	96,319.97	140,074.70	0.00E+00	1.01E-04	1.46E-04		
Th-232	3.1689E-16	96,319.97	140,074.70	0.00E+00	3.05E-11	4.44E-11		
Tl-208	4.6636E-07	96,319.97	140,074.70	0.00E+00	4.49E-02	6.53E-02		
U-232	1.2638E-06	96,319.97	140,074.70	0.00E+00	1.22E-01	1.77E-01		
U-233	5.7451E-10	96,319.97	140,074.70	0.00E+00	5.53E-05	8.05E-05		
U-234	4.3044E-06	96,319.97	140,074.70	0.00E+00	4.15E-01	6.03E-01		
U-235	-7.7765E-09	96,319.97	0.00	2.28E-03	1.53E-03	2.28E-03		
U-236	1.8050E-07	96,319.97	140,074.70	0.00E+00	1.74E-02	2.53E-02	1.93E+03	2.71E+03
U-238	-1.7914E-07	96,319.97	0.00	1.66E-01	1.49E-01	1.66E-01	Total	Total
Y-90	5.0088E-01	96,319.97	140,074.70	0.00E+00	4.82E+04	7.02E+04		
Other Radionuclides					1.36E+05	1.98E+05		

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	Pu and U	Pu and U	
BOL Enrichment %		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		96,319.97	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		140,074.70	

Checks			Estimated EOL HM/Given EOL HM
	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	Fuel decay start date	1992
SNF ID #	322	Estimates as of	2030
Fuel Units & Descr	2 - HEX ARRAY 217 ROD	Template	FFTF (FAST, SST, 10 to 30%, Pu & U)
Heavy Metal Mass	BOL= . EOL=69 402kg	*Template Burnup(MWd)	5011.2
ROD Storage Site	HANFORD	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)
	Ci/MWd From Template	Nominal 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	5,116.34	5,738.65	0 00E+00	3 16E-08	3 55E-08	0 0150	1 921E+14
Am-241	1 1066E-01	5,116.34	5,738.65	1 44E+02	7 10E+02	7 79E+02	0 0250	3 740E+13
Am-242m	1 9247E-03	5,116.34	5,738.65	0 00E+00	9 85E+00	1 10E+01	0 0375	4 337E+13
Am-243	1 0740E-04	5,116.34	5,738.65	0 00E+00	5 49E-01	6 16E-01	0 0575	4 433E+13
C-14	2 6042E-05	5,116.34	5,738.65	0 00E+00	1 33E-01	1 49E-01	0 0850	2 077E+13
Cf-252	3 4243E-10	5,116.34	5,738.65	0 00E+00	1 75E-06	1 97E-06	0 1250	1 462E+13
Cm-243	4 0629E-04	5,116.34	5,738.65	0 00E+00	2 08E+00	2 33E+00	0 2250	1 676E+13
Cm-244	1 6024E-03	5,116.34	5,738.65	0 00E+00	8 20E+00	9 20E+00	0 3750	7 267E+12
Co-60	3 4275E-03	5,116.34	5,738.65	0 00E+00	1 75E+01	1 97E+01	0 5750	2 944E+12
Cs-134	1 5566E-03	5,116.34	5,738.65	0 00E+00	7 96E+00	8 93E+00	0 8500	3 076E+12
Cs-135	4 7693E-05	5,116.34	5,738.65	0 00E+00	2 44E-01	2 74E-01	1 2500	3 681E+12
Cs-137	1 4007E+00	5,116.34	5,738.65	0 00E+00	7 17E+03	8 04E+03	1 7500	8 327E+10
Eu-154	1 6184E-02	5,116.34	5,738.65	0 00E+00	8 28E+01	9 29E+01	2 2500	1 703E+07
Eu-155	1 3774E-02	5,116.34	5,738.65	0 00E+00	7 05E+01	7 90E+01	2 7500	9 530E+07
Fe-55	3 8028E-04	5,116.34	5,738.65	0 00E+00	1 95E+00	2 18E+00	3 5000	6 358E+05
H-3	3 8454E-03	5,116.34	5,738.65	0 00E+00	1 97E+01	2 21E+01	5 0000	2 319E+05
I-129	1 2891E-06	5,116.34	5,738.65	0 00E+00	6 60E-03	7 40E-03	7 0000	2 644E+04
Kr-85	2 7848E-02	5,116.34	5,738.65	0 00E+00	1 42E+02	1 60E+02	11 0000	3 023E+03
Np-237	3 7516E-06	5,116.34	5,738.65	0 00E+00	1 92E-02	2 15E-02		
Pa-231	1 2488E-11	5,116.34	5,738.65	0 00E+00	6 39E-08	7 17E-08		
Pb-210	2 4206E-12	5,116.34	5,738.65	0 00E+00	1 24E-08	1 39E-08		
Pm-147	1 5671E-02	5,116.34	5,738.65	0 00E+00	8 02E+01	8 99E+01		
Pu-238	1 4877E-02	5,116.34	5,738.65	0 00E+00	7 61E+01	8 54E+01		
Pu-239	-3 5520E-02	5,116.34	0 00	1 18E+03	9 98E+02	1 18E+03		
Pu-240	2 0690E-02	5,116.34	5,738.65	6 00E+02	7 05E+02	7 18E+02		
Pu-241	-1 4799E+00	5,116.34	0 00	2 69E+04	1 93E+04	2 69E+04		
Pu-242	1 1252E-05	5,116.34	5,738.65	1 60E-01	2 17E-01	2 24E-01		
Ra-226	7 8524E-12	5,116.34	5,738.65	0 00E+00	4 02E-08	4 51E-08		
Ra-228	2 4086E-16	5,116.34	5,738.65	0 00E+00	1 23E-12	1 38E-12		
Ru-106	1 5066E-05	5,116.34	5,738.65	0 00E+00	7 71E-02	8 65E-02		
Se-79	1 0127E-05	5,116.34	5,738.65	0 00E+00	5 18E-02	5 81E-02		
Sn-126	4 3902E-05	5,116.34	5,738.65	0 00E+00	2 25E-01	2 52E-01		
Sr-90	5 0088E-01	5,116.34	5,738.65	0 00E+00	2 56E+03	2 87E+03		
Tc-99	3 9412E-04	5,116.34	5,738.65	0 00E+00	2 02E+00	2 26E+00		
Th-229	2 7219E-12	5,116.34	5,738.65	0 00E+00	1 39E-08	1 56E-08		
Th-230	1 0441E-09	5,116.34	5,738.65	0 00E+00	5 34E-06	5 99E-06		
Th-232	3 1689E-16	5,116.34	5,738.65	0 00E+00	1 62E-12	1 82E-12		
Th-208	4 6636E-07	5,116.34	5,738.65	0 00E+00	2 39E-03	2 68E-03		
U-232	1 2638E-06	5,116.34	5,738.65	0 00E+00	6 47E-03	7 25E-03		
U-233	5 7451E-10	5,116.34	5,738.65	0 00E+00	2 94E-06	3 30E-06		
U-234	4 3044E-06	5,116.34	5,738.65	0 00E+00	2 20E-02	2 47E-02		
U-235	-7 7765E-09	5,116.34	0 00	2 42E-04	2 02E-04	2 42E-04		
U-236	1 8050E-07	5,116.34	5,738.65	0 00E+00	9 23E-04	1 04E-03		
U-238	-1 7914E-07	5,116.34	0 00	1 76E-02	1 67E-02	1 76E-02		
Y-90	5 0088E-01	5,116.34	5,738.65	0 00E+00	2 56E+03	2 87E+03		
Other Radionuclides					7 25E+03	8 13E+03		

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
Fuel Cladding	SST	SST	This fuel matches on all parameters except enrichment (unknown)
BOL HM Constituents	Pu and U	Pu and U	
BOL Enrichment %		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		5 116.34	Nominal burnup taken from SFD and converted to MWd using BOL=74.528kg
Bounding		5 738.65	Bounding burnup taken from SFD and converted to MWd using BOL=74.528kg

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.45		1.00
Bounding	0.51		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FFTF-TFA-DEA-2
 SNF ID #: 324
 Fuel Units & Descr: 1 - HEX ARRAY 217 ROD
 Heavy Metal Mass: BOL= , EOL=34 606kg
 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

Radionuclide	m		x _a		x _b		b		y _a		y _b		Gamma Sources	
	C/MWd From Template	Nominal Fuel Burnup (MWd) ³	Bounding Fuel Burnup (MWd) ³	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)						
Ac-227	6 1822E-12	3 46	6 92	0 00E+00	2 14E-11	4 28E-11	Avg MeV							
Am-241	1 1066E-01	3 46	6 92	6 67E+01	6 71E+01	6 75E+01	0 0150	3 822E+12						
Am-242m	1 9247E-03	3 46	6 92	0 00E+00	6 66E-03	1 33E-02	0 0250	1 074E+11						
Am-243	1 0740E-04	3 46	6 92	0 00E+00	3 72E-04	7 43E-04	0 0375	5 867E+10						
C-14	2 6042E-05	3 46	6 92	0 00E+00	9 01E-05	1 80E-04	0 0575	9 775E+11						
Cl-36	3 4243E-10	3 46	6 92	0 00E+00	1 19E-09	2 37E-09	0 0850	2 608E+10						
Cm-243	4 0629E-04	3 46	6 92	0 00E+00	1 41E-03	2 81E-03	0 1250	2 051E+10						
Cm-244	1 6024E-03	3 46	6 92	0 00E+00	5 55E-03	1 11E-02	0 2250	2 053E+10						
Co-60	3 4275E-03	3 46	6 92	0 00E+00	1 19E-02	2 37E-02	0 3750	1 009E+10						
Cs-134	1 5566E-03	3 46	6 92	0 00E+00	5 39E-03	1 08E-02	0 5750	3 551E+11						
Cs-135	4 7693E-05	3 46	6 92	0 00E+00	1 65E-04	3 30E-04	0 8500	3 721E+09						
Cs-137	1 4007E+00	3 46	6 92	0 00E+00	4 85E+00	9 70E+00	1 2500	4 441E+09						
Eu-154	1 6184E-02	3 46	6 92	0 00E+00	5 60E-02	1 12E-01	1 7500	1 010E+08						
Eu-155	1 3774E-02	3 46	6 92	0 00E+00	4 77E-02	9 53E-02	2 2500	3 234E+05						
Fe-55	3 8028E-04	3 46	6 92	0 00E+00	1 32E-03	2 63E-03	2 7500	2 897E+05						
H-3	3 8454E-03	3 46	6 92	0 00E+00	1 33E-02	2 66E-02	3 5000	1 561E+05						
I-129	1 2891E-06	3 46	6 92	0 00E+00	4 46E-06	8 92E-06	5 0000	6 623E+04						
Kr-85	2 7848E-02	3 46	6 92	0 00E+00	9 64E-02	1 93E-01	7 0000	7 538E+03						
Np-237	3 7516E-06	3 46	6 92	0 00E+00	1 30E-05	2 60E-05	11 0000	8 615E+02						
Pa-231	1 2488E-11	3 46	6 92	0 00E+00	4 32E-11	8 64E-11								
Pb-210	2 4206E-12	3 46	6 92	0 00E+00	8 38E-12	1 68E-11								
Pm-147	1 5671E-02	3 46	6 92	0 00E+00	5 42E-02	1 08E-01								
Pu-238	1 4877E-02	3 46	6 92	0 00E+00	5 15E-02	1 03E-01								
Pu-239	-3 5520E-02	3 46	0 00	5 48E+02	5 48E+02	5 48E+02								
Pu-240	2 0690E-02	3 46	6 92	2 78E+02	2 78E+02	2 79E+02								
Pu-241	-1 4799E+00	3 46	0 00	1 25E+04	1 25E+04	1 25E+04								
Pu-242	1 1252E-05	3 46	6 92	7 42E-02	7 43E-02	7 43E-02								
Ra-226	7 8524E-12	3 46	6 92	0 00E+00	2 72E-11	5 44E-11								
Ra-228	2 4086E-16	3 46	6 92	0 00E+00	8 34E-16	1 67E-15								
Ru-106	1 5066E-05	3 46	6 92	0 00E+00	5 21E-05	1 04E-04								
Se-79	1 0127E-05	3 46	6 92	0 00E+00	3 51E-05	7 01E-05								
Sn-126	4 3902E-05	3 46	6 92	0 00E+00	1 52E-04	3 04E-04								
Sr-90	5 0088E-01	3 46	6 92	0 00E+00	1 73E+00	3 47E+00								
Tc-99	3 9412E-04	3 46	6 92	0 00E+00	1 36E-03	2 73E-03								
Th-229	2 7219E-12	3 46	6 92	0 00E+00	9 42E-12	1 88E-11								
Th-230	1 0441E-09	3 46	6 92	0 00E+00	3 61E-09	7 23E-09								
Th-232	3 1689E-16	3 46	6 92	0 00E+00	1 10E-15	2 19E-15								
Tl-208	4 6636E-07	3 46	6 92	0 00E+00	1 61E-06	3 23E-06								
U-232	1 2638E-06	3 46	6 92	0 00E+00	4 37E-06	8 75E-06								
U-233	5 7451E-10	3 46	6 92	0 00E+00	1 99E-09	3 98E-09								
U-234	4 3044E-06	3 46	6 92	0 00E+00	1 49E-05	2 98E-05								
U-235	-7 7765E-09	3 46	0 00	1 12E-04	1 12E-04	1 12E-04								
U-236	1 8050E-07	3 46	6 92	0 00E+00	6 25E-07	1 25E-06								
U-238	-1 7914E-07	3 46	0 00	8 19E-03	8 19E-03	8 19E-03								
Y-90	5 0088E-01	3 46	6 92	0 00E+00	1 73E+00	3 47E+00								
Other Radionuclides					4 90E+00	9 81E+00								

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	SST	
BOL HM Constituents	Pu and U	Pu and U	
BOL Enrichment %		10 to 30	

Burnup Summary (MWd) ⁴			Basis for burnup used in estimate: Nominal burnup taken from SFD and converted to MWd using BOL=34 61kg Bounding burnup assumed to be twice nominal burnup.
	From SFD	Estimated	
Nominal		3 46	
Bounding		6 92	

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FTF-TFA-FC-1
 SNF ID # 325
 Fuel Units & Descr 1 - HEX ARRAY 91 ROD
 Heavy Metal Mass BOL= , EOL=42.584kg
 ROD Storage Site HANFORD

Fuel decay start date 1992
 Estimates as of 2030
 Template FTF (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"x15"
 0 20

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Cl/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV		
Ac-227	6.1822E-12	2,694.34	5,388.68	0.00E+00	1.67E-08	3.33E-08	0.0150	1.778E+14
Am-241	1.1066E-01	2,694.34	5,388.68	8.73E+01	3.85E+02	6.84E+02	0.0250	3.508E+13
Am-242m	1.9247E-03	2,694.34	5,388.68	0.00E+00	5.19E+00	1.04E+01	0.0375	4.072E+13
Am-243	1.0740E-04	2,694.34	5,388.68	0.00E+00	2.89E-01	5.79E-01	0.0575	4.096E+13
C-14	2.6042E-05	2,694.34	5,388.68	0.00E+00	7.02E-02	1.40E-01	0.0850	1.950E+13
Cl-36	3.4243E-10	2,694.34	5,388.68	0.00E+00	9.23E-07	1.85E-06	0.1250	1.373E+13
Cm-243	4.0629E-04	2,694.34	5,388.68	0.00E+00	1.09E+00	2.19E+00	0.2250	1.574E+13
Cm-244	1.6024E-03	2,694.34	5,388.68	0.00E+00	4.32E+00	8.63E+00	0.3750	6.823E+12
Co-60	3.4275E-03	2,694.34	5,388.68	0.00E+00	9.23E+00	1.85E+01	0.5750	2.764E+14
Cs-134	1.5566E-03	2,694.34	5,388.68	0.00E+00	4.19E+00	8.39E+00	0.8500	2.888E+12
Cs-135	4.7693E-05	2,694.34	5,388.68	0.00E+00	1.29E-01	2.57E-01	1.2500	3.457E+12
Cs-137	1.4007E+00	2,694.34	5,388.68	0.00E+00	3.77E+03	7.55E+03	1.7500	7.819E+10
Eu-154	1.6184E-02	2,694.34	5,388.68	0.00E+00	4.36E+01	8.72E+01	2.2500	1.578E+07
Eu-155	1.3774E-02	2,694.34	5,388.68	0.00E+00	3.71E+01	7.42E+01	2.7500	8.936E+07
Fe-55	3.8028E-04	2,694.34	5,388.68	0.00E+00	1.02E+00	2.05E+00	3.5000	4.859E+05
H-3	3.8454E-03	2,694.34	5,388.68	0.00E+00	1.04E+01	2.07E+01	5.0000	1.706E+05
I-129	1.2891E-06	2,694.34	5,388.68	0.00E+00	3.47E-03	6.95E-03	7.0000	1.946E+04
Kr-85	2.7848E-02	2,694.34	5,388.68	0.00E+00	7.50E+01	1.50E+02	11.0000	2.225E+03
Np-237	3.7516E-06	2,694.34	5,388.68	0.00E+00	1.01E-02	2.02E-02		
Pa-231	1.2488E-11	2,694.34	5,388.68	0.00E+00	3.36E-08	6.73E-08		
Pb-210	2.4206E-12	2,694.34	5,388.68	0.00E+00	6.52E-09	1.30E-08		
Pm-147	1.5671E-02	2,694.34	5,388.68	0.00E+00	4.22E+01	8.44E+01		
Pu-238	1.4877E-02	2,694.34	5,388.68	0.00E+00	4.01E+01	8.02E+01		
Pu-239	-3.5520E-02	2,694.34	0.00	7.17E+02	6.21E+02	7.17E+02		
Pu-240	2.0690E-02	2,694.34	5,388.68	3.64E+02	4.20E+02	4.76E+02		
Pu-241	-1.4799E+00	2,694.34	0.00	1.64E+04	1.24E+04	1.64E+04		
Pu-242	1.1252E-05	2,694.34	5,388.68	9.71E-02	1.27E-01	1.58E-01		
Ra-226	7.8524E-12	2,694.34	5,388.68	0.00E+00	2.12E-08	4.23E-08		
Ra-228	2.4086E-16	2,694.34	5,388.68	0.00E+00	6.49E-13	1.30E-12		
Ru-106	1.5066E-05	2,694.34	5,388.68	0.00E+00	4.06E-02	8.12E-02		
Se-79	1.0127E-05	2,694.34	5,388.68	0.00E+00	2.73E-02	5.46E-02		
Sn-126	4.3902E-05	2,694.34	5,388.68	0.00E+00	1.18E-01	2.37E-01		
Sr-90	5.0088E-01	2,694.34	5,388.68	0.00E+00	1.35E+03	2.70E+03		
Tc-99	3.9412E-04	2,694.34	5,388.68	0.00E+00	1.06E+00	2.12E+00		
Th-229	2.7219E-12	2,694.34	5,388.68	0.00E+00	7.33E-09	1.47E-08		
Th-230	1.0441E-09	2,694.34	5,388.68	0.00E+00	2.81E-06	5.63E-06		
Th-232	3.1689E-16	2,694.34	5,388.68	0.00E+00	8.54E-13	1.71E-12		
Th-208	4.6636E-07	2,694.34	5,388.68	0.00E+00	1.26E-03	2.51E-03		
U-232	1.2638E-06	2,694.34	5,388.68	0.00E+00	3.41E-03	6.81E-03		
U-233	5.7451E-10	2,694.34	5,388.68	0.00E+00	1.55E-06	3.10E-06		
U-234	4.3044E-06	2,694.34	5,388.68	0.00E+00	1.16E-02	2.32E-02		
U-235	-7.7765E-09	2,694.34	0.00	1.47E-04	1.26E-04	1.47E-04		
U-236	1.8050E-07	2,694.34	5,388.68	0.00E+00	4.86E-04	9.73E-04		
U-238	-1.7914E-07	2,694.34	0.00	1.07E-02	1.02E-02	1.07E-02		
Y-90	5.0088E-01	2,694.34	5,388.68	0.00E+00	1.35E+03	2.70E+03		
Other Radionuclides					3.82E+03	7.63E+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:
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 %	Pu and U	Pu and U 10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		2,694.34	Nominal burnup taken from SFD and converted to MWd using BOL=45.283kg Bounding burnup assumed to be twice nominal burnup
Bounding		5,388.68	

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 & Descr, 2 - HEX ARRAY 169 ROD
 Heavy Metal Mass BOL = EOL=88 107kg
 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

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 Actvty (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6 1822E-12	10,382 82	20,765 65	0 00E+00	6.42E-08	1.28E-07	Avg MeV	
Am-241	1 1066E-01	10,382 82	20,765 65	1 90E+02	1 34E+03	2 49E+03	0 0150	6 774E+14
Am-242m	1 9247E-03	10,382 82	20,765 65	0 00E+00	2 00E+01	4 00E+01	0 0250	1 350E+14
Am-243	1 0740E-04	10,382 82	20,765 65	0 00E+00	1 12E+00	2.23E+00	0 0375	1 569E+14
C-14	2 6042E-05	10,382 82	20,765 65	0 00E+00	2 70E-01	5 41E-01	0 0575	1 558E+14
Cf-252	3 4243E-10	10,382 82	20,765 65	0 00E+00	3 56E-06	7 11E-06	0.0850	7 516E+13
Cm-243	4 0629E-04	10,382 82	20,765 65	0 00E+00	4 22E+00	8 44E+00	0 1250	5.288E+13
Cm-244	1 6024E-03	10,382 82	20,765 65	0 00E+00	1 66E+01	3 33E+01	0.2250	6 065E+13
Co-60	3 4275E-03	10,382 82	20,765 65	0 00E+00	3 56E+01	7.12E+01	0 3750	2 629E+13
Cs-134	1 5566E-03	10,382 82	20,765 65	0 00E+00	1 62E+01	3.23E+01	0 5750	1 065E+15
Cs-135	4 7693E-05	10,382 82	20,765 65	0 00E+00	4 95E-01	9 90E-01	0 8500	1 113E+13
Cs-137	1 4007E+00	10,382 82	20,765 65	0 00E+00	1 45E+04	2.91E+04	1 2500	1 332E+13
Eu-154	1 6184E-02	10,382 82	20,765 65	0 00E+00	1 68E+02	3 36E+02	1 7500	3 013E+11
Eu-155	1 3774E-02	10,382 82	20,765 65	0 00E+00	1 43E+02	2.86E+02	2 2500	6 019E+07
Fe-55	3 8028E-04	10,382 82	20,765 65	0 00E+00	3 95E+00	7.90E+00	2 7500	3 440E+08
H-3	3 8454E-03	10,382 82	20,765 65	0 00E+00	3 99E+01	7 99E+01	3 5000	1 531E+06
I-129	1 2891E-06	10,382 82	20,765 65	0 00E+00	1.34E-02	2.68E-02	5 0000	5 121E+05
Kr-85	2 7848E-02	10,382 82	20,765 65	0 00E+00	2 89E+02	5 78E+02	7 0000	5 845E+04
Np-237	3 7516E-06	10,382 82	20,765 65	0 00E+00	3 90E-02	7.79E-02	11 0000	6.686E+03
Pa-231	1.2488E-11	10,382 82	20,765 65	0 00E+00	1 30E-07	2.59E-07		
Pb-210	2 4206E-12	10,382 82	20,765 65	0 00E+00	2 51E-08	5 03E-08		
Pm-147	1.5671E-02	10,382 82	20,765 65	0 00E+00	1 63E+02	3 25E+02		
Pu-238	1 4877E-02	10,382 82	20,765 65	0 00E+00	1 54E+02	3 09E+02		
Pu-239	-3 5520E-02	10,382 82	0 00	1 56E+03	1 19E+03	1 56E+03		
Pu-240	2 0690E-02	10,382 82	20,765 65	7 92E+02	1 01E+03	1 22E+03		
Pu-241	-1 4799E-00	10,382 82	0 00	3 56E+04	2 02E+04	3 56E+04		
Pu-242	1.1252E-05	10,382 82	20,765 65	2 11E-01	3 28E-01	4 45E-01		
Ra-226	7 8524E-12	10,382 82	20,765 65	0 00E+00	8 15E-08	1 63E-07		
Ra-228	2 4086E-16	10,382 82	20,765 65	0 00E+00	2.50E-12	5 00E-12		
Ru-106	1 5066E-05	10,382 82	20,765 65	0 00E+00	1 56E-01	3 13E-01		
Se-79	1 0127E-05	10,382 82	20,765 65	0 00E+00	1.05E-01	2.10E-01		
Sn-126	4 3902E-05	10,382 82	20,765 65	0 00E+00	4 56E-01	9 12E-01		
Sr-90	5 0088E-01	10,382 82	20,765 65	0 00E+00	5 20E+03	1 04E+04		
Tc-99	3 9412E-04	10,382 82	20,765 65	0 00E+00	4 09E+00	8 18E+00		
Th-229	2 7219E-12	10,382 82	20,765 65	0 00E+00	2 83E-08	5 65E-08		
Th-230	1 0441E-09	10,382 82	20,765 65	0 00E+00	1 08E-05	2 17E-05		
Th-232	3 1689E-16	10,382 82	20,765 65	0 00E+00	3 29E-12	6 58E-12		
Tl-208	4 6636E-07	10,382 82	20,765 65	0 00E+00	4 84E-03	9 68E-03		
U-232	1.2638E-06	10,382 82	20,765 65	0 00E+00	1 31E-02	2 62E-02		
U-233	5 7451E-10	10,382 82	20,765 65	0 00E+00	5 97E-06	1 19E-05		
U-234	4 3044E-06	10,382 82	20,765 65	0 00E+00	4 47E-02	8 94E-02		
U-235	-7.7765E-09	10,382 82	0 00	3.20E-04	2.39E-04	3 20E-04		
U-236	1 8050E-07	10,382 82	20,765 65	0 00E+00	1 87E-03	3 75E-03		
U-238	-1 7914E-07	10,382 82	0 00	2.33E-02	2.14E-02	2 33E-02		
Y-90	5 0088E-01	10,382 82	20,765 65	0 00E+00	5.20E+03	1.04E+04		
Other Radionuclides					1 47E+04	2 94E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.27E+02	3 98E+02
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 and U	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		10 382.82
Bounding		20 765 65

Nominal burnup taken from SFD and converted to MWd using BOL=98.50%kg
 Bounding burnup assumed to be twice nominal burnup

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 69	
Bounding	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 **FFTF-TFA-P0-2.4 & 5** Fuel decay start date **1992**
 SNF ID # **333** Estimates as of **2030**
 Fuel Units & Descr **3 - HEX ARRAY 169 ROD** Template **FFTF (FAST, SST, 10 to 30%, Pu & U)**
 Heavy Metal Mass **BOL= ; EOL=131.25kg** ²Template Burnup(MWd) **5011.2**
 ROD Storage Site **HANFORD** Template BOL Heavy Metal Mass (MT) **0.0329181**
 Template Decay Time **35 years**

Estimated
Canister usage
18"x15"
0.60

Radionuclide	Ci/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	6.1822E-12	10,725.31	11,359.60	0.00E+00	6.63E-08	7.02E-08	Avg MeV	
Am-241	1.1066E-01	10,725.31	11,359.60	2.74E+02	1.46E+03	1.53E+03	0.0150	3.797E+14
Am-242m	1.9247E-03	10,725.31	11,359.60	0.00E+00	2.06E+01	2.19E+01	0.0250	7.403E+13
Am-243	1.0740E-04	10,725.31	11,359.60	0.00E+00	1.15E+00	1.22E+00	0.0375	8.585E+13
C-14	2.6042E-05	10,725.31	11,359.60	0.00E+00	2.79E-01	2.96E-01	0.0575	8.760E+13
Cl-36	3.4243E-10	10,725.31	11,359.60	0.00E+00	3.67E-06	3.89E-06	0.0850	4.112E+13
Cm-243	4.0629E-04	10,725.31	11,359.60	0.00E+00	4.36E+00	4.62E+00	0.1250	2.894E+13
Cm-244	1.6024E-03	10,725.31	11,359.60	0.00E+00	1.72E+01	1.82E+01	0.2250	3.318E+13
Co-60	3.4275E-03	10,725.31	11,359.60	0.00E+00	3.68E+01	3.89E+01	0.3750	1.438E+13
Cs-134	1.5566E-03	10,725.31	11,359.60	0.00E+00	1.67E+01	1.77E+01	0.5750	5.827E+14
Cs-135	4.7693E-05	10,725.31	11,359.60	0.00E+00	5.12E-01	5.42E-01	0.8500	6.088E+12
Cs-137	1.4007E+00	10,725.31	11,359.60	0.00E+00	1.50E+04	1.59E+04	1.2500	7.287E+12
Eu-154	1.6184E-02	10,725.31	11,359.60	0.00E+00	1.74E+02	1.84E+02	1.7500	1.648E+11
Eu-155	1.3774E-02	10,725.31	11,359.60	0.00E+00	1.48E+02	1.56E+02	2.2500	3.367E+07
Fe-55	3.8028E-04	10,725.31	11,359.60	0.00E+00	4.08E+00	4.32E+00	2.7500	1.886E+08
H-3	3.8454E-03	10,725.31	11,359.60	0.00E+00	4.12E+01	4.37E+01	3.5000	1.234E+06
I-129	1.2891E-06	10,725.31	11,359.60	0.00E+00	1.38E-02	1.46E-02	5.0000	4.485E+05
Kr-85	2.7848E-02	10,725.31	11,359.60	0.00E+00	2.99E+02	3.16E+02	7.0000	5.113E+04
Np-237	3.7516E-06	10,725.31	11,359.60	0.00E+00	4.02E-02	4.26E-02	11.0000	5.847E+03
Pa-231	1.2488E-11	10,725.31	11,359.60	0.00E+00	1.34E-07	1.42E-07		
Pb-210	2.4206E-12	10,725.31	11,359.60	0.00E+00	2.60E-08	2.75E-08		
Pm-147	1.5671E-02	10,725.31	11,359.60	0.00E+00	1.68E+02	1.78E+02		
Pu-238	1.4877E-02	10,725.31	11,359.60	0.00E+00	1.60E+02	1.69E+02		
Pu-239	-3.5520E-02	10,725.31	0.00	2.25E+03	1.87E+03	2.25E+03		
Pu-240	2.0690E-02	10,725.31	11,359.60	1.14E+03	1.36E+03	1.38E+03		
Pu-241	-1.4799E+00	10,725.31	0.00	5.13E+04	3.54E+04	5.13E+04		
Pu-242	1.1252E-05	10,725.31	11,359.60	3.05E-01	4.25E-01	4.32E-01		
Ra-226	7.8524E-12	10,725.31	11,359.60	0.00E+00	8.42E-08	8.92E-08		
Ra-228	2.4086E-16	10,725.31	11,359.60	0.00E+00	2.58E-12	2.74E-12		
Ru-106	1.5066E-05	10,725.31	11,359.60	0.00E+00	1.62E-01	1.71E-01		
Se-79	1.0127E-05	10,725.31	11,359.60	0.00E+00	1.09E-01	1.15E-01		
Sn-126	4.3902E-05	10,725.31	11,359.60	0.00E+00	4.71E-01	4.99E-01		
Sr-90	5.0088E-01	10,725.31	11,359.60	0.00E+00	5.37E+03	5.69E+03		
Tc-99	3.9412E-04	10,725.31	11,359.60	0.00E+00	4.23E+00	4.48E+00		
Th-229	2.7219E-12	10,725.31	11,359.60	0.00E+00	2.92E-08	3.09E-08		
Th-230	1.0441E-09	10,725.31	11,359.60	0.00E+00	1.12E-05	1.19E-05		
Th-232	3.1689E-16	10,725.31	11,359.60	0.00E+00	3.40E-12	3.60E-12		
Tl-208	4.6636E-07	10,725.31	11,359.60	0.00E+00	5.00E-03	5.30E-03		
U-232	1.2638E-06	10,725.31	11,359.60	0.00E+00	1.36E-02	1.44E-02		
U-233	5.7451E-10	10,725.31	11,359.60	0.00E+00	6.16E-06	6.53E-06		
U-234	4.3044E-06	10,725.31	11,359.60	0.00E+00	4.62E-02	4.89E-02		
U-235	-7.7765E-09	10,725.31	0.00	4.61E-04	3.78E-04	4.61E-04		
U-236	1.8050E-07	10,725.31	11,359.60	0.00E+00	1.94E-03	2.05E-03		
U-238	-1.7914E-07	10,725.31	0.00	3.36E-02	3.17E-02	3.36E-02		
Y-90	5.0088E-01	10,725.31	11,359.60	0.00E+00	5.37E+03	5.69E+03		
Other Radionuclides					1.52E+04	1.61E+04		

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 %	Pu and U	Pu and U	
		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		10,725.31	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		11,359.60	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.50		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: FFTF-TFA-SRF-384
 SNF ID #: 334
 Fuel Units & Descr: 2 - HEX ARRAY 91 ROD
 Heavy Metal Mass BOL= , EOL=85 81kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1992
 Estimates as of: 2030
 Template as: 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

II. Estimates							Gamma Sources	
	m	x _n	x _b	b	y _n	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg. MeV	
Ac-227	6.1822E-12	3,631.59	3,953.60	0.00E+00	2.25E-08	2.44E-08	0.0150	1.363E+14
Am-241	1.1066E-01	3,631.59	3,953.60	1.72E+02	5.74E+02	6.10E+02	0.0250	2.584E+13
Am-242m	1.9247E-03	3,631.59	3,953.60	0.00E+00	6.99E+00	7.61E+00	0.0375	2.989E+13
Am-243	1.0740E-04	3,631.59	3,953.60	0.00E+00	3.90E-01	4.25E-01	0.0575	3.156E+13
C-14	2.6042E-05	3,631.59	3,953.60	0.00E+00	9.46E-02	1.03E-01	0.0850	1.007E+13
Cf-254	3.4243E-10	3,631.59	3,953.60	0.00E+00	1.24E-06	1.35E-06	0.1250	1.007E+13
Cm-243	4.0629E-04	3,631.59	3,953.60	0.00E+00	1.48E+00	1.61E+00	0.2250	1.155E+13
Cm-244	1.6024E-03	3,631.59	3,953.60	0.00E+00	5.82E+00	6.34E+00	0.3750	5.008E+12
Co-60	3.4275E-03	3,631.59	3,953.60	0.00E+00	1.24E+01	1.36E+01	0.5750	2.028E+14
Cs-134	1.5566E-03	3,631.59	3,953.60	0.00E+00	5.65E+00	6.15E+00	0.8500	2.119E+12
Cs-135	4.7693E-05	3,631.59	3,953.60	0.00E+00	1.73E-01	1.89E-01	1.2500	2.536E+12
Cs-137	1.4007E+00	3,631.59	3,953.60	0.00E+00	5.09E+03	5.54E+03	1.7500	5.737E+10
Eu-154	1.6184E-02	3,631.59	3,953.60	0.00E+00	5.88E+01	6.40E+01	2.2500	1.207E+07
Eu-155	1.3774E-02	3,631.59	3,953.60	0.00E+00	5.00E+01	5.45E+01	2.7500	6.585E+07
Fe-55	3.8028E-04	3,631.59	3,953.60	0.00E+00	1.38E+00	1.50E+00	3.5000	6.094E+05
H-3	3.8454E-03	3,631.59	3,953.60	0.00E+00	1.40E+01	1.52E+01	5.0000	2.326E+05
I-129	1.2891E-06	3,631.59	3,953.60	0.00E+00	4.68E-03	5.10E-03	7.0000	2.650E+04
Kr-85	2.7848E-02	3,631.59	3,953.60	0.00E+00	1.01E+02	1.10E+02	11.0000	3.030E+03
Np-237	3.7516E-06	3,631.59	3,953.60	0.00E+00	1.36E-02	1.48E-02		
Pa-231	1.2488E-11	3,631.59	3,953.60	0.00E+00	4.54E-08	4.94E-08		
Pb-210	2.4206E-12	3,631.59	3,953.60	0.00E+00	8.79E-09	9.57E-09		
Pm-147	1.5671E-02	3,631.59	3,953.60	0.00E+00	5.69E+01	6.20E+01		
Pu-238	1.4877E-02	3,631.59	3,953.60	0.00E+00	5.40E+01	5.88E+01		
Pu-239	-3.5520E-02	3,631.59	0.00	1.42E+03	1.29E+03	1.42E+03		
Pu-240	2.0690E-02	3,631.59	3,953.60	7.20E+02	7.95E+02	8.01E+02		
Pu-241	-1.4799E+00	3,631.59	0.00	3.23E+04	2.69E+04	3.23E+04		
Pu-242	1.1252E-05	3,631.59	3,953.60	1.92E-01	2.33E-01	2.36E-01		
Ra-226	7.8524E-12	3,631.59	3,953.60	0.00E+00	2.85E-08	3.10E-08		
Ra-228	2.4086E-16	3,631.59	3,953.60	0.00E+00	8.75E-13	9.52E-13		
Ru-106	1.5066E-05	3,631.59	3,953.60	0.00E+00	5.47E-02	5.96E-02		
Se-79	1.0127E-05	3,631.59	3,953.60	0.00E+00	3.68E-02	4.00E-02		
Sn-126	4.3902E-05	3,631.59	3,953.60	0.00E+00	1.59E-01	1.74E-01		
Sr-90	5.0088E-01	3,631.59	3,953.60	0.00E+00	1.82E+03	1.98E+03		
Tc-99	3.9412E-04	3,631.59	3,953.60	0.00E+00	1.43E+00	1.56E+00		
Th-229	2.7219E-12	3,631.59	3,953.60	0.00E+00	9.88E-09	1.08E-08		
Th-230	1.0441E-09	3,631.59	3,953.60	0.00E+00	3.79E-06	4.13E-06		
Th-232	3.1689E-16	3,631.59	3,953.60	0.00E+00	1.15E-12	1.25E-12		
Tl-208	4.6636E-07	3,631.59	3,953.60	0.00E+00	1.69E-03	1.84E-03		
U-232	1.2638E-06	3,631.59	3,953.60	0.00E+00	4.59E-03	5.00E-03		
U-233	5.7451E-10	3,631.59	3,953.60	0.00E+00	2.09E-06	2.27E-06		
U-234	4.3044E-06	3,631.59	3,953.60	0.00E+00	1.56E-02	1.70E-02		
U-235	-7.7765E-09	3,631.59	0.00	2.91E-04	2.62E-04	2.91E-04		
U-236	1.8050E-07	3,631.59	3,953.60	0.00E+00	6.55E-04	7.14E-04		
U-238	-1.7914E-07	3,631.59	0.00	2.12E-02	2.05E-02	2.12E-02		
Y-90	5.0088E-01	3,631.59	3,953.60	0.00E+00	1.82E+03	1.98E+03		
Other Radionuclides					5.15E+03	5.60E+03		

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	Pu and U	Pu and U	
BOL Enrichment %		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		3,631.59	Nominal burnup taken from SFD and converted to MWd using BOL=89.448kg Bounding burnup taken from SFD and converted to MWd using BOL=89.448kg
Bounding		3,953.60	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal	0.27		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	FFTF-TFA-UO-1	Fuel decay start date	1992
SNF ID #	335	Estimates as of	2030
Fuel Units & Descr	1 - HEX ARRAY 217 ROD	Template	FFTF (FAST, SST, 10 to 30%, Pu & U)
Heavy Metal Mass	BOL= , EOL=35 012kg	Template Burnup(MWd)	5011.2
ROD Storage Site	HANFORD	Template BOL Heavy Metal Mass (MT)	0.0329181
		Template Decay Time	35 years

Estimated
Canister usage
18"x15"
0 20

Radionuclide	m		x _a		x _b		b		y _a		y _b		Gamma Sources	
	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)	Avg MeV					
Ac-227	6.1822E-12	835.27	1,229.60	0.00E+00	5.16E-09	7.60E-09								
Am-241	1.1066E-01	835.27	1,229.60	6.91E+01	1.62E+02	2.05E+02							0.0150	4.323E+13
Am-242m	1.9247E-03	835.27	1,229.60	0.00E+00	1.61E+00	2.37E+00							0.0250	8.050E+12
Am-243	1.0740E-04	835.27	1,229.60	0.00E+00	8.97E-02	1.32E-01							0.0375	9.296E+12
C-14	2.6042E-05	835.27	1,229.60	0.00E+00	2.18E-02	3.20E-02							0.0575	1.003E+13
Cl-36	3.4243E-10	835.27	1,229.60	0.00E+00	2.86E-07	4.21E-07							0.0850	4.451E+12
Cm-243	4.0629E-04	835.27	1,229.60	0.00E+00	3.39E-01	5.00E-01							0.1250	3.134E+12
Cm-244	1.6024E-03	835.27	1,229.60	0.00E+00	1.34E+00	1.97E+00							0.2250	3.592E+12
Co-60	3.4275E-03	835.27	1,229.60	0.00E+00	2.86E+00	4.21E+00							0.3750	1.558E+12
Cs-134	1.5566E-03	835.27	1,229.60	0.00E+00	1.30E+00	1.91E+00							0.5750	6.307E+13
Cs-135	4.7693E-05	835.27	1,229.60	0.00E+00	3.98E-02	5.86E-02							0.8500	6.590E+11
Cs-137	1.4007E+00	835.27	1,229.60	0.00E+00	1.17E+03	1.72E+03							1.2500	7.887E+11
Eu-154	1.6184E-02	835.27	1,229.60	0.00E+00	1.35E+01	1.99E+01							1.7500	1.784E+10
Eu-155	1.3774E-02	835.27	1,229.60	0.00E+00	1.15E+01	1.69E+01							2.2500	3.824E+06
Fe-55	3.8028E-04	835.27	1,229.60	0.00E+00	3.18E-01	4.68E-01							2.7500	2.052E+07
H-3	3.8454E-03	835.27	1,229.60	0.00E+00	3.21E+00	4.73E+00							3.5000	2.257E+05
I-129	1.2891E-06	835.27	1,229.60	0.00E+00	1.08E-03	1.59E-03							5.0000	8.766E+04
Kr-85	2.7848E-02	835.27	1,229.60	0.00E+00	2.33E+01	3.42E+01							7.0000	9.988E+03
Np-237	3.7516E-06	835.27	1,229.60	0.00E+00	3.13E-03	4.61E-03							11.0000	1.142E+03
Pa-231	1.2488E-11	835.27	1,229.60	0.00E+00	1.04E-08	1.54E-08								
Pb-210	2.4206E-12	835.27	1,229.60	0.00E+00	2.02E-09	2.98E-09								
Pm-147	1.5671E-02	835.27	1,229.60	0.00E+00	1.31E+01	1.93E+01								
Pu-238	1.4877E-02	835.27	1,229.60	0.00E+00	1.24E+01	1.83E+01								
Pu-239	-3.5520E-02	835.27	0.00	5.67E+02	5.38E+02	5.67E+02								
Pu-240	2.0690E-02	835.27	1,229.60	2.88E+02	3.06E+02	3.14E+02								
Pu-241	-1.4799E+00	835.27	0.00	1.29E+04	1.17E+04	1.29E+04								
Pu-242	1.1252E-05	835.27	1,229.60	7.69E-02	8.63E-02	9.07E-02								
Ra-226	7.8524E-12	835.27	1,229.60	0.00E+00	6.56E-09	9.66E-09								
Ra-228	2.4086E-16	835.27	1,229.60	0.00E+00	2.01E-13	2.96E-13								
Ru-106	1.5066E-05	835.27	1,229.60	0.00E+00	1.26E-02	1.85E-02								
Se-79	1.0127E-05	835.27	1,229.60	0.00E+00	8.46E-03	1.25E-02								
Sn-126	4.3902E-05	835.27	1,229.60	0.00E+00	3.67E-02	5.40E-02								
Sr-90	5.0088E-01	835.27	1,229.60	0.00E+00	4.18E+02	6.16E+02								
Tc-99	3.9412E-04	835.27	1,229.60	0.00E+00	3.29E-01	4.85E-01								
Th-229	2.7219E-12	835.27	1,229.60	0.00E+00	2.27E-09	3.35E-09								
Th-230	1.0441E-09	835.27	1,229.60	0.00E+00	8.72E-07	1.28E-06								
Th-232	3.1689E-16	835.27	1,229.60	0.00E+00	2.65E-13	3.90E-13								
Th-208	4.6636E-07	835.27	1,229.60	0.00E+00	3.90E-04	5.73E-04								
U-232	1.2638E-06	835.27	1,229.60	0.00E+00	1.06E-03	1.55E-03								
U-233	5.7451E-10	835.27	1,229.60	0.00E+00	4.80E-07	7.06E-07								
U-234	4.3044E-06	835.27	1,229.60	0.00E+00	3.60E-03	5.29E-03								
U-235	-7.7765E-09	835.27	0.00	1.16E-04	1.10E-04	1.16E-04								
U-236	1.8050E-07	835.27	1,229.60	0.00E+00	1.51E-04	2.22E-04							4.10E+01	4.80E+01
U-238	-1.7914E-07	835.27	0.00	8.48E-03	8.33E-03	8.48E-03							Total	Total
Y-90	5.0088E-01	835.27	1,229.60	0.00E+00	4.18E+02	6.16E+02								
Other Radionuclides					1.18E+03	1.74E+03								

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons. This fuel matches on all parameters except enrichment (unknown)
Reactor Moderator:	From SFD: FAST	Used: FAST	
Fuel Cladding:	SST	SST	
BOL HM Constituents:	Pu and U	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=35.848kg Bounding burnup taken from SFD and converted to MWd using BOL=35.848kg
Nominal	From SFD	Estimated: 835.27	
Bounding		1,229.60	
Checks			Estimated EOL HM/Given EOL HM 1.00
Nominal	Burnup Multiplier: 0.15	Estimated Burnup/Given Burnup	
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: FFTF-TFA-WBO18 & WBO42
 SNF ID #: 336
 Fuel Units & Descr: 2 - HEX ARRAY 61 ROD
 Heavy Metal Mass: BOL= ; EOL=94 984kg
 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"
 0 40

Radionuclide	m Cu/MWd From Template	x _a Nominal Fuel Burnup (MWd) ²	x _b Bounding Fuel Burnup (MWd) ²	b Initial Activity (Ci)	y _a Nominal Fuel Inventories(Ci)	y _b Bounding Fuel Inventories(Ci)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9 6110E-08	1,204 37	1,348 90	0 00E+00	1 16E-04	1 30E-04	Avg. MeV	
Am-241	6 5601E-07	1,204 37	1,348 90	0 00E+00	7 90E-04	8 85E-04	0 0150	8 926E+13
Am-242m	0 0000E+00	1,204 37	1,348 90	0 00E+00	0 00E+00	0 00E+00	0 0250	1 854E+13
Am-243	8 3770E-15	1,204 37	1,348 90	0 00E+00	1 01E-11	1,13E-11	0 0375	1 631E+13
C-14	2 1714E-05	1,204 37	1,348 90	0 00E+00	2 62E-02	2 93E-02	0 0575	1 728E+13
Cl-36	5 5188E-08	1,204 37	1,348 90	0 00E+00	6 65E-05	7 44E-05	0 0850	1 045E+13
Cm-243	1 5496E-14	1,204 37	1,348 90	0 00E+00	1 87E-11	2 09E-11	0 1250	6 768E+12
Cm-244	5 2375E-16	1,204 37	1,348 90	0 00E+00	6 31E-13	7 06E-13	0,2250	8 970E+12
Co-60	2 0947E-03	1,204 37	1,348 90	0 00E+00	2,52E+00	2 83E+00	0 3750	3 908E+12
Cs-134	6 2448E-07	1,204 37	1,348 90	0 00E+00	7 52E-04	8 42E-04	0 5750	6 904E+13
Cs-135	4 4996E-05	1,204 37	1,348 90	0 00E+00	5 42E-02	6 07E-02	0 8500	6 376E+11
Cs-137	1 3775E+00	1,204 37	1,348 90	0 00E+00	1 66E+03	1 86E+03	1 2500	4 229E+11
Eu-154	1 8510E-04	1,204 37	1,348 90	0 00E+00	2 23E-01	2 50E-01	1 7500	1 645E+10
Eu-155	1 4163E-03	1,204 37	1,348 90	0 00E+00	1 71E+00	1 91E+00	2,2500	2 902E+06
Fe-55	1 4179E-05	1,204 37	1,348 90	0 00E+00	1 71E-02	1 91E-02	2,7500	2 798E+05
H-3	3 5383E-03	1,204 37	1,348 90	0 00E+00	4 26E+00	4 77E+00	3 5000	3 574E+02
I-129	1 1426E-06	1,204 37	1,348 90	0 00E+00	1 38E-03	1 54E-03	5 0000	1 306E+02
Kr-85	3 8604E-02	1,204 37	1,348 90	0 00E+00	4 65E+01	5 21E+01	7 0000	1 244E+01
Np-237	3 3099E-06	1,204 37	1,348 90	0 00E+00	3 99E-03	4 46E-03	11 0000	1 257E+00
Pa-231	1 8953E-07	1,204 37	1,348 90	0 00E+00	2 28E-04	2 56E-04		
Pb-210	8 9531E-12	1,204 37	1,348 90	0 00E+00	1 08E-08	1 21E-08		
Pm-147	1 1588E-03	1,204 37	1,348 90	0 00E+00	1 40E+00	1 56E+00		
Pu-238	1 7146E-04	1,204 37	1,348 90	0 00E+00	2 07E-01	2 31E-01		
Pu-239	1 9464E-02	1,204 37	1,348 90	0 00E+00	2 34E+01	2 63E+01		
Pu-240	6 7919E-05	1,204 37	1,348 90	0 00E+00	8 18E-02	9 16E-02		
Pu-241	4 1774E-06	1,204 37	1,348 90	0 00E+00	5 03E-03	5 63E-03		
Pu-242	4 3751E-13	1,204 37	1,348 90	0 00E+00	5 27E-10	5 90E-10		
Ra-226	2 4219E-11	1,204 37	1,348 90	0 00E+00	2 92E-08	3 27E-08		
Ra-228	2 3572E-11	1,204 37	1,348 90	0 00E+00	2 84E-08	3 18E-08		
Ru-106	3 0951E-10	1,204 37	1,348 90	0 00E+00	3 73E-07	4 18E-07		
Se-79	1 6488E-05	1,204 37	1,348 90	0 00E+00	1 99E-02	2 22E-02		
Sn-126	3 7564E-05	1,204 37	1,348 90	0 00E+00	4 52E-02	5 07E-02		
Sr-90	1 2052E+00	1,204 37	1,348 90	0 00E+00	1 45E+03	1 63E+03		
Ta-99	4 4825E-04	1,204 37	1,348 90	0 00E+00	5 40E-01	6 05E-01		
Th-229	4 6478E-11	1,204 37	1,348 90	0 00E+00	5 60E-08	6 27E-08		
Th-230	2 2259E-09	1,204 37	1,348 90	0 00E+00	2 68E-06	3 00E-06		
Th-232	2 3691E-11	1,204 37	1,348 90	0 00E+00	2 85E-08	3 20E-08		
Th-208	5 8256E-09	1,204 37	1,348 90	0 00E+00	7 02E-06	7 86E-06		
U-232	1 5759E-08	1,204 37	1,348 90	0 00E+00	1 90E-05	2 13E-05		
U-233	1 0110E-08	1,204 37	1,348 90	0 00E+00	1 22E-05	1 36E-05		
U-234	4 9001E-06	1,204 37	1,348 90	0 00E+00	5 90E-03	6 61E-03		
U-235	-2 3191E-06	1,204 37	0 00	5 33E-02	5 05E-02	5 33E-02		
U-236	1 2633E-05	1,204 37	1,348 90	0 00E+00	1 52E-02	1 70E-02		
U-238	-9 5407E-08	1,204 37	0 00	2 41E-02	2 40E-02	2 41E-02		
Y-90	1 2053E+00	1,204 37	1,348 90	0 00E+00	1 45E+03	1 63E+03		
Other Radionuclides					1 65E+03	1 85E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons: This template is a good approximation since it is a FAST, Uranium fuel
Reactor Moderator	From SFD	Used	
Fuel Cladding	FAST	FAST	
BOL HM Constituents	SST	ZIRC	
BOL Enrichment %	U	U	
		10 to 40	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup taken from SFD and converted to MWd using BOL=96.35kg Bounding burnup taken from SFD and converted to MWd using BOL=96.35kg
	From SFD	Estimated	
Nominal		1,204 37	
Bounding		1 348 90	

Checks			Estimated EOL HM/Given EOL HM 1 00
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	4 00		
Bounding	4 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	GE TEST	¹ Fuel decay start date	1972
SNF ID #	96	Estimates as of	2030
Fuel Units & Descr	22 - CANISTER OF SCRAP	Template	FFTF (FAST, SST, 10 to 30% Pu & U)
Heavy Metal Mass	BOL= , EOL=45.203kg	² Template Burnup(MWd)	5011.2
ROD Storage Site	HANFORD	Template BOL Heavy Metal Mass (MT)	0 0329181
		Template Decay Time	50 years

Estimated
Canister usage
HIC
2 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	9 4369E-12	45,119.38	45,119.38	0 00E+00	4 26E-07	4.26E-07								
Am-241	1 1078E-01	45,119.38	45,119.38	1 74E+02	5 17E+03	5 17E+03							0 0150	9 732E+14
Am-242m	1 7940E-03	45,119.38	45,119.38	0 00E+00	8 09E+01	8 09E+01							0 0250	1 917E+14
Am-243	1 0724E-04	45,119.38	45,119.38	0 00E+00	4 84E+00	4 84E+00							0 0375	2 185E+14
C-14	2 5942E-05	45,119.38	45,119.38	0 00E+00	1 17E+00	1 17E+00							0 0575	2 428E+14
Cl-36	3 4243E-10	45,119.38	45,119.38	0 00E+00	1 55E-05	1 55E-05							0 0850	1 026E+14
Cm-243	2 8217E-04	45,119.38	45,119.38	0 00E+00	1 27E+01	1 27E+01							0 1250	6 757E+13
Cm-244	7 7027E-04	45,119.38	45,119.38	0 00E+00	3 48E+01	3 48E+01							0 2250	8 525E+13
Co-60	1 3011E-04	45,119.38	45,119.38	0 00E+00	5 87E+00	5 87E+00							0 3750	3 629E+13
Cs-134	1 2951E-07	45,119.38	45,119.38	0 00E+00	5 84E-03	5 84E-03							0 5750	1 538E+15
Cs-135	4 7693E-05	45,119.38	45,119.38	0 00E+00	2 15E+00	2 15E+00							0 8500	8 034E+12
Cs-137	9 3351E-01	45,119.38	45,119.38	0 00E+00	4 21E+04	4 21E+04							1 2500	4 756E+12
Eu-154	2 6341E-03	45,119.38	45,119.38	0 00E+00	1 19E+02	1 19E+02							1 7500	2 190E+11
Eu-155	4 0968E-04	45,119.38	45,119.38	0 00E+00	1 85E+01	1 85E+01							2 2500	2 164E+07
Fe-55	2 5543E-07	45,119.38	45,119.38	0 00E+00	1 15E-02	1 15E-02							2 7500	6 416E+08
H-3	1 2053E-03	45,119.38	45,119.38	0 00E+00	5 44E+01	5 44E+01							3 5000	1 517E+06
I-129	1 2891E-06	45,119.38	45,119.38	0 00E+00	5 82E-02	5 82E-02							5 0000	6 435E+05
Kr-85	7 0043E-03	45,119.38	45,119.38	0 00E+00	3 16E+02	3 16E+02							7 0000	7 329E+04
Np-237	4 3622E-06	45,119.38	45,119.38	0 00E+00	1 97E-01	1 97E-01							11 0000	8 374E+03
Pa-231	1 6733E-11	45,119.38	45,119.38	0 00E+00	7 55E-07	7 55E-07								
Pb-210	6 0684E-12	45,119.38	45,119.38	0 00E+00	2 74E-07	2 74E-07								
Pm-147	1 1315E-05	45,119.38	45,119.38	0 00E+00	5 11E-01	5 11E-01								
Pu-238	6 1482E-03	45,119.38	45,119.38	0 00E+00	2 77E+02	2 77E+02								
Pu-239	-3 5520E-02	45,119.38	0 00	1 43E+03	0 00E+00	1 43E+03								
Pu-240	2 0590E-02	45,119.38	45,119.38	7 27E+02	1 66E+03	1 66E+03								
Pu-241	-2 0307E+00	45,119.38	0 00	3 26E+04	0 00E+00	3 26E+04								
Pu-242	1 1252E-05	45,119.38	45,119.38	1 94E-01	7 02E-01	7 02E-01								
Ra-226	1 6601E-11	45,119.38	45,119.38	0 00E+00	7 49E-07	7 49E-07								
Ra-228	3 7077E-16	45,119.38	45,119.38	0 00E+00	1 67E-11	1 67E-11								
Ru-106	3 3126E-14	45,119.38	45,119.38	0 00E+00	1 49E-09	1 49E-09								
Se-79	1 0117E-05	45,119.38	45,119.38	0 00E+00	4 56E-01	4 56E-01								
Sn-126	4 3902E-05	45,119.38	45,119.38	0 00E+00	1 98E+00	1 98E+00								
Sr-90	3 2926E-01	45,119.38	45,119.38	0 00E+00	1 49E+04	1 49E+04								
Tc-99	3 9412E-04	45,119.38	45,119.38	0 00E+00	1 78E+01	1 78E+01								
Th-229	3 6957E-12	45,119.38	45,119.38	0 00E+00	1 67E-07	1 67E-07								
Th-230	1 6942E-09	45,119.38	45,119.38	0 00E+00	7 64E-05	7 64E-05								
Th-232	4 6236E-16	45,119.38	45,119.38	0 00E+00	2 09E-11	2 09E-11								
Tl-208	4 0390E-07	45,119.38	45,119.38	0 00E+00	1 82E-02	1 82E-02								
U-232	1 0941E-06	45,119.38	45,119.38	0 00E+00	4 94E-02	4 94E-02								
U-233	8 1218E-10	45,119.38	45,119.38	0 00E+00	3 66E-05	3 66E-05								
U-234	5 3101E-06	45,119.38	45,119.38	0 00E+00	2 40E-01	2 40E-01								
U-235	-6 7647E-09	45,119.38	0 00	2 94E-04	0 00E+00	2 94E-04								
U-236	2 1272E-07	45,119.38	45,119.38	0 00E+00	9 60E-03	9 60E-03							5 39E+02	5 85E+02
U-238	-1 7914E-07	45,119.38	0 00	2 14E-02	1 33E-02	2 14E-02							Total	Total
Y-90	3 2926E-01	45,119.38	45,119.38	0 00E+00	1 49E+04	1 49E+04								
Other Radionuclides					4 34E+04	4 34E+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	SST	
BOL HM Constituents	Pu and U	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.
Nominal	From SFD	Estimated	
Bounding		45,119.38	
Checks			Estimated EOL HM/Given EOL HM 1 05
Nominal	Burnup Multiplier	Estimated Burnup/Given Burnup	
Bounding	3.28	3.28	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: LWR COMMERCIAL FUEL
 SNF ID #: 130
 Fuel Units & Descr: 6 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL= , EOL=63 893kg
 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
 HIC
 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) ³	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	8 7758E-10	60,759 03	60,759 03	0 00E+00	5 33E-05	5 33E-05		
Am-241	1 4352E-01	60,759 03	60,759 03	0 00E+00	8 72E+03	8 72E+03	0 0150	3 269E+15
Am-242m	2 8698E-04	60,759 03	60,759 03	0 00E+00	1 74E+01	1 74E+01	0 0250	6 592E+14
Am-243	6 2565E-04	60,759 03	60,759 03	0 00E+00	3 80E+01	3 80E+01	0 0375	6 287E+14
C-14	4 7901E-05	60,759 03	60,759 03	0 00E+00	2 91E+00	2 91E+00	0 0575	7 265E+14
Cl-36	8 0297E-07	60,759 03	60,759 03	0 00E+00	4 88E-02	4 88E-02	0 0850	3 658E+14
Cm-243	2 5081E-04	60,759 03	60,759 03	0 00E+00	1 52E+01	1 52E+01	0 1250	2 538E+14
Cm-244	4 9015E-02	60,759 03	60,759 03	0 00E+00	2 98E+03	2 98E+03	0 2250	3 137E+14
Co-60	2 5581E-03	60,759 03	60,759 03	0 00E+00	1 55E+02	1 55E+02	0 3750	1 349E+14
Cs-134	4 0536E-05	60,759 03	60,759 03	0 00E+00	2 46E+00	2 46E+00	0 5750	3 137E+15
Cs-135	1 4433E-05	60,759 03	60,759 03	0 00E+00	8 77E-01	8 77E-01	0 8500	4 340E+13
Cs-137	1 3979E+00	60,759 03	60,759 03	0 00E+00	8 49E+04	8 49E+04	1 2500	4 263E+13
Eu-154	2 0203E-02	60,759 03	60,759 03	0 00E+00	1 23E+03	1 23E+03	1 7500	1 277E+12
Eu-155	1 7684E-03	60,759 03	60,759 03	0 00E+00	1 07E+02	1 07E+02	2 2500	2 056E+08
Fe-55	4 3136E-05	60,759 03	60,759 03	0 00E+00	2 62E+00	2 62E+00	2 7500	4 212E+08
H-3	2 0769E-02	60,759 03	60,759 03	0 00E+00	1 26E+03	1 26E+03	3 5000	4 336E+07
I-129	9 8288E-07	60,759 03	60,759 03	0 00E+00	5 97E-02	5 97E-02	5 0000	1 854E+07
Kr-85	2 8214E-02	60,759 03	60,759 03	0 00E+00	1 71E+03	1 71E+03	7 0000	2 137E+06
Np-237	1 1218E-05	60,759 03	60,759 03	0 00E+00	6 82E-01	6 82E-01	11 0000	2 454E+05
Pa-231	1 3036E-09	60,759 03	60,759 03	0 00E+00	7 92E-05	7 92E-05		
Pb-210	8 5078E-11	60,759 03	60,759 03	0 00E+00	5 17E-06	5 17E-06		
Pm-147	3 6531E-04	60,759 03	60,759 03	0 00E+00	2 22E+01	2 22E+01		
Pu-238	7 4564E-02	60,759 03	60,759 03	0 00E+00	4 53E+03	4 53E+03		
Pu-239	1 1623E-02	60,759 03	60,759 03	0 00E+00	7 06E+02	7 06E+02		
Pu-240	1 5132E-02	60,759 03	60,759 03	0 00E+00	9 19E+02	9 19E+02		
Pu-241	9 0036E-01	60,759 03	60,759 03	0 00E+00	5 47E+04	5 47E+04		
Pu-242	6 4260E-05	60,759 03	60,759 03	0 00E+00	3 90E+00	3 90E+00		
Ra-226	2 2804E-10	60,759 03	60,759 03	0 00E+00	1 39E-05	1 39E-05		
Ra-228	5 2713E-12	60,759 03	60,759 03	0 00E+00	3 20E-07	3 20E-07		
Ru-106	6 1160E-10	60,759 03	60,759 03	0 00E+00	3 72E-05	3 72E-05		
Se-79	1 2377E-05	60,759 03	60,759 03	0 00E+00	7 52E-01	7 52E-01		
Sn-126	2 5210E-05	60,759 03	60,759 03	0 00E+00	1 53E+00	1 53E+00		
Sr-90	9 1667E-01	60,759 03	60,759 03	0 00E+00	5 57E+04	5 57E+04		
Tc-99	3 9357E-04	60,759 03	60,759 03	0 00E+00	2 39E+01	2 39E+01		
Th-229	1 2057E-10	60,759 03	60,759 03	0 00E+00	7 33E-06	7 33E-06		
Th-230	2 1043E-08	60,759 03	60,759 03	0 00E+00	1 28E-03	1 28E-03		
Th-232	5 2972E-12	60,759 03	60,759 03	0 00E+00	3 22E-07	3 22E-07		
Tl-208	1 7474E-07	60,759 03	60,759 03	0 00E+00	1 06E-02	1 06E-02		
U-232	4 7368E-07	60,759 03	60,759 03	0 00E+00	2 88E-02	2 88E-02		
U-233	2 5097E-08	60,759 03	60,759 03	0 00E+00	1 52E-03	1 52E-03		
U-234	5 0000E-05	60,759 03	60,759 03	0 00E+00	3 04E+00	3 04E+00		
U-235	-1 4489E-06	60,759 03	0 00	8 84E-03	0 00E+00	8 84E-03		
U-236	7 5824E-06	60,759 03	60,759 03	0 00E+00	4 61E-01	4 61E-01		
U-238	-2 6129E-07	60,759 03	0 00	4 16E-02	2 57E-02	4 16E-02		
Y-90	9 1699E-01	60,759 03	60,759 03	0 00E+00	5 57E+04	5 57E+04		
Other Radionuclides					8 16E+04	8 16E+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	ZIRC	
BOL HM Constituents	U	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		60 759 03	
Bounding		60 759 03	

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 LWR SCRAP
 SNF ID # 309
 Fuel Units & Descr: 1 - SCRAP
 Heavy Metal Mass: BOL=76.554kg EOL=75.31kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1963
 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: 65 years

Estimated
 Canister usage
 HIC
 1.00

Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.2581E-09	2,143.51	2,449.72	0.00E+00	2.70E-06	3.08E-06	Avg MeV	
Am-241	1.4761E-01	2,143.51	2,449.72	0.00E+00	3.16E+02	3.62E+02	0.0150	6.632E+13
Am-242m	2.5032E-04	2,143.51	2,449.72	0.00E+00	5.37E-01	6.13E-01	0.0250	1.317E+13
Am-243	6.2387E-04	2,143.51	2,449.72	0.00E+00	1.34E+00	1.53E+00	0.0375	1.231E+13
C-14	4.7739E-05	2,143.51	2,449.72	0.00E+00	1.02E-01	1.17E-01	0.0575	1.690E+13
Cf-252	8.0297E-07	2,143.51	2,449.72	0.00E+00	1.72E-03	1.97E-03	0.0850	7.209E+12
Cm-243	1.2099E-04	2,143.51	2,449.72	0.00E+00	2.59E-01	2.96E-01	0.1250	4.702E+12
Cm-244	1.5560E-02	2,143.51	2,449.72	0.00E+00	3.34E+01	3.81E+01	0.2250	6.130E+12
Co-60	4.9580E-05	2,143.51	2,449.72	0.00E+00	1.06E-01	1.21E-01	0.3750	2.653E+12
Cs-134	1.7022E-09	2,143.51	2,449.72	0.00E+00	3.65E-06	4.17E-06	0.5750	6.316E+13
Cs-135	1.4433E-05	2,143.51	2,449.72	0.00E+00	3.09E-02	3.54E-02	0.8500	5.063E+11
Cs-137	6.9929E-01	2,143.51	2,449.72	0.00E+00	1.50E+03	1.71E+03	1.2500	2.367E+11
Eu-154	1.8023E-03	2,143.51	2,449.72	0.00E+00	3.86E+00	4.42E+00	1.7500	1.362E+10
Eu-155	2.6793E-05	2,143.51	2,449.72	0.00E+00	5.74E-02	6.56E-02	2.2500	2.399E+06
Fe-55	1.4580E-08	2,143.51	2,449.72	0.00E+00	3.13E-05	3.57E-05	2.7500	1.193E+07
H-3	3.8566E-03	2,143.51	2,449.72	0.00E+00	8.27E+00	9.45E+00	3.5000	5.921E+05
I-129	9.8288E-07	2,143.51	2,449.72	0.00E+00	2.11E-03	2.41E-03	5.0000	2.529E+05
Kr-85	4.0617E-03	2,143.51	2,449.72	0.00E+00	8.71E+00	9.95E+00	7.0000	2.911E+04
Np-237	1.2645E-05	2,143.51	2,449.72	0.00E+00	2.71E-02	3.10E-02	11.0000	3.341E+03
Pa-231	1.6376E-09	2,143.51	2,449.72	0.00E+00	3.51E-06	4.01E-06		
Pb-210	2.8795E-10	2,143.51	2,449.72	0.00E+00	6.17E-07	7.05E-07		
Pm-147	1.3264E-07	2,143.51	2,449.72	0.00E+00	2.84E-04	3.25E-04		
Pu-238	5.8882E-02	2,143.51	2,449.72	0.00E+00	1.26E+02	1.44E+02		
Pu-239	1.1613E-02	2,143.51	2,449.72	0.00E+00	2.49E+01	2.84E+01		
Pu-240	1.5142E-02	2,143.51	2,449.72	0.00E+00	3.25E+01	3.71E+01		
Pu-241	2.1269E-01	2,143.51	2,449.72	0.00E+00	4.56E+02	5.21E+02		
Pu-242	6.4260E-05	2,143.51	2,449.72	0.00E+00	1.38E-01	1.57E-01		
Ra-226	5.8689E-10	2,143.51	2,449.72	0.00E+00	1.26E-06	1.44E-06		
Ra-228	5.3036E-12	2,143.51	2,449.72	0.00E+00	1.14E-08	1.30E-08		
Ru-106	6.8136E-19	2,143.51	2,449.72	0.00E+00	1.46E-15	1.67E-15		
Se-79	1.2372E-05	2,143.51	2,449.72	0.00E+00	2.65E-02	3.03E-02		
Sn-126	2.5194E-05	2,143.51	2,449.72	0.00E+00	5.40E-02	6.17E-02		
Sr-90	4.4913E-01	2,143.51	2,449.72	0.00E+00	9.63E+02	1.10E+03		
Tc-99	3.9357E-04	2,143.51	2,449.72	0.00E+00	8.44E-01	9.64E-01		
Th-229	1.9331E-10	2,143.51	2,449.72	0.00E+00	4.14E-07	4.74E-07		
Th-230	3.5223E-08	2,143.51	2,449.72	0.00E+00	7.55E-05	8.63E-05		
Th-232	5.3085E-12	2,143.51	2,449.72	0.00E+00	1.14E-08	1.30E-08		
Tl-208	1.3102E-07	2,143.51	2,449.72	0.00E+00	2.81E-04	3.21E-04		
U-232	3.5497E-07	2,143.51	2,449.72	0.00E+00	7.81E-04	8.70E-04		
U-233	2.6647E-08	2,143.51	2,449.72	0.00E+00	5.71E-05	6.53E-05		
U-234	5.5023E-05	2,143.51	2,449.72	0.00E+00	1.18E-01	1.35E-01		
U-235	-1.4485E-06	2,143.51	0.00	4.58E-03	1.47E-03	4.58E-03		
U-236	7.5969E-06	2,143.51	2,449.72	0.00E+00	1.63E-02	1.86E-02		
U-238	-2.6129E-07	2,143.51	0.00	2.50E-02	2.45E-02	2.50E-02		
Y-90	4.4913E-01	2,143.51	2,449.72	0.00E+00	9.63E+02	1.10E+03		
Other Radionuclides					1.45E+03	1.66E+03		

Thermal Power	
Nominal Heat Output (Watts)	3.15E+01
Bounding Heat Output (Watts)	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:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	2.767	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate
	From SFD	Estimated	
Nominal	2,143.51	1,182.79	
Bounding	2,449.72	2,365.59	

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	0.80	0.55	
Bounding	0.91	0.97	

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: N REACTOR
 SNF ID #: 991
 Fuel Units & Descr: 103673 - 2 CONCENTRIC TUBES
 Heavy Metal Mass: BOL=2102208 523kg, EOL=2099824 044kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1971
 Estimates as of: 2030
 Template: N-Reactor (Graphite, Zinc, 0 to 5%, U)
²Template Burnup(MWd): 69600
 Template BOL Heavy Metal Mass (MT): 11.6
 Template Decay Time: 50 years

Estimated
 Canister usage:
 MCO
 383.97

Radionuclide	Ci/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	8.7399E-10	5,060,015.91	5,718,007.18	0.00E+00	4.42E-03	5.00E-03	Avg MeV	
Am-241	9.9095E-02	5,060,015.91	5,718,007.18	0.00E+00	5.01E+05	5.67E+05	0.0150	1.961E+17
Am-242m	5.4598E-05	5,060,015.91	5,718,007.18	0.00E+00	2.76E+02	3.12E+02	0.0250	3.987E+16
Am-243	4.6221E-05	5,060,015.91	5,718,007.18	0.00E+00	2.34E+02	2.64E+02	0.0375	3.672E+16
C-14	9.1853E-05	5,060,015.91	5,718,007.18	0.00E+00	4.65E+02	5.25E+02	0.0575	4.438E+16
Cl-36	0.0000E+00	5,060,015.91	5,718,007.18	0.00E+00	0.00E+00	0.00E+00	0.0850	2.204E+16
Cm-243	0.0000E+00	5,060,015.91	5,718,007.18	0.00E+00	0.00E+00	0.00E+00	0.1250	1.441E+16
Cm-244	2.5589E-04	5,060,015.91	5,718,007.18	0.00E+00	1.29E+03	1.46E+03	0.2250	1.887E+16
Co-60	8.8563E-06	5,060,015.91	5,718,007.18	0.00E+00	4.48E+01	5.06E+01	0.3750	8.181E+15
Cs-134	9.0661E-08	5,060,015.91	5,718,007.18	0.00E+00	4.59E-01	5.18E-01	0.5750	1.784E+17
Cs-135	1.0066E-05	5,060,015.91	5,718,007.18	0.00E+00	5.09E+01	5.76E+01	0.8500	1.524E+15
Cs-137	8.4454E-01	5,060,015.91	5,718,007.18	0.00E+00	4.27E+06	4.83E+06	1.2500	6.649E+14
Eu-154	1.9842E-03	5,060,015.91	5,718,007.18	0.00E+00	1.00E+04	1.13E+04	1.7500	4.073E+13
Eu-155	3.5690E-05	5,060,015.91	5,718,007.18	0.00E+00	1.81E+02	2.04E+02	2.2500	3.974E+09
Fe-55	5.2802E-08	5,060,015.91	5,718,007.18	0.00E+00	2.67E-01	3.02E-01	2.7500	1.194E+08
H-3	9.0776E-04	5,060,015.91	5,718,007.18	0.00E+00	4.59E+03	5.19E+03	3.5000	1.056E+08
I-129	8.6006E-07	5,060,015.91	5,718,007.18	0.00E+00	4.35E+00	4.92E+00	5.0000	4.451E+07
Kr-85	1.0138E-02	5,060,015.91	5,718,007.18	0.00E+00	5.13E+04	5.80E+04	7.0000	5.033E+06
Np-237	9.0345E-06	5,060,015.91	5,718,007.18	0.00E+00	4.57E+01	5.17E+01	11.0000	5.726E+05
Pa-231	1.9210E-09	5,060,015.91	5,718,007.18	0.00E+00	9.72E-03	1.10E-02		
Pb-210	7.5862E-11	5,060,015.91	5,718,007.18	0.00E+00	3.84E-04	4.34E-04		
Pm-147	1.1372E-05	5,060,015.91	5,718,007.18	0.00E+00	5.75E+01	6.50E+01		
Pu-238	1.7802E-02	5,060,015.91	5,718,007.18	0.00E+00	9.01E+04	1.02E+05		
Pu-239	2.8822E-02	5,060,015.91	5,718,007.18	0.00E+00	1.46E+05	1.65E+05		
Pu-240	2.2759E-02	5,060,015.91	5,718,007.18	0.00E+00	1.15E+05	1.30E+05		
Pu-241	2.9641E-01	5,060,015.91	5,718,007.18	0.00E+00	1.50E+06	1.69E+06		
Pu-242	1.4526E-05	5,060,015.91	5,718,007.18	0.00E+00	7.35E+01	8.31E+01		
Ra-226	2.3132E-10	5,060,015.91	5,718,007.18	0.00E+00	1.17E-03	1.32E-03		
Ra-228	1.9655E-14	5,060,015.91	5,718,007.18	0.00E+00	9.95E-08	1.12E-07		
Ru-106	1.9612E-14	5,060,015.91	5,718,007.18	0.00E+00	9.92E-08	1.12E-07		
Se-79	1.0897E-05	5,060,015.91	5,718,007.18	0.00E+00	5.51E+01	6.23E+01		
Sn-126	0.0000E+00	5,060,015.91	5,718,007.18	0.00E+00	0.00E+00	0.00E+00		
Sr-90	5.9411E-01	5,060,015.91	5,718,007.18	0.00E+00	3.01E+06	3.40E+06		
Tc-99	3.6494E-04	5,060,015.91	5,718,007.18	0.00E+00	1.85E+03	2.09E+03		
Th-229	3.1063E-12	5,060,015.91	5,718,007.18	0.00E+00	1.57E-05	1.78E-05		
Th-230	2.5187E-08	5,060,015.91	5,718,007.18	0.00E+00	1.27E-01	1.44E-01		
Th-232	2.5287E-14	5,060,015.91	5,718,007.18	0.00E+00	1.28E-07	1.45E-07		
Tl-208	6.4885E-15	5,060,015.91	5,718,007.18	0.00E+00	3.28E-08	3.71E-08		
U-232	0.0000E+00	5,060,015.91	5,718,007.18	0.00E+00	0.00E+00	0.00E+00		
U-233	1.5704E-09	5,060,015.91	5,718,007.18	0.00E+00	7.95E-03	8.98E-03		
U-234	6.6293E-05	5,060,015.91	5,718,007.18	0.00E+00	3.35E+02	3.79E+02		
U-235	-1.2930E-06	5,060,015.91	0.00	5.22E+01	4.57E+01	5.22E+01		
U-236	1.1961E-05	5,060,015.91	5,718,007.18	0.00E+00	6.05E+01	6.84E+01		
U-238	-3.0619E-07	5,060,015.91	0.00	6.98E+02	6.97E+02	6.98E+02		
Y-90	5.9425E-01	5,060,015.91	5,718,007.18	0.00E+00	3.01E+06	3.40E+06		
Other Radionuclides					4.12E+06	4.65E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.88E+04	7.77E+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:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	1.15	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	5,060,015.91	2,515,522.81	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup taken directly from SFD (converted to MWd)
Bounding	5,718,007.18	5,031,045.62	

Checks			
	Burnup Multiplier	Estimated Burnup/Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.40	0.50	1.00
Bounding	0.45	0.88	

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: POINT BEACH
 SNF ID #: 311
 Fuel Units & Descr: 3 - 14 X 14 ROD ARRAY
 Heavy Metal Mass: BOL=1167kg EOL=1161.5kg
 ROD Storage Site: HANFORD

Fuel decay start date: 1981
 Estimates as of: 2030
 Template: PWR (Light Water Zirc, 0 to 5%, U)
 Template Burnup(MWd): 61.92
 Template BOL Heavy Metal Mass (MT): 0 00176911
 Template Decay Time: 35 years

Estimated
 Canister usage
 18"x15"
 1.50

Radionuclide	Ci/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	8.7758E-10	38,160 90	38,160 90	0 00E+00	3 35E-05	3 35E-05	Avg MeV	
Am-241	1.4352E-01	38,160 90	38,160 90	0 00E+00	5 48E+03	5 48E+03	0 0150	2 053E+15
Am-242m	2.8698E-04	38,160 90	38,160 90	0 00E+00	1 10E+01	1 10E+01	0 0250	4 140E+14
Am-243	6.2565E-04	38,160 90	38,160 90	0 00E+00	2 39E+01	2 39E+01	0 0375	3 949E+14
C-14	4 7901E-05	38,160 90	38,160 90	0 00E+00	1 83E+00	1 83E+00	0 0575	4 563E+14
Cf-252	8 0297E-07	38,160 90	38,160 90	0 00E+00	3 06E-02	3 06E-02	0 0850	2 297E+14
Cm-243	2 5081E-04	38,160 90	38,160 90	0 00E+00	9 57E+00	9 57E+00	0 1250	1 594E+14
Cm-244	4 9015E-02	38,160 90	38,160 90	0 00E+00	1 87E+03	1 87E+03	0 2250	1 970E+14
Co-60	2 5581E-03	38,160 90	38,160 90	0 00E+00	9 76E+01	9 76E+01	0 3750	8 472E+13
Cs-134	4 0536E-05	38,160 90	38,160 90	0 00E+00	1 55E+00	1 55E+00	0 5750	1 970E+15
Cs-135	1 4433E-05	38,160 90	38,160 90	0 00E+00	5 51E-01	5 51E-01	0 8500	2 726E+13
Cs-137	1 3979E+00	38,160 90	38,160 90	0 00E+00	5 33E+04	5 33E+04	1 2500	2 678E+13
Eu-154	2 0203E-02	38,160 90	38,160 90	0 00E+00	7 71E+02	7 71E+02	1 7500	8 018E+11
Eu-155	1 7684E-03	38,160 90	38,160 90	0 00E+00	6 75E+01	6 75E+01	2 2500	1 291E+08
Fe-55	4 3136E-05	38,160 90	38,160 90	0 00E+00	1 65E+00	1 65E+00	2 7500	2 645E+08
H-3	2 0769E-02	38,160 90	38,160 90	0 00E+00	7 93E+02	7 93E+02	3 5000	2 724E+07
I-129	9 8288E-07	38,160 90	38,160 90	0 00E+00	3 75E-02	3 75E-02	5 0000	1 165E+07
Kr-85	2 8214E-02	38,160 90	38,160 90	0 00E+00	1 08E+03	1 08E+03	7 0000	1 342E+06
Np-237	1 1218E-05	38,160 90	38,160 90	0 00E+00	4 28E-01	4 28E-01	11 0000	1 542E+05
Pa-231	1 3036E-09	38,160 90	38,160 90	0 00E+00	4 97E-05	4 97E-05		
Pb-210	8 5078E-11	38,160 90	38,160 90	0 00E+00	3 25E-06	3 25E-06		
Pm-147	3 6531E-04	38,160 90	38,160 90	0 00E+00	1 39E+01	1 39E+01		
Pu-238	7 4564E-02	38,160 90	38,160 90	0 00E+00	2 85E+03	2 85E+03		
Pu-239	1 1623E-02	38,160 90	38,160 90	0 00E+00	4 44E+02	4 44E+02		
Pu-240	1 5132E-02	38,160 90	38,160 90	0 00E+00	5 77E+02	5 77E+02		
Pu-241	9 0036E-01	38,160 90	38,160 90	0 00E+00	3 44E+04	3 44E+04		
Pu-242	6 4260E-05	38,160 90	38,160 90	0 00E+00	2 45E+00	2 45E+00		
Ra-226	2 2804E-10	38,160 90	38,160 90	0 00E+00	8 70E-06	8 70E-06		
Ra-228	5 2713E-12	38,160 90	38,160 90	0 00E+00	2 01E-07	2 01E-07		
Ru-106	6 1160E-10	38,160 90	38,160 90	0 00E+00	2 33E-05	2 33E-05		
Se-79	1 2377E-05	38,160 90	38,160 90	0 00E+00	4 72E-01	4 72E-01		
Sn-126	2 5210E-05	38,160 90	38,160 90	0 00E+00	9 62E-01	9 62E-01		
Sr-90	9 1667E-01	38,160 90	38,160 90	0 00E+00	3 50E+04	3 50E+04		
Tc-99	3 9357E-04	38,160 90	38,160 90	0 00E+00	1 50E+01	1 50E+01		
Th-229	1 2057E-10	38,160 90	38,160 90	0 00E+00	4 60E-06	4 60E-06		
Th-230	2 1043E-08	38,160 90	38,160 90	0 00E+00	8 03E-04	8 03E-04		
Th-232	5 2972E-12	38,160 90	38,160 90	0 00E+00	2 02E-07	2 02E-07		
Th-208	1 7474E-07	38,160 90	38,160 90	0 00E+00	6 67E-03	6 67E-03		
U-232	4 7368E-07	38,160 90	38,160 90	0 00E+00	1 81E-02	1 81E-02		
U-233	2 5097E-08	38,160 90	38,160 90	0 00E+00	9 58E-04	9 58E-04		
U-234	5 0000E-05	38,160 90	38,160 90	0 00E+00	1 91E+00	1 91E+00		
U-235	-1.4489E-06	38,160 90	0 00	6 30E-02	7 76E-03	6 30E-02		
U-236	7 5824E-06	38,160 90	38,160 90	0 00E+00	2 89E-01	2 89E-01		
U-238	-2.6129E-07	38,160 90	0 00	3 82E-01	3 72E-01	3 82E-01		
Y-90	9 1699E-01	38,160 90	38,160 90	0 00E+00	3 50E+04	3 50E+04		
Other Radionuclides					5 12E+04	5 12E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: LIGHT WATER	Used: LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	2.5	0 to 5	
Burnup Summary (MWd)²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	38 160 90	5.230 14	
Bounding	38 160 90	10,460.29	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	0.93	0.14	
Bounding	0.93	0.27	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 SHIPINGPORT PWR C2 BLKT
 SNF ID #, 193
 Fuel Units & Descr: 72 - 19 FLAT PLATES
 Heavy Metal Mass, BOL=16236kg EOL=15780 002kg
 ROD Storage Site HANFORD

¹Fuel decay start date: 1969
 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 Time³: 50 years

Estimated
 Canister usage:
 MCO
 18.00

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	1.0733E-09	433,632.15	867,264.30	0.00E+00	4.65E-04	9.31E-04	0.0150	3.300E+16
Am-241	1.4751E-01	433,632.15	867,264.30	0.00E+00	6.40E+04	1.28E+05	0.0250	6.613E+15
Am-242m	2.6809E-04	433,632.15	867,264.30	0.00E+00	1.16E+02	2.33E+02	0.0375	6.232E+15
Am-243	6.2484E-04	433,632.15	867,264.30	0.00E+00	2.71E+02	5.42E+02	0.0575	7.798E+15
C-14	4.7820E-05	433,632.15	867,264.30	0.00E+00	2.07E+01	4.15E+01	0.0850	3.644E+15
Cl-36	8.0297E-04	433,632.15	867,264.30	0.00E+00	3.48E-01	6.96E-01	0.1250	2.424E+15
Cm-243	1.7426E-04	433,632.15	867,264.30	0.00E+00	7.56E+01	1.51E+02	0.2250	3.111E+15
Cm-244	2.7616E-02	433,632.15	867,264.30	0.00E+00	1.20E+04	2.40E+04	0.3750	1.343E+15
Co-60	3.5610E-04	433,632.15	867,264.30	0.00E+00	1.54E+02	3.09E+02	0.5750	3.164E+16
Cs-134	2.6260E-07	433,632.15	867,264.30	0.00E+00	1.14E-01	2.28E-01	0.8500	3.089E+14
Cs-135	1.4433E-05	433,632.15	867,264.30	0.00E+00	6.26E+00	1.25E+01	1.2500	1.966E+14
Cs-137	9.8870E-01	433,632.15	867,264.30	0.00E+00	4.29E+05	8.57E+05	1.7500	8.642E+12
Eu-154	6.0320E-03	433,632.15	867,264.30	0.00E+00	2.62E+03	5.23E+03	2.2500	1.420E+09
Eu-155	2.1770E-04	433,632.15	867,264.30	0.00E+00	9.44E+01	1.89E+02	2.7500	5.007E+09
Fe-55	7.9296E-07	433,632.15	867,264.30	0.00E+00	3.44E-01	6.88E-01	3.5000	3.572E+08
H-3	8.9486E-03	433,632.15	867,264.30	0.00E+00	3.88E+03	7.76E+03	5.0000	1.527E+08
I-129	9.8288E-07	433,632.15	867,264.30	0.00E+00	4.26E-01	8.52E-01	7.0000	1.759E+07
Kr-85	1.0707E-02	433,632.15	867,264.30	0.00E+00	4.64E+03	9.29E+03	11.0000	2.019E+06
Np-237	1.1927E-05	433,632.15	867,264.30	0.00E+00	5.17E+00	1.03E+01		
Pa-231	1.4703E-09	433,632.15	867,264.30	0.00E+00	6.38E-04	1.28E-03		
Pb-210	1.6828E-10	433,632.15	867,264.30	0.00E+00	7.30E-05	1.46E-04		
Pm-147	6.9606E-06	433,632.15	867,264.30	0.00E+00	3.02E+00	6.04E+00		
Pu-238	6.6263E-02	433,632.15	867,264.30	0.00E+00	2.87E+04	5.75E+04		
Pu-239	1.1618E-02	433,632.15	867,264.30	0.00E+00	5.04E+03	1.01E+04		
Pu-240	1.5142E-02	433,632.15	867,264.30	0.00E+00	6.57E+03	1.31E+04		
Pu-241	4.3766E-01	433,632.15	867,264.30	0.00E+00	1.90E+05	3.80E+05		
Pu-242	6.4260E-05	433,632.15	867,264.30	0.00E+00	2.79E+01	5.57E+01		
Ra-226	3.8501E-10	433,632.15	867,264.30	0.00E+00	1.67E-04	3.34E-04		
Ra-228	5.2955E-12	433,632.15	867,264.30	0.00E+00	2.30E-06	4.59E-06		
Ru-106	2.0413E-14	433,632.15	867,264.30	0.00E+00	8.85E-09	1.77E-08		
Se-79	1.2376E-05	433,632.15	867,264.30	0.00E+00	5.37E+00	1.07E+01		
Sn-126	2.5210E-05	433,632.15	867,264.30	0.00E+00	1.09E+01	2.19E+01		
Sr-90	6.4163E-01	433,632.15	867,264.30	0.00E+00	2.78E+05	5.56E+05		
Tc-99	3.9357E-04	433,632.15	867,264.30	0.00E+00	1.71E+02	3.41E+02		
Th-229	1.5644E-10	433,632.15	867,264.30	0.00E+00	6.78E-05	1.36E-04		
Th-230	2.7972E-08	433,632.15	867,264.30	0.00E+00	1.21E-02	2.43E-02		
Th-232	5.3036E-12	433,632.15	867,264.30	0.00E+00	2.30E-06	4.60E-06		
Tl-208	1.5136E-07	433,632.15	867,264.30	0.00E+00	6.56E-02	1.31E-01		
U-232	4.1005E-07	433,632.15	867,264.30	0.00E+00	1.78E-01	3.56E-01		
U-233	2.5856E-08	433,632.15	867,264.30	0.00E+00	1.12E-02	2.24E-02		
U-234	5.2665E-05	433,632.15	867,264.30	0.00E+00	2.28E+01	4.57E+01		
U-235	-1.4487E-06	433,632.15	0.00	2.49E-01	0.00E+00	2.49E-01		
U-236	7.5888E-06	433,632.15	867,264.30	0.00E+00	3.29E+00	6.58E+00		
U-238	-2.6129E-07	433,632.15	0.00	5.42E+00	5.30E+00	5.42E+00		
Y-90	6.4180E-01	433,632.15	867,264.30	0.00E+00	2.78E+05	5.57E+05		
Other Radionuclides					4.13E+05	8.26E+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	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	0.71	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	263 023.20	433 632.15	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding	399 405.60	867,264.30	Bounding burnup assumed to be twice nominal burnup

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
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	SINGLE PASS REACTOR FUEL	Fuel decay start date	1971
SNF ID #	198	Estimates as of	2030
Fuel Units & Descr	835 - TUBE	Template	N-Reacto (Graphite Zirc, 0 to 5%, U)
Heavy Metal Mass	BOL=2891 605kg, EOL=2885.844kg	*Template Burnup(MWd)	69600
ROD Storage Site	HANFORD	Template BOL Heavy Metal Mass (MT):	11.6
		Template Decay Time	50 years

Estimated Canister usage MCO
0.86

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 7399E-10	6,078 13	12,156.27	0 00E+00	5 31E-06	1 06E-05	Avg MeV	
Am-241	9 9095E-02	6,078 13	12,156.27	0 00E+00	6 02E+02	1 20E+03	0 0150	4 170E+14
Am-242m	5 4598E-05	6,078 13	12,156.27	0 00E+00	3 32E-01	6 64E-01	0 0250	8 476E+13
Am-243	4 6221E-05	6,078 13	12,156.27	0 00E+00	2 81E-01	5 62E-01	0 0375	7 807E+13
C-14	9 1853E-05	6,078 13	12,156.27	0 00E+00	5 58E-01	1 12E+00	0 0575	9 436E+13
Cl-36	0 0000E+00	6,078 13	12,156.27	0 00E+00	0 00E+00	0 00E+00	0 0850	4 685E+13
Cm-243	0 0000E+00	6,078 13	12,156.27	0 00E+00	0 00E+00	0 00E+00	0 1250	3 064E+13
Cm-244	2 5589E-04	6,078 13	12,156.27	0 00E+00	1 56E+00	3 11E+00	0 2250	4 012E+13
Co-60	8 8563E-06	6,078 13	12,156.27	0 00E+00	5 38E-02	1 08E-01	0 3750	1 739E+13
Cs-134	9 2861E-08	6,078 13	12,156.27	0 00E+00	5 51E-04	1 10E-03	0 5750	3 793E+14
Cs-135	1 0066E-05	6,078 13	12,156.27	0 00E+00	6 12E-02	1 22E-01	0 8500	3 239E+12
Cs-137	8 4454E-01	6,078 13	12,156.27	0 00E+00	5 13E+03	1 03E+04	1 2500	1 414E+12
Eu-154	1 9842E-03	6,078 13	12,156.27	0 00E+00	1 21E+01	2 41E+01	1 7500	8 660E+10
Eu-155	3 5690E-05	6,078 13	12,156.27	0 00E+00	2 17E-01	4 34E-01	2 2500	8 444E+06
Fe-55	5 2802E-08	6,078 13	12,156.27	0 00E+00	3 21E-04	6 42E-04	2 7500	2 507E+05
H-3	9 0776E-04	6,078 13	12,156.27	0 00E+00	5 52E+00	1 10E+01	3 5000	2 218E+05
I-129	8 6006E-07	6,078 13	12,156.27	0 00E+00	5 23E-03	1 05E-02	5 0000	9 346E+04
Kr-85	1 0138E-02	6,078 13	12,156.27	0 00E+00	6 16E+01	1 23E+02	7 0000	1 056E+04
Np-237	9 0345E-06	6,078 13	12,156.27	0 00E+00	5 49E-02	1 10E-01	11 0000	1 202E+03
Pa-231	1 9210E-09	6,078 13	12,156.27	0 00E+00	1 17E-05	2 34E-05		
Pb-210	7 5862E-11	6,078 13	12,156.27	0 00E+00	4 61E-07	9 22E-07		
Pm-147	1 1372E-05	6,078 13	12,156.27	0 00E+00	6 91E-02	1 38E-01		
Pu-238	1 7802E-02	6,078 13	12,156.27	0 00E+00	1 08E+02	2 16E+02		
Pu-239	2 8822E-02	6,078 13	12,156.27	0 00E+00	1 75E+02	3 50E+02		
Pu-240	2 2759E-02	6,078 13	12,156.27	0 00E+00	1 38E+02	2 77E+02		
Pu-241	2 9641E-01	6,078 13	12,156.27	0 00E+00	1 80E+03	3 60E+03		
Pu-242	1 4526E-05	6,078 13	12,156.27	0 00E+00	8 83E-02	1 77E-01		
Ra-226	2 3132E-10	6,078 13	12,156.27	0 00E+00	1 41E-06	2 81E-06		
Ra-228	1 9655E-14	6,078 13	12,156.27	0 00E+00	1 19E-10	2 39E-10		
Ru-106	1 9612E-14	6,078 13	12,156.27	0 00E+00	1 19E-10	2 38E-10		
Se-79	1 0897E-05	6,078 13	12,156.27	0 00E+00	6 62E-02	1 32E-01		
Sn-126	0 0000E+00	6,078 13	12,156.27	0 00E+00	0 00E+00	0 00E+00		
Sr-90	5 9411E-01	6,078 13	12,156.27	0 00E+00	3 61E+03	7 22E+03		
Tc-99	3 6494E-04	6,078 13	12,156.27	0 00E+00	2 22E+00	4 44E+00		
Th-229	3 1063E-12	6,078 13	12,156.27	0 00E+00	1 89E-08	3 78E-08		
Th-230	2 5187E-08	6,078 13	12,156.27	0 00E+00	1 53E-04	3 06E-04		
Th-232	2 5287E-14	6,078 13	12,156.27	0 00E+00	1 54E-10	3 07E-10		
Tl-208	6 4885E-15	6,078 13	12,156.27	0 00E+00	3 94E-11	7 89E-11		
U-232	0 0000E+00	6,078 13	12,156.27	0 00E+00	0 00E+00	0 00E+00		
U-233	1 5704E-09	6,078 13	12,156.27	0 00E+00	9 55E-06	1 91E-05		
U-234	6 6293E-05	6,078 13	12,156.27	0 00E+00	4 03E-01	8 06E-01		
U-235	-1 2930E-06	6,078 13	0 00	5 37E-03	0 00E+00	5 37E-03		
U-236	1 1961E-05	6,078 13	12,156.27	0 00E+00	7 27E-02	1 45E-01		
U-238	-3 0619E-07	6,078 13	0 00	9 71E-01	9 69E-01	9 71E-01		
Y-90	5 9425E-01	6,078 13	12,156.27	0 00E+00	3 61E+03	7 22E+03		
Other Radionuclides					4 94E+03	9 89E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences
Reactor Moderator	From SFD GRAPHITE	Used GRAPHITE	
Fuel Cladding	ALUM	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	0.086	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	2,891.61	6,078.13	
Bounding		12,156.27	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.35	2.10	
Bounding	0.70		

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: SINGLE PASS REACTOR FUEL
 SNF ID #: 197
 Fuel Units & Descr: 139 - TUBE
 Heavy Metal Mass: BOL=407 437kg, EOL=407 006kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1971
 Estimates as of: 2030
 Template: N-React (Graphite, Zirc, 0 to 5%, U)
²Template Burnup(MWd): 69600
 Template BOL Heavy Metal Mass (MT): 11.6
 Template Decay Time: 50 years

Estimated
 Canister usage:
 MCO
 0.14

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	8.7399E-10	454.58	909.16	0.00E+00	3.97E-07	7.95E-07	0.0150	3.119E+13
Am-241	9.9095E-02	454.58	909.16	0.00E+00	4.50E+01	9.01E+01	0.0250	6.339E+12
Am-242m	5.4598E-05	454.58	909.16	0.00E+00	2.48E-02	4.96E-02	0.0375	5.839E+12
Am-243	4.6221E-05	454.58	909.16	0.00E+00	2.10E-02	4.20E-02	0.0575	7.057E+12
C-14	9.1853E-05	454.58	909.16	0.00E+00	4.18E-02	8.35E-02	0.0850	3.504E+12
Cl-36	0.0000E+00	454.58	909.16	0.00E+00	0.00E+00	0.00E+00	0.1250	2.291E+12
Cm-243	0.0000E+00	454.58	909.16	0.00E+00	0.00E+00	0.00E+00	0.2250	3.001E+12
Cm-244	2.5589E-04	454.58	909.16	0.00E+00	1.16E-01	2.33E-01	0.3750	1.301E+12
Co-60	8.8563E-06	454.58	909.16	0.00E+00	4.03E-03	8.05E-03	0.5750	2.837E+13
Cs-134	9.0661E-08	454.58	909.16	0.00E+00	4.12E-05	8.24E-05	0.8500	2.423E+11
Cs-135	1.0066E-05	454.58	909.16	0.00E+00	4.58E-03	9.15E-03	1.2500	1.057E+11
Cs-137	8.4454E-01	454.58	909.16	0.00E+00	3.84E+02	7.68E+02	1.7500	6.477E+09
Eu-154	1.9842E-03	454.58	909.16	0.00E+00	9.02E-01	1.80E+00	2.2500	6.322E+05
Eu-155	3.5690E-05	454.58	909.16	0.00E+00	1.62E-02	3.24E-02	2.7500	1.912E+04
Fe-55	5.2802E-08	454.58	909.16	0.00E+00	2.40E-05	4.80E-05	3.5000	1.692E+04
H-3	9.0776E-04	454.58	909.16	0.00E+00	4.13E-01	8.25E-01	5.0000	7.133E+03
I-129	8.6006E-07	454.58	909.16	0.00E+00	3.91E-04	7.82E-04	7.0000	8.066E+02
Kr-85	1.0138E-02	454.58	909.16	0.00E+00	4.61E+00	9.22E+00	11.0000	9.178E+01
Np-237	9.0345E-06	454.58	909.16	0.00E+00	4.11E-03	8.21E-03		
Pa-231	1.9210E-09	454.58	909.16	0.00E+00	8.73E-07	1.75E-06		
Pb-210	7.5862E-11	454.58	909.16	0.00E+00	3.45E-08	6.90E-08		
Pm-147	1.1372E-05	454.58	909.16	0.00E+00	5.17E-03	1.03E-02		
Pu-238	1.7802E-02	454.58	909.16	0.00E+00	8.09E+00	1.62E+01		
Pu-239	2.8822E-02	454.58	909.16	0.00E+00	1.31E+01	2.62E+01		
Pu-240	2.2759E-02	454.58	909.16	0.00E+00	1.03E+01	2.07E+01		
Pu-241	2.9641E-01	454.58	909.16	0.00E+00	1.35E+02	2.69E+02		
Pu-242	1.4526E-05	454.58	909.16	0.00E+00	6.60E-03	1.32E-02		
Ra-226	2.3132E-10	454.58	909.16	0.00E+00	1.05E-07	2.10E-07		
Ra-228	1.9655E-14	454.58	909.16	0.00E+00	8.93E-12	1.79E-11		
Ru-106	1.9612E-14	454.58	909.16	0.00E+00	8.92E-12	1.78E-11		
Se-79	1.0897E-05	454.58	909.16	0.00E+00	4.95E-03	9.91E-03		
Sn-126	0.0000E+00	454.58	909.16	0.00E+00	0.00E+00	0.00E+00		
Sr-90	5.9411E-01	454.58	909.16	0.00E+00	2.70E+02	5.40E+02		
Tc-99	3.6494E-04	454.58	909.16	0.00E+00	1.66E-01	3.32E-01		
Th-229	3.1063E-12	454.58	909.16	0.00E+00	1.41E-09	2.82E-09		
Th-230	2.5187E-08	454.58	909.16	0.00E+00	1.14E-05	2.29E-05		
Th-232	2.5287E-14	454.58	909.16	0.00E+00	1.15E-11	2.30E-11		
Tl-208	6.4885E-15	454.58	909.16	0.00E+00	2.95E-12	5.90E-12		
U-232	0.0000E+00	454.58	909.16	0.00E+00	0.00E+00	0.00E+00		
U-233	1.5704E-09	454.58	909.16	0.00E+00	7.14E-07	1.43E-06		
U-234	6.6293E-05	454.58	909.16	0.00E+00	3.01E-02	6.03E-02		
U-235	-1.2930E-06	454.58	0.00	1.10E-02	1.04E-02	1.10E-02		
U-236	1.1961E-05	454.58	909.16	0.00E+00	5.44E-03	1.09E-02		
U-238	-3.0619E-07	454.58	0.00	1.35E-01	1.35E-01	1.35E-01		
Y-90	5.9425E-01	454.58	909.16	0.00E+00	2.70E+02	5.40E+02		
Other Radionuclides					3.70E+02	7.40E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches on all parameters except cladding
	From SFD	Used	
Reactor Moderator	GRAPHITE	GRAPHITE	
Fuel Cladding	ALUM	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	1.252	0 to 5	

Burnup Summary (MWd) ¹			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	407.44	454.58	
Bounding		909.16	

Checks			Estimated EOL HM/Given EOL HM 1.00
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.19	1.12	
Bounding	0.37		

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	SP-100 FUEL	Fuel decay start date	1992
SNF ID #	777	Estimates as of	2030
Fuel Units & Descr	2 - CRAP	Template	FERMI (Fast Zirc 10 to 40% U)
Heavy Metal Mass	BOL=2711kg, EOL=2628kg	*Template Burnup(MWd)	58 6725048
ROD Storage Site	HANFORD	Template BOL Heavy Metal Mass (MT)	0 018774
		Template Decay Time	35 years

Estimated Canister usage
HIC
2 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	9 6110E-08	73 37	146 73	0 00E+00	7 05E-06	1 41E-05	Avg MeV	
Am-241	6 5601E-07	73 37	146 73	0 00E+00	4 81E-05	9 63E-05	0 0150	9 709E+12
Am-242m	0 0000E+00	73 37	146.73	0 00E+00	0 00E+00	0 00E+00	0 0250	2 017E+12
Am-243	8 3770E-15	73 37	146 73	0 00E+00	6 15E-13	1 23E-12	0 0375	1 774E+12
C-14	2 1714E-05	73 37	146 73	0 00E+00	1 59E-03	3 19E-03	0 0575	1 879E+12
Cl-36	5.5188E-08	73 37	146 73	0 00E+00	4 05E-06	8 10E-06	0 0850	1 137E+12
Cr-243	1.5496E-14	73 37	146 73	0 00E+00	1 14E-12	2 27E-12	0 1250	7 362E+11
Cr-244	5.2375E-16	73 37	146 73	0 00E+00	3 84E-14	7 69E-14	0.2250	9 757E+11
Co-60	2.0947E-03	73 37	146 73	0 00E+00	1 54E-01	3 07E-01	0.3750	4 251E+11
Cs-134	6.2448E-07	73 37	146 73	0 00E+00	4 58E-05	9 16E-05	0.5750	7.510E+12
Cs-135	4 4996E-05	73 37	146 73	0 00E+00	3 30E-03	6 60E-03	0.8500	6 936E+10
Cs-137	1.3775E+00	73 37	146 73	0 00E+00	1 01E+02	2 02E+02	1.2500	4 601E+10
Eu-154	1 8510E-04	73 37	146 73	0 00E+00	1.36E-02	2 72E-02	1 7500	1 790E+09
Eu-155	1 4163E-03	73 37	146 73	0 00E+00	1 04E-01	2 08E-01	2.2500	3.156E+05
Fe-55	1 4179E-05	73.37	146 73	0 00E+00	1.04E-03	2 08E-03	2 7500	3.042E+04
H-3	3 5383E-03	73.37	146 73	0 00E+00	2 60E-01	5.19E-01	3 5000	2.873E+01
I-129	1 1426E-06	73.37	146 73	0 00E+00	8.38E-05	1.68E-04	5 0000	9 856E+00
Kr-85	3 8604E-02	73 37	146 73	0 00E+00	2 83E+00	5 66E+00	7 0000	8.518E-01
Np-237	3 3099E-06	73 37	146 73	0 00E+00	2 43E-04	4 86E-04	11 0000	7.913E-02
Pa-231	1 8953E-07	73 37	146 73	0 00E+00	1.39E-05	2 78E-05		
Pb-210	8 9531E-12	73 37	146 73	0 00E+00	6.57E-10	1.31E-09		
Pm-147	1 1588E-03	73 37	146.73	0 00E+00	8.50E-02	1 70E-01		
Pu-238	1 7146E-04	73 37	146 73	0 00E+00	1.26E-02	2 52E-02		
Pu-239	1 9464E-02	73 37	146.73	0.00E+00	1 43E+00	2 86E+00		
Pu-240	6 7919E-05	73 37	146 73	0 00E+00	4 98E-03	9 97E-03		
Pu-241	4 1774E-06	73 37	146 73	0 00E+00	3 06E-04	6 13E-04		
Pu-242	4 3751E-13	73 37	146 73	0 00E+00	3 21E-11	6 42E-11		
Ra-226	2 4219E-11	73 37	146 73	0 00E+00	1 78E-09	3 55E-09		
Ra-228	2.3572E-11	73.37	146 73	0 00E+00	1 73E-09	3 46E-09		
Ru-106	3 0951E-10	73 37	146 73	0 00E+00	2.27E-08	4 54E-08		
Se-79	1 6488E-05	73 37	146 73	0 00E+00	1.21E-03	2 42E-03		
Sn-126	3 7564E-05	73.37	146 73	0 00E+00	2 76E-03	5.51E-03		
Sr-90	1.2052E+00	73.37	146 73	0 00E+00	8 84E+01	1 77E+02		
Tc-99	4 4825E-04	73.37	146 73	0 00E+00	3.29E-02	6.58E-02		
Th-229	4 6478E-11	73.37	146 73	0 00E+00	3.41E-09	6.82E-09		
Th-230	2.2259E-09	73 37	146 73	0 00E+00	1.63E-07	3.27E-07		
Th-232	2 3691E-11	73 37	146 73	0 00E+00	1.74E-09	3 48E-09		
Th-208	5 8256E-09	73 37	146 73	0 00E+00	4.27E-07	8 55E-07		
U-232	1 5759E-08	73 37	146 73	0 00E+00	1 16E-06	2.31E-06		
U-233	1 0110E-08	73 37	146 73	0 00E+00	7 42E-07	1 48E-06		
U-234	4 9001E-06	73 37	146 73	0 00E+00	3 59E-04	7 19E-04		
U-235	-2.3191E-06	73 37	0 00	1.05E-03	8 84E-04	1 05E-03		
U-236	1 2633E-05	73 37	146.73	0 00E+00	9 27E-04	1 85E-03		
U-238	-9 5407E-08	73 37	0 00	7.47E-04	7 40E-04	7 47E-04		
Y-90	1 2053E+00	73 37	146.73	0 00E+00	8 84E+01	1 77E+02		
Other Radionuclides					1 00E+02	2 01E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1 13E+00	2 26E+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 template is a good approximation since it is a FAST, Uranium fuel
Reactor Moderator	From SFD	Used	
Fuel Cladding	FAST	FAST	
BOL HM Constituents	UNKNOWN	ZIRC	
BOL Enrichment %	U	U	
	18	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		73 37	
Bounding		146 73	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	8.66		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: TRIGA STD 8 5/20
 SNF ID #: 233
 Fuel Units & Descr: 90 - ELEMENT
 Heavy Metal Mass: BOL=17 55kg, EOL=17 19kg
 ROD Storage Site: HANFORD

¹Fuel decay start date: 1989
 Estimates as of: 2030
 Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd)²: 6 65
 Template BOL Heavy Metal Mass (MT): 0 000195
 Template Decay Time³: 35 years

Estimated
 Canister usage
 18"x10"
 0 81

II. Estimates

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6 7038E-09	343 66	687 32	0 00E+00	2 30E-06	4 61E-06	Avg. MeV	
Am-241	3 9068E-03	343 66	687 32	0 00E+00	1 34E+00	2 69E+00	0 0150	4 798E+13
Am-242m	1 2325E-06	343 66	687 32	0 00E+00	4 24E-04	8 47E-04	0 0250	9 969E+12
Am-243	1 4732E-07	343 66	687 32	0 00E+00	5 06E-05	1 01E-04	0 0375	8 660E+12
C-14	1 2824E-04	343 66	687 32	0 00E+00	4 41E-02	8 81E-02	0 0575	9 331E+12
Cl-36	2 8120E-06	343 66	687 32	0 00E+00	9 66E-04	1 93E-03	0 0850	5 615E+12
Co-243	8 6556E-08	343 66	687 32	0 00E+00	2 97E-05	5 95E-05	0 1250	3 654E+12
Co-244	5 3835E-07	343 66	687 32	0 00E+00	1 85E-04	3 70E-04	0 2250	4 836E+12
Co-60	2 4887E-02	343 66	687 32	0 00E+00	8 55E+00	1 71E+01	0 3750	2 109E+12
Cs-134	3 8030E-06	343 66	687 32	0 00E+00	1 31E-03	2 61E-03	0 5750	3 528E+13
Cs-135	3 2195E-05	343 66	687 32	0 00E+00	1 11E-02	2 21E-02	0 8500	3 610E+11
Cs-137	1 3788E+00	343 66	687 32	0 00E+00	4 74E+02	9 48E+02	1 2500	1 401E+12
Eu-154	1 3711E-03	343 66	687 32	0 00E+00	4 71E-01	9 42E-01	1 7500	9 369E+09
Eu-155	4 4361E-04	343 66	687 32	0 00E+00	1 52E-01	3 05E-01	2 2500	7 678E+06
Fe-55	2 6075E-04	343 66	687 32	0 00E+00	8 96E-02	1 79E-01	2 7500	3 529E+05
H-3	2 0647E-03	343 66	687 32	0 00E+00	7 10E-01	1 42E+00	3 5000	8 686E+02
I-129	7 3684E-07	343 66	687 32	0 00E+00	2 53E-04	5 06E-04	5 0000	3 658E+02
Kr-85	3 6346E-02	343 66	687 32	0 00E+00	1 25E+01	2 50E+01	7 0000	4 129E+01
Np-237	1 2844E-06	343 66	687 32	0 00E+00	4 41E-04	8 83E-04	11 0000	4 695E+00
Pa-231	1 2352E-08	343 66	687 32	0 00E+00	4 24E-06	8 49E-06		
Pb-210	3 5338E-13	343 66	687 32	0 00E+00	1 21E-10	2 43E-10		
Pm-147	7 6346E-04	343 66	687 32	0 00E+00	2 62E-01	5 25E-01		
Pu-238	8 1970E-04	343 66	687 32	0 00E+00	2 82E-01	5 63E-01		
Pu-239	5 5248E-03	343 66	687 32	0 00E+00	1 90E+00	3 80E+00		
Pu-240	2 1203E-03	343 66	687 32	0 00E+00	7 29E-01	1 46E+00		
Pu-241	2 4075E-02	343 66	687 32	0 00E+00	8 27E+00	1 65E+01		
Pu-242	2 3128E-07	343 66	687 32	0 00E+00	7 95E-05	1 59E-04		
Ra-226	9 6481E-13	343 66	687 32	0 00E+00	3 32E-10	6 63E-10		
Ra-228	2 5188E-10	343 66	687 32	0 00E+00	8 66E-08	1 73E-07		
Ru-106	1 0214E-10	343 66	687 32	0 00E+00	3 51E-08	7 02E-08		
Se-79	1 3014E-05	343 66	687 32	0 00E+00	4 47E-03	8 94E-03		
Sn-126	1 2164E-05	343 66	687 32	0 00E+00	4 18E-03	8 36E-03		
Sr-90	1 2762E+00	343 66	687 32	0 00E+00	4 39E+02	8 77E+02		
Tc-99	4 4241E-04	343 66	687 32	0 00E+00	1 52E-01	3 04E-01		
Th-229	5 9684E-10	343 66	687 32	0 00E+00	2 05E-07	4 10E-07		
Th-230	9 3880E-11	343 66	687 32	0 00E+00	3 23E-08	6 45E-08		
Th-232	2 5278E-10	343 66	687 32	0 00E+00	8 69E-08	1 74E-07		
Tl-208	1 3723E-08	343 66	687 32	0 00E+00	4 72E-06	9 43E-06		
U-232	3 6932E-08	343 66	687 32	0 00E+00	1 27E-05	2 54E-05		
U-233	1 2224E-07	343 66	687 32	0 00E+00	4 20E-05	8 40E-05		
U-234	2 5714E-07	343 66	687 32	0 00E+00	8 84E-05	1 77E-04		
U-235	-2 6194E-06	343 66	0 00	7 59E-03	6 68E-03	7 59E-03		
U-236	1 2695E-05	343 66	687 32	0 00E+00	4 36E-03	8 73E-03		
U-238	-3 6331E-08	343 66	0 00	4 72E-03	4 71E-03	4 72E-03		
Y-90	1 2765E+00	343 66	687 32	0 00E+00	4 39E+02	8 77E+02		
Other Radionuclides					4 73E+02	9 45E+02		

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:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20 00000115	10 to 20 1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	256 56	343 66	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		687 32	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	1 00
Bounding	1 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 8 5/20 (HANFORD)	¹ Fuel decay start date	1989
SNF ID #	316	Estimates as of	2030
Fuel Units & Descr	33 - ELEMENT	Template	TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
Heavy Metal Mass	BOL=6.336kg, EOL=6.316kg	² Template Burnup(MWd)	6.65
ROD Storage Site	HANFORD	Template BOL Heavy Metal Mass (MT)	0.000195
		Template Decay Time	35 years

Estimated Canister usage 18"x10" 0.30
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II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	6.7038E-09	30.88	61.75	0.00E+00	2.07E-07	4.14E-07	0.0150	4.310E+12
Am-241	3.9068E-03	30.88	61.75	0.00E+00	1.21E-01	2.41E-01	0.0250	8.956E+11
Am-242m	1.2325E-06	30.88	61.75	0.00E+00	3.81E-05	7.61E-05	0.0375	7.781E+11
Am-243	1.4732E-07	30.88	61.75	0.00E+00	4.55E-06	9.10E-06	0.0575	8.383E+11
C-14	1.2824E-04	30.88	61.75	0.00E+00	3.96E-03	7.92E-03	0.0850	5.044E+11
Cl-36	2.8120E-06	30.88	61.75	0.00E+00	8.68E-05	1.74E-04	0.1250	3.283E+11
Cm-243	8.6556E-08	30.88	61.75	0.00E+00	2.67E-06	5.34E-06	0.2250	4.345E+11
Cm-244	5.3835E-07	30.88	61.75	0.00E+00	1.66E-05	3.32E-05	0.3750	1.895E+11
Co-60	2.4887E-02	30.88	61.75	0.00E+00	7.68E-01	1.54E+00	0.5750	3.169E+12
Cs-134	3.8030E-06	30.88	61.75	0.00E+00	1.17E-04	2.35E-04	0.8500	3.243E+10
Cs-135	3.2195E-05	30.88	61.75	0.00E+00	9.94E-04	1.99E-03	1.2500	1.259E+11
Cs-137	1.3788E+00	30.88	61.75	0.00E+00	4.26E+01	8.51E+01	1.7500	8.418E+08
Eu-154	1.3711E-03	30.88	61.75	0.00E+00	4.23E-02	8.47E-02	2.2500	6.898E+05
Eu-155	4.4361E-04	30.88	61.75	0.00E+00	1.37E-02	2.74E-02	2.7500	3.172E+04
Fe-55	2.6075E-04	30.88	61.75	0.00E+00	8.05E-03	1.61E-02	3.5000	8.494E+01
H-3	2.0647E-03	30.88	61.75	0.00E+00	6.37E-02	1.27E-01	5.0000	3.583E+01
I-129	7.3684E-07	30.88	61.75	0.00E+00	2.28E-05	4.55E-05	7.0000	4.051E+00
Kr-85	3.6346E-02	30.88	61.75	0.00E+00	1.12E+00	2.24E+00	11.0000	4.611E-01
Np-237	1.2844E-06	30.88	61.75	0.00E+00	3.97E-05	7.93E-05		
Pa-231	1.2352E-08	30.88	61.75	0.00E+00	3.81E-07	7.63E-07		
Pb-210	3.5338E-13	30.88	61.75	0.00E+00	1.09E-11	2.18E-11		
Pm-147	7.6346E-04	30.88	61.75	0.00E+00	2.36E-02	4.71E-02		
Pu-238	8.1970E-04	30.88	61.75	0.00E+00	2.53E-02	5.06E-02		
Pu-239	5.5248E-03	30.88	61.75	0.00E+00	1.71E-01	3.41E-01		
Pu-240	2.1203E-03	30.88	61.75	0.00E+00	6.55E-02	1.31E-01		
Pu-241	2.4075E-02	30.88	61.75	0.00E+00	7.43E-01	1.49E+00		
Pu-242	2.3128E-07	30.88	61.75	0.00E+00	7.14E-06	1.43E-05		
Ra-226	9.6481E-13	30.88	61.75	0.00E+00	2.98E-11	5.96E-11		
Ra-228	2.5188E-10	30.88	61.75	0.00E+00	7.78E-09	1.56E-08		
Ru-106	1.0214E-10	30.88	61.75	0.00E+00	3.15E-09	6.31E-09		
Se-79	1.3014E-05	30.88	61.75	0.00E+00	4.02E-04	8.04E-04		
Sn-126	1.2164E-05	30.88	61.75	0.00E+00	3.76E-04	7.51E-04		
Sr-90	1.2762E+00	30.88	61.75	0.00E+00	3.94E+01	7.88E+01		
Tc-99	4.4241E-04	30.88	61.75	0.00E+00	1.37E-02	2.73E-02		
Th-229	5.9684E-10	30.88	61.75	0.00E+00	1.84E-08	3.69E-08		
Th-230	9.3880E-11	30.88	61.75	0.00E+00	2.90E-09	5.80E-09		
Th-232	2.5278E-10	30.88	61.75	0.00E+00	7.80E-09	1.56E-08		
Tl-208	1.3723E-08	30.88	61.75	0.00E+00	4.24E-07	8.47E-07		
U-232	3.6932E-08	30.88	61.75	0.00E+00	1.14E-06	2.28E-06		
U-233	1.2224E-07	30.88	61.75	0.00E+00	3.77E-06	7.55E-06		
U-234	2.5714E-07	30.88	61.75	0.00E+00	7.94E-06	1.59E-05		
U-235	-2.6194E-06	30.88	0.00	2.72E-03	2.64E-03	2.72E-03		
U-236	1.2695E-05	30.88	61.75	0.00E+00	3.92E-04	7.84E-04		
U-238	-3.6331E-08	30.88	0.00	1.71E-03	1.70E-03	1.71E-03		
Y-90	1.2765E+00	30.88	61.75	0.00E+00	3.94E+01	7.88E+01		
Other Radionuclides					4.25E+01	8.49E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.97E+01	9.93E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %:	19.896	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate
	From SFD	Estimated	
Nominal	30.88	18.90	Nominal burnup taken directly from SFD (converted to MWd)
Bounding		61.75	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Grven 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: ACRR (PULSED CORE)
 SNF ID #: 757
 Fuel Units & Descr: 251 - ELEMENT
 Heavy Metal Mass BOL=120 831kg; EOL=120 831kg
 ROD Storage Site INEEL

Fuel decay start date: 2035
 Estimates as of: 2030
 Template: Pathfinder (Light Water, SST, 60 to 100%, U)
 Template Burnup (MWd): 6 01
 Template BOL Heavy Metal Mass (MT): 0 00012882
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 2 26

Radionuclide	C/MWd From		Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
	Template	Estimated						Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 9667E-09	2,282.86	2,282.86	4,565.72	0 00E+00	4 49E-06	8 98E-06	Avg. MeV	
Am-241	4 9468E-05	2,282.86	2,282.86	4,565.72	0 00E+00	1 13E-01	2 26E-01	0 0150	8 978E+14
Am-242m	9 7537E-09	2,282.86	2,282.86	4,565.72	0 00E+00	2 23E-05	4 45E-05	0 0250	1 915E+14
Am-243	9 8802E-10	2,282.86	2,282.86	4,565.72	0 00E+00	2 26E-06	4 51E-06	0 0375	1 709E+14
C-14	2 3095E-04	2,282.86	2,282.86	4,565.72	0 00E+00	5 27E-01	1 05E+00	0 0575	1 718E+14
Cf-252	1 2261E-06	2,282.86	2,282.86	4,565.72	0 00E+00	2 80E-03	5 60E-03	0 0850	1 089E+14
Cm-243	5 1581E-10	2,282.86	2,282.86	4,565.72	0 00E+00	1 18E-06	2 36E-06	0 1250	8 686E+13
Cm-244	7 3012E-09	2,282.86	2,282.86	4,565.72	0 00E+00	1 67E-05	3 33E-05	0 2250	9 015E+13
Co-60	3 6556E+00	2,282.86	2,282.86	4,565.72	0 00E+00	8 35E+03	1 67E+04	0 3750	4 376E+13
Cs-134	4 6123E-02	2,282.86	2,282.86	4,565.72	0 00E+00	1 65E+02	3 29E+02	0 5750	5.305E+14
Cs-135	3 0316E-05	2,282.86	2,282.86	4,565.72	0 00E+00	6 92E-02	1 38E-01	0 8500	2.569E+13
Cs-137	2 9002E+00	2,282.86	2,282.86	4,565.72	0 00E+00	6 62E+03	1 32E+04	1 2500	1.240E+15
Eu-154	7 5025E-03	2,282.86	2,282.86	4,565.72	0 00E+00	1 71E+01	3 43E+01	1 7500	4.378E+11
Eu-155	4 6123E-02	2,282.86	2,282.86	4,565.72	0 00E+00	1 05E+02	2 11E+02	2 2500	1.253E+12
Fe-55	3 6439E+00	2,282.86	2,282.86	4,565.72	0 00E+00	8 32E+03	1 66E+04	2 7500	7 109E+09
H-3	1 3524E-02	2,282.86	2,282.86	4,565.72	0 00E+00	3 09E+01	6 17E+01	3 5000	7 847E+08
I-129	7 3195E-07	2,282.86	2,282.86	4,565.72	0 00E+00	1 67E-03	3 34E-03	5 0000	1 891E+02
Kr-85	2 8686E-01	2,282.86	2,282.86	4,565.72	0 00E+00	6 55E+02	1 31E+03	7 0000	2.123E+01
Np-237	1 1478E-06	2,282.86	2,282.86	4,565.72	0 00E+00	2 62E-03	5.24E-03	11 0000	2 406E+00
Pa-231	1 0990E-08	2,282.86	2,282.86	4,565.72	0 00E+00	2 51E-05	5 02E-05		
Pb-210	8 0782E-15	2,282.86	2,282.86	4,565.72	0 00E+00	1 84E-11	3 69E-11		
Pm-147	3 2097E+00	2,282.86	2,282.86	4,565.72	0 00E+00	7 33E+03	1 47E+04		
Pu-238	3 7404E-04	2,282.86	2,282.86	4,565.72	0 00E+00	8 54E-01	1 71E+00		
Pu-239	6 6839E-04	2,282.86	2,282.86	4,565.72	0 00E+00	1 53E+00	3 05E+00		
Pu-240	8 7121E-05	2,282.86	2,282.86	4,565.72	0 00E+00	1 99E-01	3 98E-01		
Pu-241	3 0283E-03	2,282.86	2,282.86	4,565.72	0 00E+00	6 91E+00	1 38E+01		
Pu-242	1 9717E-09	2,282.86	2,282.86	4,565.72	0 00E+00	4 50E-06	9 00E-06		
Ra-226	7 3527E-14	2,282.86	2,282.86	4,565.72	0 00E+00	1 68E-10	3 36E-10		
Ra-228	6 0965E-12	2,282.86	2,282.86	4,565.72	0 00E+00	1 39E-08	2 78E-08		
Ru-106	1 6531E-01	2,282.86	2,282.86	4,565.72	0 00E+00	3 77E+02	7 55E+02		
Se-79	1 3228E-05	2,282.86	2,282.86	4,565.72	0 00E+00	3 02E-02	6 04E-02		
Sn-126	1 1494E-05	2,282.86	2,282.86	4,565.72	0 00E+00	2 62E-02	5.25E-02		
Sr-90	2 7854E+00	2,282.86	2,282.86	4,565.72	0 00E+00	6 36E+03	1 27E+04		
Tc-99	4 6656E-04	2,282.86	2,282.86	4,565.72	0 00E+00	1 07E+00	2 13E+00		
Th-229	2 9368E-12	2,282.86	2,282.86	4,565.72	0 00E+00	6 70E-09	1 34E-08		
Th-230	3 2662E-11	2,282.86	2,282.86	4,565.72	0 00E+00	7 46E-08	1 49E-07		
Th-232	8 3045E-12	2,282.86	2,282.86	4,565.72	0 00E+00	1 90E-08	3 79E-08		
Th-208	2 6722E-08	2,282.86	2,282.86	4,565.72	0 00E+00	6 10E-05	1 22E-04		
U-232	7 7720E-08	2,282.86	2,282.86	4,565.72	0 00E+00	1 77E-04	3 55E-04		
U-233	2 9834E-09	2,282.86	2,282.86	4,565.72	0 00E+00	6 81E-06	1 36E-05		
U-234	3 5275E-07	2,282.86	2,282.86	4,565.72	0 00E+00	8 05E-04	1 61E-03		
U-235	-2 7761E-06	2,282.86	2,282.86	0 00	5 51E-02	4 88E-02	5 51E-02		
U-236	1 6190E-05	2,282.86	2,282.86	4,565.72	0 00E+00	3 70E-02	7.39E-02		
U-238	-2 8547E-09	2,282.86	2,282.86	0.00	3 20E-02	3 20E-02	3.20E-02		
Y-90	2 7870E+00	2,282.86	2,282.86	4,565.72	0 00E+00	6 36E+03	1 27E+04		
Other Radionuclides						1.20E+04	2 40E+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.
	From SFD	Used	
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	21 10367543	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		2,282.86	
Bounding		4 565 72	

Checks			Estimated EOL HM/Given EOL HM 0 98
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 40		
Bounding	0 81		

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 ANP	¹ Fuel decay start date 1957	Estimated Canister usage: 18"x10" 0 69
SNF ID # 451	Estimates as of 2030	
Fuel Units & Descr: 9 - CONCENTRIC TUBES	Template Pathfinder (Light Water, SST, 60 to 100% U)	
Heavy Metal Mass BOL=1 118kg EOL=1 102kg	² Template Burnup(MWd) 6 01	
ROD Storage Site: INEEL	Template BOL Heavy Metal Mass (MT) 0 00012882	
	Template Decay Time 65 years	

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4 5940E-08	15 30	30 61	0 00E+00	7 03E-07	1 41E-06	Avg MeV	
Am-241	1 1471E-04	15 30	30 61	0 00E+00	1 76E-03	3 51E-03	0 0150	1 117E+12
Am-242m	7 4210E-09	15 30	30 61	0 00E+00	1 14E-07	2 27E-07	0 0250	2 321E+11
Am-243	9 8236E-10	15 30	30 61	0 00E+00	1 50E-08	3 01E-08	0 0375	2 017E+11
C-14	2 2928E-04	15 30	30 61	0 00E+00	3 51E-03	7 02E-03	0 0575	2 164E+11
Cl-36	1 2260E-06	15 30	30 61	0 00E+00	1 88E-05	3 75E-05	0 0850	1 307E+11
Cm-243	1 2000E-10	15 30	30 61	0 00E+00	1 84E-09	3 67E-09	0 1250	8 478E+10
Cm-244	7 3577E-10	15 30	30 61	0 00E+00	1 13E-08	2 25E-08	0 2250	1 127E+11
Co-60	1 3732E-03	15 30	30 61	0 00E+00	2 10E-02	4 20E-02	0 3750	4 915E+10
Cs-134	1 2709E-10	15 30	30 61	0 00E+00	1 94E-09	3 89E-09	0 5750	8 267E+11
Cs-135	3 0316E-05	15 30	30 61	0 00E+00	4 64E-04	9 28E-04	0 8500	8 029E+09
Cs-137	7 2579E-01	15 30	30 61	0 00E+00	1 11E+01	2 22E+01	1 2500	5 811E+09
Eu-154	5 9750E-05	15 30	30 61	0 00E+00	9 14E-04	1 83E-03	1 7500	2 065E+08
Eu-155	1 0577E-05	15 30	30 61	0 00E+00	1 62E-04	3 24E-04	2 2500	3 906E+04
Fe-55	4 1631E-07	15 30	30 61	0 00E+00	6 37E-06	1 27E-05	2 7500	1 749E+04
H-3	4 6722E-04	15 30	30 61	0 00E+00	7 15E-03	1 43E-02	3 5000	1 968E+00
I-129	7 3195E-07	15 30	30 61	0 00E+00	1 12E-05	2 24E-05	5 0000	8 142E-01
Kr-85	5 9418E-03	15 30	30 61	0 00E+00	9 09E-02	1 82E-01	7 0000	9 017E-02
Np-237	1 1499E-06	15 30	30 61	0 00E+00	1 76E-05	3 52E-05	11 0000	1 014E-02
Pa-231	7 0899E-08	15 30	30 61	0 00E+00	1 08E-06	2 17E-06		
Pb-210	2 2363E-12	15 30	30 61	0 00E+00	3 42E-11	6 84E-11		
Pm-147	4 2296E-07	15 30	30 61	0 00E+00	6 47E-06	1 29E-05		
Pu-238	2 3295E-04	15 30	30 61	0 00E+00	3 56E-03	7 13E-03		
Pu-239	6 6722E-04	15 30	30 61	0 00E+00	1 02E-02	2 04E-02		
Pu-240	8 6566E-05	15 30	30 61	0 00E+00	1 32E-03	2 65E-03		
Pu-241	1 6889E-04	15 30	30 61	0 00E+00	2 58E-03	5 17E-03		
Pu-242	1 9717E-09	15 30	30 61	0 00E+00	3 02E-08	6 03E-08		
Ra-226	4 5740E-12	15 30	30 61	0 00E+00	7 00E-11	1 40E-10		
Ra-228	8 3511E-12	15 30	30 61	0 00E+00	1 28E-10	2 56E-10		
Ru-106	2 0516E-19	15 30	30 61	0 00E+00	3 14E-18	6 28E-18		
Se-79	1 3220E-05	15 30	30 61	0 00E+00	2 02E-04	4 05E-04		
Sn-126	1 1489E-05	15 30	30 61	0 00E+00	1 76E-04	3 52E-04		
Sr-90	6 6872E-01	15 30	30 61	0 00E+00	1 02E+01	2 05E+01		
Tc-99	4 6639E-04	15 30	30 61	0 00E+00	7 14E-03	1 43E-02		
Th-229	2 3727E-11	15 30	30 61	0 00E+00	3 63E-10	7 26E-10		
Th-230	2 7354E-10	15 30	30 61	0 00E+00	4 19E-09	8 37E-09		
Th-232	8 3594E-12	15 30	30 61	0 00E+00	1 28E-10	2 56E-10		
Tl-208	1 6228E-08	15 30	30 61	0 00E+00	2 48E-07	4 97E-07		
U-232	4 3960E-08	15 30	30 61	0 00E+00	6 73E-07	1 35E-06		
U-233	3 3344E-09	15 30	30 61	0 00E+00	5 10E-08	1 02E-07		
U-234	4 0749E-07	15 30	30 61	0 00E+00	6 24E-06	1 25E-05		
U-235	-2 7761E-06	15 30	0 00	2 25E-03	2 21E-03	2 25E-03		
U-236	1 6190E-05	15 30	30 61	0 00E+00	2 48E-04	4 96E-04		
U-238	-2 8547E-09	15 30	0 00	2 55E-05	2 55E-05	2 55E-05		
Y-90	6 6889E-01	15 30	30 61	0 00E+00	1 02E+01	2 05E+01		
Other Radionuclides					1 39E+01	2 78E+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 cladding (SST is conservative)
Fuel Cladding	NICHROME	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	93.20218125	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		15.30	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding		30.61	

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=0.246kg, EOL=0.216kg
 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	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Actvrvty (Ci)	Nominal Fuel Inventones(Ci)	Bounding Fuel Inventones(Ci)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4 5940E-08	28 72	57 43	0 00E+00	1 32E-06	2 64E-06	Avg. MeV	
Am-241	1 1471E-04	28 72	57 43	0 00E+00	3 29E-03	6 59E-03	0 0150	2 096E+12
Am-242m	7 4210E-09	28 72	57 43	0 00E+00	2 13E-07	4 26E-07	0 0250	4 356E+11
Am-243	9 8236E-10	28 72	57 43	0 00E+00	2 82E-08	5 64E-08	0 0375	3 785E+11
C-14	2 2928E-04	28 72	57 43	0 00E+00	6 58E-03	1 32E-02	0 0575	4 062E+11
Cl-36	1 2260E-06	28 72	57 43	0 00E+00	3 52E-05	7 04E-05	0 0850	2 453E+11
Cm-243	1 2000E-10	28 72	57 43	0 00E+00	3 45E-09	6 89E-09	0 1250	1 591E+11
Cm-244	7 3577E-10	28 72	57 43	0 00E+00	2 11E-08	4 23E-08	0 2250	2 114E+11
Co-60	1 3732E-03	28 72	57 43	0 00E+00	3 94E-02	7 89E-02	0 3750	9 222E+10
Cs-134	1 2709E-10	28 72	57 43	0 00E+00	3 65E-09	7 30E-09	0 5750	1 551E+12
Cs-135	3 0316E-05	28 72	57 43	0 00E+00	8 71E-04	1 74E-03	0 8500	1 507E+10
Cs-137	7 2579E-01	28 72	57 43	0 00E+00	2 08E+01	4 17E+01	1 2500	1 090E+10
Eu-154	5 9750E-05	28 72	57 43	0 00E+00	1 72E-03	3 43E-03	1 7500	3 876E+08
Eu-155	1 0577E-05	28 72	57 43	0 00E+00	3 04E-04	6 08E-04	2 2500	7 330E+04
Fe-55	4 1631E-07	28 72	57 43	0 00E+00	1 20E-05	2 39E-05	2 7500	3 283E+04
H-3	4 6722E-04	28 72	57 43	0 00E+00	1 34E-02	2 68E-02	3 5000	3 343E+00
I-129	7 3195E-07	28 72	57 43	0 00E+00	2 10E-05	4 20E-05	5 0000	1 381E+00
Kr-85	5 9418E-03	28 72	57 43	0 00E+00	1 71E-01	3 41E-01	7 0000	1 526E-01
Np-237	1 1499E-06	28 72	57 43	0 00E+00	3 30E-05	6 60E-05	11 0000	1 714E-02
Pa-231	7 0899E-08	28 72	57 43	0 00E+00	2 04E-06	4 07E-06		
Pb-210	2 2363E-12	28 72	57 43	0 00E+00	6 42E-11	1 28E-10		
Pm-147	4 2296E-07	28 72	57 43	0 00E+00	1 21E-05	2 43E-05		
Pu-238	2 3295E-04	28 72	57 43	0 00E+00	6 69E-03	1 34E-02		
Pu-239	6 6722E-04	28 72	57 43	0 00E+00	1 92E-02	3 83E-02		
Pu-240	8 6556E-05	28 72	57 43	0 00E+00	2 49E-03	4 97E-03		
Pu-241	1 6889E-04	28 72	57 43	0 00E+00	4 85E-03	9 70E-03		
Pu-242	1 9717E-09	28 72	57 43	0 00E+00	5 66E-08	1 13E-07		
Ra-226	4 5740E-12	28 72	57 43	0 00E+00	1 31E-10	2 63E-10		
Ra-228	8 3511E-12	28 72	57 43	0 00E+00	2 40E-10	4 80E-10		
Ru-106	2 0516E-19	28 72	57 43	0 00E+00	5 89E-18	1 18E-17		
Se-79	1 3220E-05	28 72	57 43	0 00E+00	3 80E-04	7 59E-04		
Sn-126	1 1489E-05	28 72	57 43	0 00E+00	3 30E-04	6 60E-04		
Sr-90	6 6872E-01	28 72	57 43	0 00E+00	1 92E+01	3 84E+01		
Tc-99	4 6639E-04	28 72	57 43	0 00E+00	1 34E-02	2 68E-02		
Th-229	2 3727E-11	28 72	57 43	0 00E+00	6 81E-10	1 36E-09		
Th-230	2 7354E-10	28 72	57 43	0 00E+00	7 86E-09	1 57E-08		
Th-232	8 3594E-12	28 72	57 43	0 00E+00	2 40E-10	4 80E-10		
Tl-208	1 6228E-08	28 72	57 43	0 00E+00	4 66E-07	9 32E-07		
U-232	4 3960E-08	28 72	57 43	0 00E+00	1 26E-06	2 52E-06		
U-233	3 3344E-09	28 72	57 43	0 00E+00	9 58E-08	1 92E-07		
U-234	4 0749E-07	28 72	57 43	0 00E+00	1 17E-05	2 34E-05		
U-235	-2 7761E-06	28 72	0 00	4 95E-04	4 15E-04	4 95E-04		
U-236	1 6190E-05	28 72	57 43	0 00E+00	4 65E-04	9 30E-04		
U-238	-2 8547E-09	28 72	0 00	5 81E-06	5 73E-06	5 81E-06		
Y-90	6 6889E-01	28 72	57 43	0 00E+00	1 92E+01	3 84E+01		
Other Radionuclides					2 61E+01	5 22E+01		

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:
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	SST	SST	
BOL Enrichment %	U	U	
	92 987	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		28 72	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding		57 43	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal	2 50		
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	Fuel decay start date	1986
SNF ID #	7	Estimates as of	2030
Fuel Units & Descr	3 - SCRAP	Template	PWR (Light Water, Zirc 0 to 5%, U)
Heavy Metal Mass	BOL=12.6kg EOL=11.895kg	Template Burnup(MWd)	61.92
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0.00176911
		Template Decay Time	35 years

Estimated Canister usage 18"x10" 0.17
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Radionuclide	Ci/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	8.7758E-10	670.42	1,340.84	0.00E+00	5.88E-07	1.18E-06	Avg MeV	
Am-241	1.4352E-01	670.42	1,340.84	0.00E+00	9.62E+01	1.92E+02	0.0150	7.214E+13
Am-242m	2.8698E-04	670.42	1,340.84	0.00E+00	1.92E-01	3.85E-01	0.0250	1.455E+13
Am-243	6.2565E-04	670.42	1,340.84	0.00E+00	4.19E-01	8.39E-01	0.0375	1.388E+13
C-14	4.7901E-05	670.42	1,340.84	0.00E+00	3.21E-02	6.42E-02	0.0575	1.603E+13
Cl-36	8.0297E-07	670.42	1,340.84	0.00E+00	5.38E-04	1.08E-03	0.0850	8.073E+12
Cm-243	2.5081E-04	670.42	1,340.84	0.00E+00	1.68E-01	3.36E-01	0.1250	5.602E+12
Cm-244	4.9015E-02	670.42	1,340.84	0.00E+00	3.29E+01	6.57E+01	0.2250	6.922E+12
Co-60	2.5581E-03	670.42	1,340.84	0.00E+00	1.72E+00	3.43E+00	0.3750	2.977E+12
Cs-134	4.0536E-05	670.42	1,340.84	0.00E+00	2.72E-02	5.44E-02	0.5750	6.923E+13
Cs-135	1.4433E-05	670.42	1,340.84	0.00E+00	9.68E-03	1.94E-02	0.8500	9.578E+11
Cs-137	1.3979E+00	670.42	1,340.84	0.00E+00	9.37E+02	1.87E+03	1.2500	9.408E+11
Eu-154	2.0203E-02	670.42	1,340.84	0.00E+00	1.35E+01	2.71E+01	1.7500	2.817E+10
Eu-155	1.7684E-03	670.42	1,340.84	0.00E+00	1.19E+00	2.37E+00	2.2500	4.536E+06
Fe-55	4.3136E-05	670.42	1,340.84	0.00E+00	2.89E-02	5.78E-02	2.7500	9.294E+06
H-3	2.0769E-02	670.42	1,340.84	0.00E+00	1.39E+01	2.78E+01	3.5000	9.570E+05
I-129	9.8288E-07	670.42	1,340.84	0.00E+00	6.59E-04	1.32E-03	5.0000	4.092E+05
Kr-85	2.8214E-02	670.42	1,340.84	0.00E+00	1.89E+01	3.78E+01	7.0000	4.716E+04
Np-237	1.1218E-05	670.42	1,340.84	0.00E+00	7.52E-03	1.50E-02	11.0000	5.416E+03
Pa-231	1.3036E-09	670.42	1,340.84	0.00E+00	8.74E-07	1.75E-06		
Pb-210	8.5078E-11	670.42	1,340.84	0.00E+00	5.70E-08	1.14E-07		
Pm-147	3.6531E-04	670.42	1,340.84	0.00E+00	2.45E-01	4.90E-01		
Pu-238	7.4564E-02	670.42	1,340.84	0.00E+00	5.00E+01	1.00E+02		
Pu-239	1.1623E-02	670.42	1,340.84	0.00E+00	7.79E+00	1.56E+01		
Pu-240	1.5132E-02	670.42	1,340.84	0.00E+00	1.01E+01	2.03E+01		
Pu-241	9.0036E-01	670.42	1,340.84	0.00E+00	6.04E+02	1.21E+03		
Pu-242	6.4260E-05	670.42	1,340.84	0.00E+00	4.31E-02	8.62E-02		
Ra-226	2.2804E-10	670.42	1,340.84	0.00E+00	1.53E-07	3.06E-07		
Ra-228	5.2713E-12	670.42	1,340.84	0.00E+00	3.53E-09	7.07E-09		
Ru-106	6.1160E-10	670.42	1,340.84	0.00E+00	4.10E-07	8.20E-07		
Se-79	1.2377E-05	670.42	1,340.84	0.00E+00	8.30E-03	1.66E-02		
Sn-126	2.5210E-05	670.42	1,340.84	0.00E+00	1.69E-02	3.38E-02		
Sr-90	9.1667E-01	670.42	1,340.84	0.00E+00	6.15E+02	1.23E+03		
Tc-99	3.9357E-04	670.42	1,340.84	0.00E+00	2.64E-01	5.28E-01		
Th-229	1.2057E-10	670.42	1,340.84	0.00E+00	8.08E-08	1.62E-07		
Th-230	2.1043E-08	670.42	1,340.84	0.00E+00	1.41E-05	2.82E-05		
Th-232	5.2972E-12	670.42	1,340.84	0.00E+00	3.55E-09	7.10E-09		
Tl-208	1.7474E-07	670.42	1,340.84	0.00E+00	1.17E-04	2.34E-04		
U-232	4.7368E-07	670.42	1,340.84	0.00E+00	3.18E-04	6.35E-04		
U-233	2.5097E-08	670.42	1,340.84	0.00E+00	1.68E-05	3.37E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	5.0000E-05	670.42	1,340.84	0.00E+00	3.35E-02	6.70E-02	1.54E+01	3.08E+01
U-235	-1.4489E-06	670.42	0.00	7.90E-04	0.00E+00	7.90E-04	Total	Total
U-236	7.5824E-06	670.42	1,340.84	0.00E+00	5.08E-03	1.02E-02		
U-238	-2.6129E-07	670.42	0.00	4.11E-03	3.94E-03	4.11E-03		
Y-90	9.1699E-01	670.42	1,340.84	0.00E+00	6.15E+02	1.23E+03		
Other Radionuclides					9.00E+02	1.80E+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	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	2.9	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	592.20	670.42	
Bounding		1,340.84	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	1.52	1.13	
Bounding	3.04		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: ARMF (PLATES)
 SNF ID #: 8
 Fuel Units & Descr: 15 - FLAT PLATES IN CAN
 Heavy Metal Mass: BOL=0 198kg; EOL=0 198kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1987
 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 00

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	2 0068E-09	0 02	0 05	0 00E+00	4 57E-11	9 14E-11	0 0150	3 363E+09
Am-241	2 5251E-03	0 02	0 05	0 00E+00	5 75E-05	1 15E-04	0 0250	6 965E+08
Am-242m	3 9624E-07	0 02	0 05	0 00E+00	9 02E-09	1 80E-08	0 0375	6 054E+08
Am-243	1 4880E-06	0 02	0 05	0 00E+00	3 39E-08	6 78E-08	0 0575	6 516E+08
C-14	5 7053E-09	0 02	0 05	0 00E+00	1 30E-10	2 60E-10	0 0850	3 937E+08
Cl-36	1 3124E-32	0 02	0 05	0 00E+00	2 99E-34	5 98E-34	0 1250	2 616E+08
Cm-243	1 1419E-07	0 02	0 05	0 00E+00	2 60E-09	5 20E-09	0 2250	3 469E+08
Cm-244	1 6522E-05	0 02	0 05	0 00E+00	3 76E-07	7 52E-07	0 3750	1 475E+08
Co-60	7 4047E-07	0 02	0 05	0 00E+00	1 69E-08	3 37E-08	0 5750	2 437E+09
Cs-134	2 0455E-05	0 02	0 05	0 00E+00	4 66E-07	9 32E-07	0 8500	2 977E+07
Cs-135	3 4477E-06	0 02	0 05	0 00E+00	7 85E-08	1 57E-07	1 2500	1 440E+07
Cs-137	1 4365E+00	0 02	0 05	0 00E+00	3 27E-02	6 54E-02	1 7500	8 103E+05
Eu-154	7 3230E-03	0 02	0 05	0 00E+00	1 67E-04	3 33E-04	2 2500	6 783E+01
Eu-155	5 9259E-04	0 02	0 05	0 00E+00	1 35E-05	2 70E-05	2 7500	6 471E+01
Fe-55	2 2791E-06	0 02	0 05	0 00E+00	5 19E-08	1 04E-07	3 5000	7 945E-02
H-3	1 9698E-03	0 02	0 05	0 00E+00	4 49E-05	8 97E-05	5 0000	3 301E-02
I-129	7 5300E-07	0 02	0 05	0 00E+00	1 71E-08	3 43E-08	7 0000	3 675E-03
Kr-85	4 1176E-02	0 02	0 05	0 00E+00	9 38E-04	1 88E-03	11 0000	4 142E-04
Np-237	9 5752E-06	0 02	0 05	0 00E+00	2 18E-07	4 36E-07		
Pa-231	3 9379E-09	0 02	0 05	0 00E+00	8 97E-11	1 79E-10		
Pb-210	3 3115E-10	0 02	0 05	0 00E+00	7 54E-12	1 51E-11		
Pm-147	9 2402E-04	0 02	0 05	0 00E+00	2 10E-05	4 21E-05		
Pu-238	1 6217E-02	0 02	0 05	0 00E+00	3 69E-04	7 39E-04		
Pu-239	4 2810E-04	0 02	0 05	0 00E+00	9 75E-06	1 95E-05		
Pu-240	2 4333E-04	0 02	0 05	0 00E+00	5 54E-06	1 11E-05		
Pu-241	1 6242E-02	0 02	0 05	0 00E+00	3 70E-04	7 40E-04		
Pu-242	3 6329E-07	0 02	0 05	0 00E+00	8 27E-09	1 65E-08		
Ra-226	9 0114E-10	0 02	0 05	0 00E+00	2 05E-11	4 10E-11		
Ra-228	3 1019E-14	0 02	0 05	0 00E+00	7 06E-16	1 41E-15		
Ru-106	2 1225E-10	0 02	0 05	0 00E+00	4 83E-12	9 67E-12		
Se-79	1 2930E-05	0 02	0 05	0 00E+00	2 94E-07	5 89E-07		
Sn-126	1 1571E-05	0 02	0 05	0 00E+00	2 63E-07	5 27E-07		
Sr-90	1 3472E+00	0 02	0 05	0 00E+00	3 07E-02	6 14E-02		
Tc-99	4 2239E-04	0 02	0 05	0 00E+00	9 62E-06	1 92E-05		
Th-229	1 2407E-11	0 02	0 05	0 00E+00	2 83E-13	5 65E-13		
Th-230	8 3497E-08	0 02	0 05	0 00E+00	1 90E-09	3 80E-09		
Th-232	3 8371E-14	0 02	0 05	0 00E+00	8 74E-16	1 75E-15		
Tl-208	4 0414E-08	0 02	0 05	0 00E+00	9 20E-10	1 84E-09		
U-232	1 0948E-07	0 02	0 05	0 00E+00	2 49E-09	4 99E-09		
U-233	3 6275E-09	0 02	0 05	0 00E+00	8 26E-11	1 65E-10		
U-234	1 8562E-04	0 02	0 05	0 00E+00	4 23E-06	8 45E-06		
U-235	-2 7235E-06	0 02	0 00	3 93E-04	3 93E-04	3 93E-04		
U-236	1 5493E-05	0 02	0 05	0 00E+00	3 53E-07	7 06E-07		
U-238	-4 2851E-09	0 02	0 00	5 39E-06	5 39E-06	5 39E-06		
Y-90	1 3475E+00	0 02	0 05	0 00E+00	3 07E-02	6 14E-02		
Other Radionuclides					3 12E-02	6 23E-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	U	
BOL Enrichment %	91 83393939	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup assumed to be twice nominal burnup.
	From SFD	Estimated	
Nominal	0 02		
Bounding		0 05	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
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

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	2.0068E-09	1.30	13.74	0.00E+00	2.61E-09	2.76E-08	0.0150	1.012E+12
Am-241	2.5251E-03	1.30	13.74	0.00E+00	3.28E-03	3.47E-02	0.0250	2.101E+11
Am-242m	3.9624E-07	1.30	13.74	0.00E+00	5.14E-07	5.44E-06	0.0375	1.826E+11
Am-243	1.4880E-06	1.30	13.74	0.00E+00	1.93E-06	2.04E-05	0.0575	1.966E+11
C-14	5.7053E-09	1.30	13.74	0.00E+00	7.41E-09	7.84E-08	0.0850	1.185E+11
Cf-252	1.3124E-32	1.30	13.74	0.00E+00	1.70E-32	1.80E-31	0.1250	7.837E+10
Cm-243	1.1419E-07	1.30	13.74	0.00E+00	1.48E-07	1.57E-06	0.2250	1.027E+11
Cm-244	1.6522E-05	1.30	13.74	0.00E+00	2.15E-05	2.27E-04	0.3750	4.449E+10
Co-60	7.4047E-07	1.30	13.74	0.00E+00	9.61E-07	1.02E-05	0.5750	7.352E+11
Cs-134	2.0455E-05	1.30	13.74	0.00E+00	2.66E-05	2.81E-04	0.8500	8.981E+09
Cs-135	3.4477E-06	1.30	13.74	0.00E+00	4.48E-06	4.74E-05	1.2500	4.344E+09
Cs-137	1.4365E+00	1.30	13.74	0.00E+00	1.87E+00	1.97E+01	1.7500	2.445E+08
Eu-154	7.3230E-03	1.30	13.74	0.00E+00	9.51E-03	1.01E-01	2.2500	2.045E+04
Eu-155	5.9259E-04	1.30	13.74	0.00E+00	7.69E-04	8.14E-03	2.7500	1.951E+04
Fe-55	2.2791E-06	1.30	13.74	0.00E+00	2.96E-06	3.13E-05	3.5000	1.362E+01
H-3	1.9698E-03	1.30	13.74	0.00E+00	2.56E-03	2.71E-02	5.0000	5.593E+00
I-129	7.5300E-07	1.30	13.74	0.00E+00	9.78E-07	1.03E-05	7.0000	6.154E-01
Kr-85	4.1176E-02	1.30	13.74	0.00E+00	5.35E-02	5.66E-01	11.0000	6.886E-02
Np-237	9.5752E-06	1.30	13.74	0.00E+00	1.24E-05	1.32E-04		
Pa-231	3.9379E-09	1.30	13.74	0.00E+00	5.11E-09	5.41E-08		
Pb-210	3.3115E-10	1.30	13.74	0.00E+00	4.30E-10	4.55E-09		
Pm-147	9.2402E-04	1.30	13.74	0.00E+00	1.20E-03	1.27E-02		
Pu-238	1.6217E-02	1.30	13.74	0.00E+00	2.11E-02	2.23E-01		
Pu-239	4.2810E-04	1.30	13.74	0.00E+00	5.56E-04	5.88E-03		
Pu-240	2.4333E-04	1.30	13.74	0.00E+00	3.16E-04	3.34E-03		
Pu-241	1.6242E-02	1.30	13.74	0.00E+00	2.11E-02	2.23E-01		
Pu-242	3.6329E-07	1.30	13.74	0.00E+00	4.72E-07	4.99E-06		
Ra-226	9.0114E-10	1.30	13.74	0.00E+00	1.17E-09	1.24E-08		
Ra-228	3.1019E-14	1.30	13.74	0.00E+00	4.03E-14	4.26E-13		
Ru-106	2.1225E-10	1.30	13.74	0.00E+00	2.76E-10	2.92E-09		
Se-79	1.2930E-05	1.30	13.74	0.00E+00	1.68E-05	1.78E-04		
Sn-126	1.1571E-05	1.30	13.74	0.00E+00	1.50E-05	1.59E-04		
Sr-90	1.3472E+00	1.30	13.74	0.00E+00	1.75E+00	1.85E+01		
Tc-99	4.2239E-04	1.30	13.74	0.00E+00	5.48E-04	5.80E-03		
Th-229	1.2407E-11	1.30	13.74	0.00E+00	1.61E-11	1.70E-10		
Th-230	8.3497E-08	1.30	13.74	0.00E+00	1.08E-07	1.15E-06		
Th-232	3.8371E-14	1.30	13.74	0.00E+00	4.98E-14	5.27E-13		
Th-208	4.0414E-08	1.30	13.74	0.00E+00	5.25E-08	5.55E-07		
U-232	1.0948E-07	1.30	13.74	0.00E+00	1.42E-07	1.50E-06		
U-233	3.6275E-09	1.30	13.74	0.00E+00	4.71E-09	4.98E-08		
U-234	1.8562E-04	1.30	13.74	0.00E+00	2.41E-04	2.55E-03		
U-235	-2.7235E-06	1.30	0.00	2.25E-02	2.25E-02	2.25E-02		
U-236	1.5493E-05	1.30	13.74	0.00E+00	2.01E-05	2.13E-04		
U-238	-4.2851E-09	1.30	0.00	2.92E-04	2.92E-04	2.92E-04		
Y-90	1.3475E+00	1.30	13.74	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	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	92.29270621	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	1.30		
Bounding	13.74		

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	

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: ARMF/CFRMF MARK I LL
 SNF ID #: 10
 Fuel Units & Descr: 2 - 15 FLAT PLATES
 Heavy Metal Mass: BOL=0.236kg; EOL=0.236kg
 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

Radionuclide	II. Estimates						Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	2.0068E-09	0.03	0.29	0.00E+00	5.45E-11	5.76E-10	0.0150	2.116E+10
Am-241	2.5251E-03	0.03	0.29	0.00E+00	6.85E-05	7.25E-04	0.0250	4.393E+09
Am-242m	3.9624E-07	0.03	0.29	0.00E+00	1.08E-08	1.14E-07	0.0375	3.818E+09
Am-243	1.4880E-06	0.03	0.29	0.00E+00	4.04E-08	4.27E-07	0.0575	4.110E+09
C-14	5.7053E-09	0.03	0.29	0.00E+00	1.55E-10	1.64E-09	0.0850	2.478E+09
Cl-36	1.3124E-32	0.03	0.29	0.00E+00	3.56E-34	3.77E-33	0.1250	1.638E+09
Cm-243	1.1419E-07	0.03	0.29	0.00E+00	3.10E-09	3.28E-08	0.2250	2.147E+09
Cm-244	1.6522E-05	0.03	0.29	0.00E+00	4.48E-07	4.75E-06	0.3750	9.300E+08
Co-60	7.4047E-07	0.03	0.29	0.00E+00	2.01E-08	2.13E-07	0.5750	1.537E+10
Cs-134	2.0455E-05	0.03	0.29	0.00E+00	5.55E-07	5.87E-06	0.8500	1.877E+08
Cs-135	3.4477E-06	0.03	0.29	0.00E+00	9.36E-08	9.90E-07	1.2500	9.080E+07
Cs-137	1.4365E+00	0.03	0.29	0.00E+00	3.90E-02	4.13E-01	1.7500	5.111E+06
Eu-154	7.3230E-03	0.03	0.29	0.00E+00	1.99E-04	2.10E-03	2.2500	4.274E+02
Eu-155	5.9259E-04	0.03	0.29	0.00E+00	1.61E-05	1.70E-04	2.7500	4.079E+02
Fe-55	2.2791E-06	0.03	0.29	0.00E+00	6.19E-08	6.55E-07	3.5000	2.809E+01
H-3	1.9698E-03	0.03	0.29	0.00E+00	5.35E-05	5.66E-04	5.0000	1.153E-01
I-129	7.5300E-07	0.03	0.29	0.00E+00	2.04E-08	2.16E-07	7.0000	1.268E-02
Kr-85	4.1176E-02	0.03	0.29	0.00E+00	1.12E-03	1.18E-02	11.0000	1.418E-03
Np-237	9.5752E-06	0.03	0.29	0.00E+00	2.60E-07	2.75E-06		
Pa-231	3.9379E-09	0.03	0.29	0.00E+00	1.07E-10	1.13E-09		
Pb-210	3.3115E-10	0.03	0.29	0.00E+00	8.99E-12	9.51E-11		
Pm-147	9.2402E-04	0.03	0.29	0.00E+00	2.51E-05	2.65E-04		
Pu-238	1.6217E-02	0.03	0.29	0.00E+00	4.40E-04	4.66E-03		
Pu-239	4.2810E-04	0.03	0.29	0.00E+00	1.16E-05	1.23E-04		
Pu-240	2.4333E-04	0.03	0.29	0.00E+00	6.60E-06	6.99E-05		
Pu-241	1.6242E-02	0.03	0.29	0.00E+00	4.41E-04	4.66E-03		
Pu-242	3.6329E-07	0.03	0.29	0.00E+00	9.86E-09	1.04E-07		
Ra-226	9.0114E-10	0.03	0.29	0.00E+00	2.45E-11	2.59E-10		
Ra-228	3.1019E-14	0.03	0.29	0.00E+00	8.42E-16	8.91E-15		
Ru-106	2.1225E-10	0.03	0.29	0.00E+00	5.76E-12	6.10E-11		
Se-79	1.2930E-05	0.03	0.29	0.00E+00	3.51E-07	3.71E-06		
Sn-126	1.1571E-05	0.03	0.29	0.00E+00	3.14E-07	3.32E-06		
Sr-90	1.3472E+00	0.03	0.29	0.00E+00	3.66E-02	3.87E-01		
Tc-99	4.2239E-11	0.03	0.29	0.00E+00	1.15E-05	1.21E-04		
Th-229	1.2407E-11	0.03	0.29	0.00E+00	3.37E-13	3.56E-12		
Th-230	8.3497E-08	0.03	0.29	0.00E+00	2.27E-09	2.40E-08		
Th-232	3.8371E-14	0.03	0.29	0.00E+00	1.04E-15	1.10E-14		
Tl-208	4.0414E-08	0.03	0.29	0.00E+00	1.10E-09	1.16E-08		
U-232	1.0948E-07	0.03	0.29	0.00E+00	2.97E-09	3.14E-08		
U-233	3.6275E-09	0.03	0.29	0.00E+00	9.84E-11	1.04E-09		
U-234	1.8562E-04	0.03	0.29	0.00E+00	5.04E-06	5.33E-05		
U-235	-2.7235E-06	0.03	0.00	4.75E-04	4.75E-04	4.75E-04		
U-236	1.5493E-05	0.03	0.29	0.00E+00	4.20E-07	4.45E-06		
U-238	-4.2851E-09	0.03	0.00	5.38E-06	5.38E-06	5.38E-06		
Y-90	1.3475E+00	0.03	0.29	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	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93.22	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	0.03		
Bounding	0.29		

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.00	0.00	
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/CFRMP MARK II	¹ Fuel decay start date	1991
SNF ID #	11	Estimates as of	2030
Fuel Units & Descr	8 - 15 FLAT PLATES	Template	ATR (Light Water, Alum. 60 to 100%, U)
Heavy Metal Mass	BOL=1 164kg, EOL=1 164kg	² Template 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" 0.33
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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	0 13	1 42	0 00E+00	2 69E-10	2 84E-09	Avg MeV	
Am-241	2 5251E-03	0 13	1 42	0 00E+00	3 38E-04	3 58E-03	0 0150	1 044E+11
Am-242m	3 9624E-07	0 13	1 42	0 00E+00	5.30E-08	5 61E-07	0 0250	2 166E+10
Am-243	1.4880E-06	0 13	1 42	0 00E+00	1.99E-07	2 11E-06	0 0375	1 883E+10
C-14	5 7053E-09	0 13	1 42	0 00E+00	7 64E-10	8 08E-09	0 0575	2 027E+10
Cl-36	1.3124E-32	0 13	1.42	0 00E+00	1 76E-33	1.86E-32	0 0850	1 222E+10
Cm-243	1 1419E-07	0 13	1.42	0 00E+00	1 53E-08	1.62E-07	0 1250	8 080E+09
Cm-244	1 6522E-05	0 13	1 42	0 00E+00	2 21E-06	2.34E-05	0 2250	1 059E+10
Co-60	7 4047E-07	0 13	1 42	0 00E+00	9 91E-08	1 05E-06	0 3750	4 587E+09
Cs-134	2 0455E-05	0 13	1 42	0 00E+00	2 74E-06	2 90E-05	0 5750	7 581E+10
Cs-135	3 4477E-06	0 13	1 42	0 00E+00	4 62E-07	4 88E-06	0 8500	9 260E+08
Cs-137	1 4365E+00	0 13	1 42	0 00E+00	1 92E-01	2 03E+00	1 2500	4 479E+08
Eu-154	7.3230E-03	0 13	1 42	0 00E+00	9 80E-04	1 04E-02	1 7500	2 521E+07
Eu-155	5 9259E-04	0 13	1 42	0 00E+00	7.93E-05	8 39E-04	2 2500	2 108E+03
Fe-55	2.2791E-06	0 13	1.42	0 00E+00	3 05E-07	3.23E-06	2 7500	2 012E+03
H-3	1 9698E-03	0 13	1.42	0 00E+00	2 64E-04	2.79E-03	3.5000	1 387E+00
I-129	7 5300E-07	0 13	1 42	0 00E+00	1 01E-07	1 07E-06	5 0000	5 695E-01
Kr-85	4 1176E-02	0 13	1 42	0 00E+00	5 51E-03	5 83E-02	7.0000	6 262E-02
Np-237	9 5752E-06	0 13	1 42	0 00E+00	1 28E-06	1 36E-05	11 0000	7 004E-03
Pa-231	3 9379E-09	0 13	1 42	0 00E+00	5.27E-10	5 58E-09		
Pb-210	3 3115E-10	0 13	1 42	0 00E+00	4 43E-11	4 69E-10		
Pm-147	9.2402E-04	0 13	1 42	0 00E+00	1.24E-04	1.31E-03		
Pu-238	1.6217E-02	0 13	1 42	0 00E+00	2 17E-03	2.30E-02		
Pu-239	4.2810E-04	0 13	1 42	0 00E+00	5 73E-05	6 06E-04		
Pu-240	2 4333E-04	0 13	1 42	0 00E+00	3 26E-05	3 45E-04		
Pu-241	1 6242E-02	0 13	1 42	0 00E+00	2 17E-03	2.30E-02		
Pu-242	3 6329E-07	0 13	1.42	0 00E+00	4 86E-08	5 15E-07		
Ra-226	9 0114E-10	0 13	1 42	0 00E+00	1 21E-10	1 28E-09		
Ra-228	3 1019E-14	0 13	1 42	0 00E+00	4 15E-15	4 39E-14		
Ru-106	2 1225E-10	0 13	1 42	0 00E+00	2 84E-11	3 01E-10		
Se-79	1 2930E-05	0 13	1 42	0 00E+00	1.73E-06	1 83E-05		
Sn-126	1.1571E-05	0 13	1 42	0 00E+00	1.55E-06	1 64E-05		
Sr-90	1.3472E+00	0 13	1 42	0 00E+00	1 80E-01	1 91E+00		
Tc-99	4.2239E-04	0 13	1 42	0 00E+00	5 65E-05	5 98E-04		
Th-229	1.2407E-11	0 13	1.42	0 00E+00	1 66E-12	1 76E-11		
Th-230	8 3497E-08	0 13	1 42	0 00E+00	1 12E-08	1 18E-07		
Th-232	3 8371E-14	0 13	1 42	0 00E+00	5 14E-15	5 44E-14		
Ti-208	4 0414E-08	0 13	1 42	0 00E+00	5 41E-09	5 72E-08		
U-232	1 0948E-07	0 13	1 42	0 00E+00	1 47E-08	1 55E-07		
U-233	3 6275E-09	0 13	1 42	0 00E+00	4 86E-10	5 14E-09		
U-234	1.8562E-04	0 13	1 42	0 00E+00	2 48E-05	2 63E-04		
U-235	-2 7235E-06	0 13	0 00	2.34E-03	2.34E-03	2.34E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.5493E-05	0 13	1 42	0 00E+00	2 07E-06	2 19E-05	2.30E-03	2.38E-02
U-238	-4 2851E-09	0 13	0 00	2 69E-05	2 69E-05	2 69E-05	Total	Total
Y-90	1.3475E+00	0 13	1 42	0 00E+00	1 80E-01	1 94E+00		
Other Radionuclides					1 83E-01	1 94E+00		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
	From SFD	Used	
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93 12714777	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal	0 13		Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup taken directly from SFD (converted to MWd)
Bounding	1 42		

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ARMF/CFRMF MARK III
 SNF ID #: 12
 Fuel Units & Descr. 4 - 15 FLAT PLATES
 Heavy Metal Mass. BOL=0.096kg; EOL=0.096kg
 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

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	0.01	0.12	0.00E+00	2.22E-11	2.34E-10	Avg MeV	
Am-241	2.5251E-03	0.01	0.12	0.00E+00	2.79E-05	2.95E-04	0.0150	8.609E+09
Am-242m	3.9624E-07	0.01	0.12	0.00E+00	4.37E-09	4.63E-08	0.0250	1.787E+09
Am-243	1.4880E-06	0.01	0.12	0.00E+00	1.64E-08	1.74E-07	0.0375	1.553E+09
C-14	5.7053E-09	0.01	0.12	0.00E+00	6.30E-11	6.67E-10	0.0575	1.672E+09
Cl-36	1.3124E-32	0.01	0.12	0.00E+00	1.45E-34	1.53E-33	0.0850	1.008E+09
Cm-243	1.1419E-07	0.01	0.12	0.00E+00	1.26E-09	1.33E-08	0.1250	6.664E+08
Cm-244	1.6522E-05	0.01	0.12	0.00E+00	1.82E-07	1.93E-06	0.2250	8.734E+08
Co-60	7.4047E-07	0.01	0.12	0.00E+00	8.17E-09	8.65E-08	0.3750	3.783E+08
Cs-134	2.0455E-05	0.01	0.12	0.00E+00	2.26E-07	2.39E-06	0.5750	6.252E+08
Cs-135	3.4477E-06	0.01	0.12	0.00E+00	3.81E-08	4.03E-07	0.8500	7.637E+07
Cs-137	1.4365E+00	0.01	0.12	0.00E+00	1.59E-02	1.68E-01	1.2500	3.694E+07
Eu-154	7.3230E-03	0.01	0.12	0.00E+00	8.08E-05	8.56E-04	1.7500	2.079E+06
Eu-155	5.9259E-04	0.01	0.12	0.00E+00	6.54E-06	6.92E-05	2.2500	1.739E+02
Fe-55	2.2791E-06	0.01	0.12	0.00E+00	2.52E-08	2.66E-07	2.7500	1.659E+02
H-3	1.9698E-03	0.01	0.12	0.00E+00	2.17E-05	2.30E-04	3.5000	1.188E-01
I-129	7.5300E-07	0.01	0.12	0.00E+00	8.31E-09	8.80E-08	5.0000	4.801E-02
Kr-85	4.1176E-02	0.01	0.12	0.00E+00	4.55E-04	4.81E-03	7.0000	5.285E-03
Np-237	9.5752E-06	0.01	0.12	0.00E+00	1.06E-07	1.12E-06	11.0000	5.915E-04
Pa-231	3.9379E-09	0.01	0.12	0.00E+00	4.35E-11	4.60E-10		
Pb-210	3.3115E-10	0.01	0.12	0.00E+00	3.66E-12	3.87E-11		
Pm-147	9.2402E-04	0.01	0.12	0.00E+00	1.02E-05	1.08E-04		
Pu-238	1.6217E-02	0.01	0.12	0.00E+00	1.79E-04	1.89E-03		
Pu-239	4.2810E-04	0.01	0.12	0.00E+00	4.73E-06	5.00E-05		
Pu-240	2.4333E-04	0.01	0.12	0.00E+00	2.69E-06	2.84E-05		
Pu-241	1.6242E-02	0.01	0.12	0.00E+00	1.79E-04	1.90E-03		
Pu-242	3.6329E-07	0.01	0.12	0.00E+00	4.01E-09	4.24E-08		
Ra-226	9.0114E-10	0.01	0.12	0.00E+00	9.95E-12	1.05E-10		
Ra-228	3.1019E-14	0.01	0.12	0.00E+00	3.42E-16	3.62E-15		
Ru-106	2.1225E-10	0.01	0.12	0.00E+00	2.34E-12	2.48E-11		
Se-79	1.2930E-05	0.01	0.12	0.00E+00	1.43E-07	1.51E-06		
Sn-126	1.1571E-05	0.01	0.12	0.00E+00	1.28E-07	1.35E-06		
Sr-90	1.3472E+00	0.01	0.12	0.00E+00	1.49E-02	1.57E-01		
Tc-99	4.2239E-04	0.01	0.12	0.00E+00	4.66E-06	4.93E-05		
Th-229	1.2407E-11	0.01	0.12	0.00E+00	1.37E-13	1.45E-12		
Th-230	8.3497E-08	0.01	0.12	0.00E+00	9.22E-10	9.76E-09		
Th-232	3.8371E-14	0.01	0.12	0.00E+00	4.24E-16	4.48E-15		
Th-208	4.0414E-08	0.01	0.12	0.00E+00	4.46E-10	4.72E-09		
U-232	1.0948E-07	0.01	0.12	0.00E+00	1.21E-09	1.28E-08		
U-233	3.6275E-09	0.01	0.12	0.00E+00	4.00E-11	4.24E-10		
U-234	1.8562E-04	0.01	0.12	0.00E+00	2.05E-06	2.17E-05		
U-235	-2.7235E-06	0.01	0.00	1.90E-04	1.90E-04	1.90E-04		
U-236	1.5493E-05	0.01	0.12	0.00E+00	1.71E-07	1.81E-06		
U-238	-4.2851E-09	0.01	0.00	2.69E-06	2.69E-06	2.69E-06		
Y-90	1.3475E+00	0.01	0.12	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	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %:	91.6666667	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	0.01		Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup taken directly from SFD (converted to MWd)
Bounding	0.12		

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	

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel
²Total burnup for all fuel associated with this worksheet must be 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	Fuel decay start date	1985
SNF ID #	15	Estimates as of	2030
Fuel Units & Descr	1576 - 19 CURVED PLATES	Template	ATR (Light Water, Alum, 60 to 100%, U)
Heavy Metal Mass	BOL=1818 704kg EOL=1313 754kg	*Template 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" 78 80
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Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2 0068E-09	480,779 86	961,559 72	0 00E+00	9 65E-04	1 93E-03	Avg MeV	
Am-241	2 5251E-03	480,779 86	961,559 72	0 00E+00	1.21E+03	2 43E+03	0 0150	7 082E+16
Am-242m	3 9624E-07	480,779 86	961,559 72	0 00E+00	1 91E-01	3 81E-01	0 0250	1 471E+16
Am-243	1 4880E-06	480,779 86	961,559 72	0 00E+00	7.15E-01	1 43E+00	0 0375	1.278E+16
C-14	5 7053E-09	480,779 86	961,559 72	0 00E+00	2 74E-03	5 49E-03	0 0575	1.376E+16
Cl-36	1.3124E-32	480,779 86	961,559 72	0 00E+00	6 31E-27	1 26E-26	0 0850	8.290E+15
Cm-243	1 1419E-07	480,779 86	961,559 72	0 00E+00	5 49E-02	1 10E-01	0 1250	5 476E+15
Cm-244	1 6522E-05	480,779 86	961,559 72	0 00E+00	7 94E+00	1 59E+01	0 2250	7 157E+15
Co-60	7 4047E-07	480,779 86	961,559 72	0 00E+00	3 56E-01	7.12E-01	0 3750	3 114E+15
Cs-134	2 0455E-05	480,779 86	961,559 72	0 00E+00	9 83E+00	1 97E+01	0 5750	5 146E+16
Cs-135	3 4477E-06	480,779 86	961,559 72	0 00E+00	1 66E+00	3 32E+00	0 8500	6 285E+14
Cs-137	1 4365E+00	480,779 86	961,559 72	0 00E+00	6 91E+05	1 38E+06	1 2500	3 040E+14
Eu-154	7 3230E-03	480,779 86	961,559 72	0 00E+00	3 52E+03	7 04E+03	1 7500	1 711E+13
Eu-155	5 9259E-04	480,779 86	961,559 72	0 00E+00	2 85E+02	5 70E+02	2 2500	1 431E+09
Fe-55	2 2791E-06	480,779 86	961,559 72	0 00E+00	1 10E+00	2.19E+00	2 7500	1.365E+09
H-3	1 9698E-03	480,779 86	961,559 72	0 00E+00	9 47E+02	1.89E+03	3 5000	7 911E+05
I-129	7.5300E-07	480,779 86	961,559 72	0 00E+00	3 62E-01	7.24E-01	5 0000	3.239E+05
Kr-85	4 1176E-02	480,779 86	961,559 72	0 00E+00	1 98E+04	3 96E+04	7 0000	3.537E+04
Np-237	9 5752E-06	480,779 86	961,559 72	0 00E+00	4 60E+00	9.21E+00	11 0000	3 944E+03
Pa-231	3 9379E-09	480,779 86	961,559 72	0.00E+00	1 89E-03	3 79E-03		
Pb-210	3.3115E-10	480,779 86	961,559 72	0.00E+00	1.59E-04	3 18E-04		
Pm-147	9.2402E-04	480,779 86	961,559 72	0.00E+00	4 44E+02	8 89E+02		
Pu-238	1.6217E-02	480,779 86	961,559 72	0 00E+00	7 80E+03	1 56E+04		
Pu-239	4.2810E-04	480,779 86	961,559 72	0 00E+00	2 06E+02	4 12E+02		
Pu-240	2.4333E-04	480,779 86	961,559 72	0 00E+00	1.17E+02	2 34E+02		
Pu-241	1 6242E-02	480,779 86	961,559 72	0 00E+00	7.81E+03	1 56E+04		
Pu-242	3 6329E-07	480,779 86	961,559 72	0 00E+00	1 75E-01	3 49E-01		
Ra-226	9 0114E-10	480,779 86	961,559 72	0 00E+00	4 33E-04	8 67E-04		
Ra-228	3 1019E-14	480,779 86	961,559 72	0 00E+00	1 49E-08	2 98E-08		
Ru-106	2 1225E-10	480,779 86	961,559 72	0 00E+00	1 02E-04	2 04E-04		
Se-79	1.2930E-05	480,779 86	961,559 72	0 00E+00	6.22E+00	1.24E+01		
Sn-126	1.1571E-05	480,779 86	961,559 72	0 00E+00	5.56E+00	1 11E+01		
Sr-90	1.3472E+00	480,779 86	961,559 72	0 00E+00	6 48E+05	1.30E+06		
Tc-99	4 2239E-04	480,779 86	961,559 72	0 00E+00	2 03E+02	4 06E+02		
Th-229	1 2407E-11	480,779 86	961,559 72	0 00E+00	5 97E-05	1 19E-05		
Th-230	8 3497E-08	480,779 86	961,559 72	0 00E+00	4 01E-02	8 03E-02		
Th-232	3 8371E-14	480,779 86	961,559 72	0 00E+00	1 84E-08	3 69E-08		
Tl-208	-4 0414E-08	480,779 86	961,559 72	0 00E+00	1 94E-02	3 89E-02		
U-232	1 0948E-07	480,779 86	961,559 72	0 00E+00	5 26E-02	1 05E-01		
U-233	3 6275E-09	480,779 86	961,559 72	0 00E+00	1 74E-03	3 49E-03		
U-234	1 8562E-04	480,779 86	961,559 72	0 00E+00	8 92E+01	1 78E+02		
U-235	-2 7235E-06	480,779 86	0.00	3 66E+00	2 35E+00	3 66E+00		
U-236	1.5493E-05	480,779 86	961,559 72	0 00E+00	7 45E+00	1 49E+01		
U-238	-4.2851E-09	480,779 86	0 00	4 18E-02	3 98E-02	4 18E-02		
Y-90	1.3475E+00	480,779 86	961,559 72	0 00E+00	6 48E+05	1 30E+06		
Other Radionuclides					6 58E+05	1 32E+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	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93 154	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	480,779 86	478,197.82	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup assumed to be twice nominal burnup
Bounding		961,559 72	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 84	0 99	1 02
Bounding	1 68		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ATR	¹ Fuel decay start date: 1985	Estimated Canister usage 18"x10" 6.40
SNF ID #: 843	Estimates as of: 2030	
Fuel Units & Descr: 128 - 19 CURVED PLATES	Template: ATR (Light Water Alum 60 to 100% U)	
Heavy Metal Mass: BOL=147.712kg EOL=99.392kg	² Template Burnup(MWd): 367.2	
ROD Storage Site: SRS	Template BOL Heavy Metal Mass (MT): 0.00116689	
	Template Decay Time: 35 years	

Radionuclide	Ci/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	2.0068E-09	45,921.00	91,842.00	0.00E+00	9.22E-05	1.84E-04	Avg MeV	
Am-241	2.5251E-03	45,921.00	91,842.00	0.00E+00	1.16E+02	2.32E+02	0.0150	6.764E+15
Am-242m	3.9624E-07	45,921.00	91,842.00	0.00E+00	1.82E-02	3.64E-02	0.0250	1.405E+15
Am-243	1.4880E-06	45,921.00	91,842.00	0.00E+00	6.83E-02	1.37E-01	0.0375	1.221E+15
C-14	5.7053E-09	45,921.00	91,842.00	0.00E+00	2.62E-04	5.24E-04	0.0575	1.314E+15
Cl-36	1.3124E-32	45,921.00	91,842.00	0.00E+00	6.03E-28	1.21E-27	0.0850	7.918E+14
Cm-243	1.1419E-07	45,921.00	91,842.00	0.00E+00	5.24E-03	1.05E-02	0.1250	5.230E+14
Cm-244	1.6522E-05	45,921.00	91,842.00	0.00E+00	7.59E-01	1.52E+00	0.2250	6.836E+14
Co-60	7.4047E-07	45,921.00	91,842.00	0.00E+00	3.40E-02	6.80E-02	0.3750	2.974E+14
Cs-134	2.0455E-05	45,921.00	91,842.00	0.00E+00	9.39E-01	1.88E+00	0.5750	4.915E+15
Cs-135	3.4477E-06	45,921.00	91,842.00	0.00E+00	1.58E-01	3.17E-01	0.8500	6.003E+13
Cs-137	1.4365E+00	45,921.00	91,842.00	0.00E+00	6.60E+04	1.32E+05	1.2500	2.904E+13
Eu-154	7.3230E-03	45,921.00	91,842.00	0.00E+00	3.36E+02	6.73E+02	1.7500	1.634E+12
Eu-155	5.9259E-04	45,921.00	91,842.00	0.00E+00	2.72E+01	5.44E+01	2.2500	1.366E+08
Fe-55	2.2791E-06	45,921.00	91,842.00	0.00E+00	1.05E-01	2.09E-01	2.7500	1.304E+08
H-3	1.9698E-03	45,921.00	91,842.00	0.00E+00	9.05E+01	1.81E+02	3.5000	7.556E+04
I-129	7.5300E-07	45,921.00	91,842.00	0.00E+00	3.46E-02	6.92E-02	5.0000	3.087E+04
Kr-85	4.1176E-02	45,921.00	91,842.00	0.00E+00	1.89E+03	3.78E+03	7.0000	3.378E+03
Np-237	9.5752E-06	45,921.00	91,842.00	0.00E+00	4.40E-01	8.79E-01	11.0000	3.767E+02
Pa-231	3.9379E-09	45,921.00	91,842.00	0.00E+00	1.81E-04	3.62E-04		
Pb-210	3.3115E-10	45,921.00	91,842.00	0.00E+00	1.52E-05	3.04E-05		
Pm-147	9.2402E-04	45,921.00	91,842.00	0.00E+00	4.24E+01	8.49E+01		
Pu-238	1.6217E-02	45,921.00	91,842.00	0.00E+00	7.45E+02	1.49E+03		
Pu-239	4.2810E-04	45,921.00	91,842.00	0.00E+00	1.97E+01	3.93E+01		
Pu-240	2.4333E-04	45,921.00	91,842.00	0.00E+00	1.12E+01	2.23E+01		
Pu-241	1.6242E-02	45,921.00	91,842.00	0.00E+00	7.46E+02	1.49E+03		
Pu-242	3.6329E-07	45,921.00	91,842.00	0.00E+00	1.67E-02	3.34E-02		
Ra-226	9.0114E-10	45,921.00	91,842.00	0.00E+00	4.14E-05	8.28E-05		
Ra-228	3.1019E-14	45,921.00	91,842.00	0.00E+00	1.42E-09	2.85E-09		
Ru-106	2.1225E-10	45,921.00	91,842.00	0.00E+00	9.75E-06	1.95E-05		
Se-79	1.2930E-05	45,921.00	91,842.00	0.00E+00	5.94E-01	1.19E+00		
Sn-126	1.1571E-05	45,921.00	91,842.00	0.00E+00	5.31E-01	1.06E+00		
Sr-90	1.3472E+00	45,921.00	91,842.00	0.00E+00	6.19E+04	1.24E+05		
Tc-99	4.2239E-04	45,921.00	91,842.00	0.00E+00	1.94E+01	3.88E+01		
Th-229	1.2407E-11	45,921.00	91,842.00	0.00E+00	5.70E-07	1.14E-06		
Th-230	8.3497E-08	45,921.00	91,842.00	0.00E+00	3.83E-03	7.67E-03		
Th-232	3.8371E-14	45,921.00	91,842.00	0.00E+00	1.76E-09	3.52E-09		
Tl-208	4.0414E-08	45,921.00	91,842.00	0.00E+00	1.86E-03	3.71E-03		
U-232	1.0948E-07	45,921.00	91,842.00	0.00E+00	5.03E-03	1.01E-02		
U-233	3.6275E-09	45,921.00	91,842.00	0.00E+00	1.67E-04	3.33E-04		
U-234	1.8562E-04	45,921.00	91,842.00	0.00E+00	8.52E+00	1.70E+01		
U-235	-2.7235E-06	45,921.00	0.00	2.97E-01	1.72E-01	2.97E-01	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.5493E-05	45,921.00	91,842.00	0.00E+00	7.11E-01	1.42E+00	7.69E+02	1.54E+03
U-238	-4.2851E-09	45,921.00	0.00	3.40E-03	3.20E-03	3.40E-03	Total	Total
Y-90	1.3475E+00	45,921.00	91,842.00	0.00E+00	6.19E+04	1.24E+05		
Other Radionuclides					6.28E+04	1.26E+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	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93.1542461	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	45,921.00	45,759.98	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup assumed to be twice nominal burnup
Bounding		91,842.00	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.99	1.00	1.03
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	BER-II TRIGA (FLIP LEU 45/20) (GERMANY)	¹ Fuel 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 196kg EOL=9 192kg	² Template 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
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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	6 7038E-09	22 40	9 41	0 00E+00	1 50E-07	6 31E-08	Avg MeV	
Am-241	3 9068E-03	22 40	9 41	0 00E+00	8 75E-02	3 68E-02	0 0150	6 568E+11
Am-242m	1 2325E-06	22 40	9 41	0 00E+00	2 76E-05	1 16E-05	0 0250	1 364E+11
Am-243	1 4732E-07	22 40	9 41	0 00E+00	3 30E-06	1 39E-06	0 0375	1 185E+11
C-14	1 2824E-04	22 40	9 41	0 00E+00	2 87E-03	1 21E-03	0 0575	1 277E+11
Cl-36	2 8120E-06	22 40	9 41	0 00E+00	6 30E-05	2 65E-05	0 0850	7 687E+10
Cm-243	8 6556E-08	22 40	9 41	0 00E+00	1 94E-00	8 14E-07	0 1250	5 006E+10
Cm-244	5 3835E-07	22 40	9 41	0 00E+00	1 21E-05	5 06E-06	0 2250	6 637E+10
Co-60	2 4887E-02	22 40	9 41	0 00E+00	5 58E-01	2 34E-01	0 3750	2 887E+10
Cs-134	3 8030E-06	22 40	9 41	0 00E+00	8 52E-05	3 58E-05	0 5750	4 828E+10
Cs-135	3 2195E-05	22 40	9 41	0 00E+00	7 21E-04	3 03E-04	0 8500	4 941E+09
Cs-137	1 3788E+00	22 40	9 41	0 00E+00	3 09E+01	1 30E+01	1 2500	1 917E+10
Eu-154	1 3711E-03	22 40	9 41	0 00E+00	3 07E-02	1 29E-02	1 7500	1 282E+08
Eu-155	4 4361E-04	22 40	9 41	0 00E+00	9 94E-03	4 17E-03	2 2500	1 051E+05
Fe-55	2 6075E-04	22 40	9 41	0 00E+00	5 84E-03	2 45E-03	2 7500	4 841E+03
H-3	2 0647E-03	22 40	9 41	0 00E+00	4 63E-02	1 94E-02	3 5000	2 105E+01
I-129	7 3684E-07	22 40	9 41	0 00E+00	1 65E-05	6 93E-06	5 0000	8 939E+00
Kr-85	3 6346E-02	22 40	9 41	0 00E+00	8 14E-01	3 42E-01	7 0000	1 017E+00
Np-237	1 2844E-06	22 40	9 41	0 00E+00	2 88E-05	1 21E-05	11 0000	1 162E-01
Pa-231	1 2352E-08	22 40	9 41	0 00E+00	2 77E-07	1 16E-07		
Pb-210	3 5338E-13	22 40	9 41	0 00E+00	7 92E-12	3 32E-12		
Pm-147	7 6346E-04	22 40	9 41	0 00E+00	1 71E-02	7 18E-03		
Pu-238	8 1970E-04	22 40	9 41	0 00E+00	1 84E-02	7 71E-03		
Pu-239	5 5248E-03	22 40	9 41	0 00E+00	1 24E-01	5 20E-02		
Pu-240	2 1203E-03	22 40	9 41	0 00E+00	4 75E-02	1 99E-02		
Pu-241	2 4075E-02	22 40	9 41	0 00E+00	5 39E-01	2 26E-01		
Pu-242	2 3128E-07	22 40	9 41	0 00E+00	5 18E-06	2 18E-06		
Ra-226	9 6481E-13	22 40	9 41	0 00E+00	2 16E-11	9 08E-12		
Ra-228	2 5188E-10	22 40	9 41	0 00E+00	5 64E-09	2 37E-09		
Ru-106	1 0214E-10	22 40	9 41	0 00E+00	2 29E-09	9 61E-10		
Se-79	1 3014E-05	22 40	9 41	0 00E+00	2 92E-04	1 22E-04		
Sn-126	1 2164E-05	22 40	9 41	0 00E+00	2 72E-04	1 14E-04		
Sr-90	1 2762E+00	22 40	9 41	0 00E+00	2 86E+01	1 20E+01		
Tc-99	4 4241E-04	22 40	9 41	0 00E+00	9 91E-03	4 16E-03		
Th-229	5 9684E-10	22 40	9 41	0 00E+00	1 34E-08	5 61E-09		
Th-230	9 3880E-11	22 40	9 41	0 00E+00	2 10E-09	8 83E-10		
Th-232	2 5278E-10	22 40	9 41	0 00E+00	5 66E-09	2 38E-09		
Th-208	1 3723E-08	22 40	9 41	0 00E+00	3 07E-07	1 29E-07		
U-232	3 6932E-08	22 40	9 41	0 00E+00	8 27E-07	3 47E-07		
U-233	1 2224E-07	22 40	9 41	0 00E+00	2 74E-06	1 15E-06		
U-234	2 5714E-07	22 40	9 41	0 00E+00	5 76E-06	2 42E-06		
U-235	-2 6194E-06	22 40	0 00	8 75E-03	8 69E-03	8 75E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1 2695E-05	22 40	9 41	0 00E+00	2 84E-04	1 19E-04	3 60E-01	1 52E-01
U-238	-3 6331E-08	22 40	0 00	1 73E-03	1 73E-03	1 73E-03	Total	Total
Y-90	1 2765E+00	22 40	9 41	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: This Template was used for the following reasons: This fuel matches on all parameters except enrichment.
	From SFD	Used	
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	44 026	10 to 20 1	
Burnup Summary (MWd)²			Basis for burnup used in estimate: Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup taken directly from SFD (converted to MWd)
	From SFD	Estimated	
Nominal	22 40	4 01	
Bounding	9 41	8 02	
Checks			Estimated EOL HM/Given EOL HM 1 00
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 07	0 18	
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 (CP1-24)
 SNF ID #: 774
 Fuel Units & Descr: 2 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL = ; EOL=0.559kg
 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 usage³
 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	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	4.5940E-08	528.25	528.25	0.00E+00	2.43E-05	2.43E-05	Avg. MeV	
Am-241	1.1471E-04	528.25	528.25	0.00E+00	6.06E-02	6.06E-02	0.0150	1.928E+13
Am-242m	7.4210E-09	528.25	528.25	0.00E+00	3.92E-06	3.92E-06	0.0250	4.006E+12
Am-243	9.8236E-10	528.25	528.25	0.00E+00	5.19E-07	5.19E-07	0.0375	3.481E+12
C-14	2.2928E-04	528.25	528.25	0.00E+00	1.21E-01	1.21E-01	0.0575	3.736E+12
Cl-36	1.2260E-06	528.25	528.25	0.00E+00	6.48E-04	6.48E-04	0.0850	2.256E+12
Cm-243	1.2000E-10	528.25	528.25	0.00E+00	6.34E-08	6.34E-08	0.1250	1.463E+12
Cm-244	7.3577E-10	528.25	528.25	0.00E+00	3.89E-07	3.89E-07	0.2250	1.945E+12
Co-60	1.3732E-03	528.25	528.25	0.00E+00	7.25E-01	7.25E-01	0.3750	8.482E+11
Cs-134	1.2709E-10	528.25	528.25	0.00E+00	6.71E-08	6.71E-08	0.5750	1.427E+13
Cs-135	3.0316E-05	528.25	528.25	0.00E+00	1.60E-02	1.60E-02	0.8500	1.386E+11
Cs-137	7.2579E-01	528.25	528.25	0.00E+00	3.83E+02	3.83E+02	1.2500	1.003E+11
Eu-154	5.9750E-05	528.25	528.25	0.00E+00	3.16E-02	3.16E-02	1.7500	3.565E+09
Eu-155	1.0577E-05	528.25	528.25	0.00E+00	5.59E-03	5.59E-03	2.2500	6.742E+05
Fe-55	4.1631E-07	528.25	528.25	0.00E+00	2.20E-04	2.20E-04	2.7500	3.019E+05
H-3	4.6722E-04	528.25	528.25	0.00E+00	2.47E-01	2.47E-01	3.5000	3.051E+01
I-129	7.3195E-07	528.25	528.25	0.00E+00	3.87E-04	3.87E-04	5.0000	1.260E+01
Kr-85	5.9418E-03	528.25	528.25	0.00E+00	3.14E+00	3.14E+00	7.0000	1.393E+00
Np-237	1.1499E-06	528.25	528.25	0.00E+00	6.07E-04	6.07E-04	11.0000	1.564E-01
Pa-231	7.0899E-08	528.25	528.25	0.00E+00	3.75E-05	3.75E-05		
Pb-210	2.2363E-12	528.25	528.25	0.00E+00	1.18E-09	1.18E-09		
Pm-147	4.2296E-07	528.25	528.25	0.00E+00	2.23E-04	2.23E-04		
Pu-238	2.3295E-04	528.25	528.25	0.00E+00	1.23E-01	1.23E-01		
Pu-239	6.6722E-04	528.25	528.25	0.00E+00	3.52E-01	3.52E-01		
Pu-240	8.6556E-05	528.25	528.25	0.00E+00	4.57E-02	4.57E-02		
Pu-241	1.6889E-04	528.25	528.25	0.00E+00	8.92E-02	8.92E-02		
Pu-242	1.9717E-09	528.25	528.25	0.00E+00	1.04E-06	1.04E-06		
Ra-226	4.5740E-12	528.25	528.25	0.00E+00	2.42E-09	2.42E-09		
Ra-228	8.3511E-12	528.25	528.25	0.00E+00	4.41E-09	4.41E-09		
Ru-106	2.0516E-19	528.25	528.25	0.00E+00	1.08E-16	1.08E-16		
Se-79	1.3220E-05	528.25	528.25	0.00E+00	6.98E-03	6.98E-03		
Sn-126	1.1489E-05	528.25	528.25	0.00E+00	6.07E-03	6.07E-03		
Sr-90	6.6872E-01	528.25	528.25	0.00E+00	3.53E+02	3.53E+02		
Tc-99	4.6639E-04	528.25	528.25	0.00E+00	2.46E-01	2.46E-01		
Th-229	2.3727E-11	528.25	528.25	0.00E+00	1.25E-08	1.25E-08		
Th-230	2.7354E-10	528.25	528.25	0.00E+00	1.44E-07	1.44E-07		
Th-232	8.3594E-12	528.25	528.25	0.00E+00	4.42E-09	4.42E-09		
Tl-208	1.6228E-08	528.25	528.25	0.00E+00	8.57E-06	8.57E-06		
U-232	4.3960E-08	528.25	528.25	0.00E+00	2.32E-05	2.32E-05		
U-233	3.3344E-09	528.25	528.25	0.00E+00	1.76E-06	1.76E-06		
U-234	4.0749E-07	528.25	528.25	0.00E+00	2.15E-04	2.15E-04		
U-235	-2.7761E-06	528.25	0.00	2.26E-03	7.92E-04	2.26E-03		
U-236	1.6190E-05	528.25	528.25	0.00E+00	8.55E-03	8.55E-03		
U-238	-2.8547E-09	528.25	0.00	2.44E-05	2.29E-05	2.44E-05		
Y-90	6.6889E-01	528.25	528.25	0.00E+00	3.53E+02	3.53E+02		
Other Radionuclides					4.80E+02	4.80E+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	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %		60 to 100	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		528.25	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding		528.25	

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 BMI (CPI-38) Fuel decay start date 1961
 SNF ID # 20 Estimates as of 2030
 Fuel Units & Descr: 1 - CANISTER OF SCRAP Template Pathfinder (Light Water, SST, 60 to 100%, U)
 Heavy Metal Mass: BOL= , EOL=1.266kg Template 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"
 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	4 5940E-08	1,215 10	1,215 10	0 00E+00	5 58E-05	5 58E-05	Avg MeV	
Am-241	1 1471E-04	1,215 10	1,215 10	0 00E+00	1 39E-01	1 39E-01	0 0150	4 435E+13
Am-242m	7 4210E-09	1,215 10	1,215 10	0 00E+00	9 02E-06	9 02E-06	0.0250	9 215E+12
Am-243	9 8236E-10	1,215 10	1,215 10	0 00E+00	1.19E-06	1 19E-06	0.0375	8 008E+12
C-14	2 2928E-04	1,215 10	1,215 10	0 00E+00	2.79E-01	2 79E-01	0.0575	8 593E+12
Cl-36	1 2260E-06	1,215 10	1,215 10	0 00E+00	1.49E-03	1 49E-03	0.0850	5 190E+12
Cm-243	1 2000E-10	1,215 10	1,215 10	0 00E+00	1 46E-07	1.46E-07	0 1250	3.365E+12
Cm-244	7.3577E-10	1,215.10	1,215.10	0 00E+00	8 94E-07	8 94E-07	0.2250	4 473E+12
Co-60	1.3732E-03	1,215.10	1,215.10	0 00E+00	1.67E+00	1.67E+00	0.3750	1.951E+12
Cs-134	1.2709E-10	1,215.10	1,215.10	0 00E+00	1 54E-07	1 54E-07	0 5750	3.282E+13
Cs-135	3 0316E-05	1,215 10	1,215 10	0 00E+00	3 68E-02	3 68E-02	0 8500	3 188E+11
Cs-137	7.2579E-01	1,215 10	1,215 10	0 00E+00	8 82E+02	8 82E+02	1.2500	2.307E+11
Eu-154	5 9750E-05	1,215 10	1,215 10	0 00E+00	7.26E-02	7.26E-02	1 7500	8 199E+09
Eu-155	1 0577E-05	1,215 10	1,215 10	0 00E+00	1 29E-02	1 29E-02	2.2500	1 551E+06
Fe-55	4 1631E-07	1,215 10	1,215 10	0 00E+00	5 06E-04	5 06E-04	2 7500	6 945E+05
H-3	4 6722E-04	1,215 10	1,215 10	0 00E+00	5 68E-01	5 68E-01	3.5000	7 018E+01
I-129	7 3195E-07	1,215 10	1,215 10	0 00E+00	8 89E-04	8 89E-04	5 0000	2 898E+01
Kr-85	5 9418E-03	1,215 10	1,215 10	0 00E+00	7.22E+00	7 22E+00	7.0000	3.203E+00
Np-237	1 1499E-06	1,215 10	1,215 10	0 00E+00	1.40E-03	1 40E-03	11.0000	3.597E-01
Pa-231	7 0899E-08	1,215 10	1,215 10	0 00E+00	8 61E-05	8 61E-05		
Pb-210	2 2363E-12	1,215 10	1,215 10	0 00E+00	2 72E-09	2.72E-09		
Pm-147	4 2296E-07	1,215 10	1,215 10	0 00E+00	5 14E-04	5.14E-04		
Pu-238	2 3295E-04	1,215 10	1,215 10	0 00E+00	2 83E-01	2 83E-01		
Pu-239	6 6722E-04	1,215 10	1,215 10	0 00E+00	8 11E-01	8 11E-01		
Pu-240	8 6556E-05	1,215 10	1,215.10	0 00E+00	1 05E-01	1 05E-01		
Pu-241	1 6889E-04	1,215 10	1,215.10	0 00E+00	2 05E-01	2 05E-01		
Pu-242	1.9717E-09	1,215 10	1,215 10	0 00E+00	2 40E-06	2 40E-06		
Ra-226	4.5740E-12	1,215 10	1,215 10	0 00E+00	5 56E-09	5 56E-09		
Ra-228	8.3511E-12	1,215 10	1,215 10	0 00E+00	1 01E-08	1 01E-08		
Ru-106	2 0516E-19	1,215 10	1,215 10	0 00E+00	2 49E-16	2 49E-16		
Se-79	1 3220E-05	1,215 10	1,215 10	0 00E+00	1 61E-02	1 61E-02		
Sn-126	1 1489E-05	1,215 10	1,215 10	0 00E+00	1 40E-02	1 40E-02		
Sr-90	6 6872E-01	1,215 10	1,215 10	0 00E+00	8 13E+02	8 13E+02		
Tc-99	4 6639E-04	1,215 10	1,215 10	0 00E+00	5 67E-01	5 67E-01		
Th-229	2 3727E-11	1,215 10	1,215 10	0 00E+00	2 88E-08	2.88E-08		
Th-230	2 7354E-10	1,215 10	1,215 10	0 00E+00	3.32E-07	3.32E-07		
Th-232	8 3594E-12	1,215 10	1,215 10	0 00E+00	1.02E-08	1 02E-08		
Th-208	1 6228E-08	1,215 10	1,215 10	0 00E+00	1 97E-05	1 97E-05		
U-232	4 3960E-08	1,215 10	1,215.10	0 00E+00	5 34E-05	5 34E-05		
U-233	3 3344E-09	1,215 10	1,215 10	0 00E+00	4 05E-06	4 05E-06		
U-234	4 0749E-07	1,215 10	1,215.10	0 00E+00	4 95E-04	4 95E-04		
U-235	-2 7761E-06	1,215.10	0.00	5 20E-03	1 82E-03	5 20E-03		
U-236	1 6190E-05	1,215.10	1,215.10	0 00E+00	1 97E-02	1 97E-02		
U-238	-2 8547E-09	1,215 10	0 00	5 62E-05	5 27E-05	5 62E-05		
Y-90	6 6889E-01	1,215 10	1,215 10	0 00E+00	8 13E+02	8 13E+02		
Other Radionuclides					1 10E+03	1 10E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences
	From SFD	Used	
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons This fuel matches on all parameters except cladding (SST is conservative) and enrichment (unknown)
Fuel Cladding	HASTELLOY	SST	
BOL HM Constituents	U	U	
BOL Enrichment %		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		1,215 10	Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding		1,215 10	

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: BORAX V (SUPERHEATER)
 SNF ID #: 22
 Fuel Units & Descr: 36 - 20 FLAT PLATES
 Heavy Metal Mass: BOL=22 014kg EOL=20 833kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1964
 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"
 2 00

II. Estimates							Gamma Sources	
Radionuclide	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)		
Ac-227	4 5940E-08	1,115 44	2,230 88	0 00E+00	5 12E-05	1 02E-04	Avg MeV	
Am-241	1 1471E-04	1,115 44	2,230 88	0 00E+00	1 28E-01	2 56E-01	0 0150	8 143E+13
Am-242m	7 4210E-09	1,115 44	2,230 88	0 00E+00	8 28E-06	1 66E-05	0 0250	1 692E+13
Am-243	9 8236E-10	1,115 44	2,230 88	0 00E+00	1 10E-06	2 19E-06	0 0375	1 470E+13
C-14	2 2928E-04	1,115 44	2,230 88	0 00E+00	2 56E-01	5 12E-01	0 0575	1 578E+13
Cl-36	1 2260E-06	1,115 44	2,230 88	0 00E+00	1 37E-03	2 73E-03	0 0850	9 529E+12
Cm-243	1 2000E-10	1,115 44	2,230 88	0 00E+00	1 34E-07	2 68E-07	0 1250	6 179E+12
Cm-244	7 3577E-10	1,115 44	2,230 88	0 00E+00	8 21E-07	1 64E-06	0 2250	8 213E+12
Co-60	1 3732E-03	1,115 44	2,230 88	0 00E+00	1 53E+00	3 06E+00	0 3750	3 582E+12
Cs-134	1 2709E-10	1,115 44	2,230 88	0 00E+00	1 42E-07	2 84E-07	0 5750	6 026E+13
Cs-135	3 0316E-05	1,115 44	2,230 88	0 00E+00	3 38E-02	6 76E-02	0 8500	5 852E+11
Cs-137	7 2579E-01	1,115 44	2,230 88	0 00E+00	8 10E+02	1 62E+03	1 2500	4 236E+11
Eu-154	5 9750E-05	1,115 44	2,230 88	0 00E+00	6 66E-02	1 33E-01	1 7500	1 505E+10
Eu-155	1 0577E-05	1,115 44	2,230 88	0 00E+00	1 18E-02	2 36E-02	2 2500	2 847E+06
Fe-55	4 1631E-07	1,115 44	2,230 88	0 00E+00	4 64E-04	9 29E-04	2 7500	1 275E+06
H-3	4 6722E-04	1,115 44	2,230 88	0 00E+00	5 21E-01	1 04E+00	3 5000	1 322E+02
I-129	7 3195E-07	1,115 44	2,230 88	0 00E+00	8 16E-04	1 63E-03	5 0000	5 464E+01
Kr-85	5 9418E-03	1,115 44	2,230 88	0 00E+00	6 63E+00	1 33E+01	7 0000	6 042E+00
Np-237	1 1499E-06	1,115 44	2,230 88	0 00E+00	1 28E-03	2 57E-03	11 0000	6 786E-01
Pa-231	7 0899E-08	1,115 44	2,230 88	0 00E+00	7 91E-05	1 58E-04		
Pb-210	2 2363E-12	1,115 44	2,230 88	0 00E+00	2 49E-09	4 99E-09		
Pm-147	4 2296E-07	1,115 44	2,230 88	0 00E+00	4 72E-04	9 44E-04		
Pu-238	2 3295E-04	1,115 44	2,230 88	0 00E+00	2 60E-01	5 20E-01		
Pu-239	6 6722E-04	1,115 44	2,230 88	0 00E+00	7 44E-01	1 49E+00		
Pu-240	8 6556E-05	1,115 44	2,230 88	0 00E+00	9 65E-02	1 93E-01		
Pu-241	1 6889E-04	1,115 44	2,230 88	0 00E+00	1 88E-01	3 77E-01		
Pu-242	1 9717E-09	1,115 44	2,230 88	0 00E+00	2 20E-06	4 40E-06		
Ra-226	4 5740E-12	1,115 44	2,230 88	0 00E+00	5 10E-09	1 02E-08		
Ra-228	8 3511E-12	1,115 44	2,230 88	0 00E+00	9 32E-09	1 86E-08		
Ru-106	2 0516E-19	1,115 44	2,230 88	0 00E+00	2 29E-16	4 58E-16		
Sr-90	1 3220E-05	1,115 44	2,230 88	0 00E+00	1 47E-02	2 95E-02		
Sn-126	1 1489E-05	1,115 44	2,230 88	0 00E+00	1 28E-02	2 56E-02		
Sr-90	6 6872E-01	1,115 44	2,230 88	0 00E+00	7 46E+02	1 49E+03		
Tc-99	4 6639E-04	1,115 44	2,230 88	0 00E+00	5 20E-01	1 04E+00		
Th-229	2 3727E-11	1,115 44	2,230 88	0 00E+00	2 65E-08	5 29E-08		
Th-230	2 7354E-10	1,115 44	2,230 88	0 00E+00	3 05E-07	6 10E-07		
Th-232	8 3594E-12	1,115 44	2,230 88	0 00E+00	9 32E-09	1 86E-08		
Tl-208	1 6228E-08	1,115 44	2,230 88	0 00E+00	1 81E-05	3 62E-05		
U-232	4 3960E-08	1,115 44	2,230 88	0 00E+00	4 90E-05	9 81E-05		
U-233	3 3344E-09	1,115 44	2,230 88	0 00E+00	3 72E-06	7 44E-06		
U-234	4 0749E-07	1,115 44	2,230 88	0 00E+00	4 55E-04	9 09E-04		
U-235	-2 7761E-06	1,115 44	0 00	4 42E-02	4 11E-02	4 42E-02		
U-236	1 6190E-05	1,115 44	2,230 88	0 00E+00	1 81E-02	3 61E-02		
U-238	-2 8547E-09	1,115 44	0 00	5 18E-04	5 15E-04	5 18E-04		
Y-90	6 6889E-01	1,115 44	2,230 88	0 00E+00	7 46E+02	1 49E+03		
Other Radionuclides					1 01E+03	2 03E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9 08E+00	1 82E+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:	SST	SST	
BOL Enrichment %:	U	U	
	93.00081766	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		1,115 44	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding		2,230 88	

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	1 09	
Bounding	2 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: BR-3
 SNF ID #: 927
 Fuel Units & Descr: 16 - ROD
 Heavy Metal Mass BOL=5.6kg 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	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	465.59	931.17	0.00E+00	4.09E-07	8.17E-07	0.0150	5.010E+13	
Am-241	1.4352E-01	465.59	931.17	0.00E+00	6.68E+01	1.34E+02	0.0250	1.010E+13	
Am-242m	2.8698E-04	465.59	931.17	0.00E+00	1.34E-01	2.67E-01	0.0375	9.636E+12	
Am-243	6.2565E-04	465.59	931.17	0.00E+00	2.91E-01	5.83E-01	0.0575	1.113E+13	
C-14	4.7901E-05	465.59	931.17	0.00E+00	2.23E-02	4.46E-02	0.0850	5.606E+12	
Cl-36	8.0297E-07	465.59	931.17	0.00E+00	3.74E-04	7.48E-04	0.1250	3.890E+12	
Cm-243	2.5081E-04	465.59	931.17	0.00E+00	1.17E-01	2.34E-01	0.2250	4.807E+12	
Cm-244	4.9015E-02	465.59	931.17	0.00E+00	2.28E+01	4.56E+01	0.3750	2.067E+12	
Co-60	2.5581E-03	465.59	931.17	0.00E+00	1.19E+00	2.38E+00	0.5750	4.808E+13	
Cs-134	4.0536E-05	465.59	931.17	0.00E+00	1.89E-02	3.77E-02	0.8500	6.651E+11	
Cs-135	1.4433E-05	465.59	931.17	0.00E+00	6.72E-03	1.34E-02	1.2500	6.533E+11	
Cs-137	1.3979E+00	465.59	931.17	0.00E+00	6.51E+02	1.30E+03	1.7500	1.957E+10	
Eu-154	2.0203E-02	465.59	931.17	0.00E+00	9.41E+00	1.88E+01	2.2500	3.150E+06	
Eu-155	1.7684E-03	465.59	931.17	0.00E+00	8.23E-01	1.65E+00	2.7500	6.455E+06	
Fe-55	4.3136E-05	465.59	931.17	0.00E+00	2.01E-02	4.02E-02	3.5000	6.646E+05	
H-3	2.0769E-02	465.59	931.17	0.00E+00	9.67E+00	1.93E+01	5.0000	2.842E+05	
I-129	9.8288E-07	465.59	931.17	0.00E+00	4.58E-04	9.15E-04	7.0000	3.275E+04	
Kr-85	2.8214E-02	465.59	931.17	0.00E+00	1.31E+01	2.63E+01	11.0000	3.761E+03	
Np-237	1.1218E-05	465.59	931.17	0.00E+00	5.22E-03	1.04E-02			
Pa-231	1.3036E-09	465.59	931.17	0.00E+00	6.07E-07	1.21E-06			
Pb-210	8.5078E-11	465.59	931.17	0.00E+00	3.96E-08	7.92E-08			
Pm-147	3.6531E-04	465.59	931.17	0.00E+00	1.70E-01	3.40E-01			
Pu-238	7.4564E-02	465.59	931.17	0.00E+00	3.47E+01	6.94E+01			
Pu-239	1.1623E-02	465.59	931.17	0.00E+00	5.41E+00	1.08E+01			
Pu-240	1.5132E-02	465.59	931.17	0.00E+00	7.05E+00	1.41E+01			
Pu-241	9.0036E-01	465.59	931.17	0.00E+00	4.19E+02	8.38E+02			
Pu-242	6.4260E-05	465.59	931.17	0.00E+00	2.99E-02	5.98E-02			
Ra-226	2.2804E-10	465.59	931.17	0.00E+00	1.06E-07	2.12E-07			
Ra-228	5.2713E-12	465.59	931.17	0.00E+00	2.45E-09	4.91E-09			
Ru-106	6.1160E-10	465.59	931.17	0.00E+00	2.85E-07	5.70E-07			
Se-79	1.2377E-05	465.59	931.17	0.00E+00	5.76E-03	1.15E-02			
Sn-126	2.5210E-05	465.59	931.17	0.00E+00	1.17E-02	2.35E-02			
Sr-90	9.1667E-01	465.59	931.17	0.00E+00	4.27E+02	8.54E+02			
Tc-99	3.9357E-04	465.59	931.17	0.00E+00	1.83E-01	3.66E-01			
Th-229	1.2057E-10	465.59	931.17	0.00E+00	5.61E-08	1.12E-07			
Th-230	2.1043E-08	465.59	931.17	0.00E+00	9.80E-06	1.96E-05			
Th-232	5.2972E-12	465.59	931.17	0.00E+00	2.47E-09	4.93E-09			
Tl-208	1.7474E-07	465.59	931.17	0.00E+00	8.14E-05	1.63E-04			
U-232	4.7368E-07	465.59	931.17	0.00E+00	2.21E-04	4.41E-04			
U-233	2.5097E-08	465.59	931.17	0.00E+00	1.17E-05	2.34E-05			
U-234	5.0000E-05	465.59	931.17	0.00E+00	2.33E-02	4.66E-02			
U-235	-1.4489E-06	465.59	0.00	3.46E-03	2.78E-03	3.46E-03			
U-236	7.5824E-06	465.59	931.17	0.00E+00	3.53E-03	7.06E-03			
U-238	-2.6129E-07	465.59	0.00	1.34E-03	1.22E-03	1.34E-03			
Y-90	9.1699E-01	465.59	931.17	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	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	28.57142857	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		465.59	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding		931.17	

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	2.38	
Bounding	4.75	
		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: BR-3 FUEL
 SNF ID #: 340
 Fuel Units & Descr: 16 - ROD
 Heavy Metal Mass: BOL=7 536kg; EOL=7 064kg
 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

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	448.85	897.70	0.00E+00	3.94E-07	7.88E-07	0.0150	4.830E+13
Am-241	1.4352E-01	448.85	897.70	0.00E+00	6.44E+01	1.29E+02	0.0250	9.740E+12
Am-242m	2.8698E-04	448.85	897.70	0.00E+00	1.29E-01	2.58E-01	0.0375	9.290E+12
Am-243	6.2585E-04	448.85	897.70	0.00E+00	2.81E-01	5.62E-01	0.0575	1.073E+13
C-14	4.7901E-05	448.85	897.70	0.00E+00	2.15E-02	4.30E-02	0.0850	5.405E+12
Cl-36	8.0297E-07	448.85	897.70	0.00E+00	3.60E-04	7.21E-04	0.1250	3.750E+12
Cm-243	2.5081E-04	448.85	897.70	0.00E+00	1.13E-01	2.25E-01	0.2250	4.634E+12
Cm-244	4.9015E-02	448.85	897.70	0.00E+00	2.20E+01	4.40E+01	0.3750	1.993E+12
Co-60	2.5581E-03	448.85	897.70	0.00E+00	1.15E+00	2.30E+00	0.5750	4.635E+13
Cs-134	4.0536E-05	448.85	897.70	0.00E+00	1.82E-02	3.64E-02	0.8500	6.412E+11
Cs-135	1.4433E-05	448.85	897.70	0.00E+00	6.48E-03	1.30E-02	1.2500	6.299E+11
Cs-137	1.3979E+00	448.85	897.70	0.00E+00	6.27E+02	1.25E+03	1.7500	1.886E+10
Eu-154	2.0203E-02	448.85	897.70	0.00E+00	9.07E+00	1.81E+01	2.2500	3.037E+06
Eu-155	1.7684E-03	448.85	897.70	0.00E+00	7.94E-01	1.59E+00	2.7500	6.223E+06
Fe-55	4.3136E-05	448.85	897.70	0.00E+00	1.94E-02	3.87E-02	3.5000	6.407E+05
H-3	2.0769E-02	448.85	897.70	0.00E+00	9.32E+00	1.86E+01	5.0000	2.739E+05
I-129	9.8288E-07	448.85	897.70	0.00E+00	4.41E-04	8.82E-04	7.0000	3.157E+04
Kr-85	2.8214E-02	448.85	897.70	0.00E+00	1.27E+01	2.53E+01	11.0000	3.626E+03
Np-237	1.1218E-05	448.85	897.70	0.00E+00	5.04E-03	1.01E-02		
Pa-231	1.3036E-09	448.85	897.70	0.00E+00	5.85E-07	1.17E-06		
Pb-210	8.5078E-11	448.85	897.70	0.00E+00	3.82E-08	7.64E-08		
Pm-147	3.6531E-04	448.85	897.70	0.00E+00	1.64E-01	3.28E-01		
Pu-238	7.4564E-02	448.85	897.70	0.00E+00	3.35E+01	6.69E+01		
Pu-239	1.1623E-02	448.85	897.70	0.00E+00	5.22E+00	1.04E+01		
Pu-240	1.5132E-02	448.85	897.70	0.00E+00	6.79E+00	1.36E+01		
Pu-241	9.0036E-01	448.85	897.70	0.00E+00	4.04E+02	8.08E+02		
Pu-242	6.4260E-05	448.85	897.70	0.00E+00	2.88E-02	5.77E-02		
Ra-226	2.2804E-10	448.85	897.70	0.00E+00	1.02E-07	2.05E-07		
Ra-228	5.2713E-12	448.85	897.70	0.00E+00	2.37E-09	4.73E-09		
Ru-106	6.1160E-10	448.85	897.70	0.00E+00	2.75E-07	5.49E-07		
Se-79	1.2377E-05	448.85	897.70	0.00E+00	5.56E-03	1.11E-02		
Sn-126	2.5210E-05	448.85	897.70	0.00E+00	1.13E-02	2.26E-02		
Sr-90	9.1667E-01	448.85	897.70	0.00E+00	4.11E+02	8.23E+02		
Tc-99	3.9357E-04	448.85	897.70	0.00E+00	1.77E-01	3.53E-01		
Th-229	1.2057E-10	448.85	897.70	0.00E+00	5.41E-08	1.08E-07		
Th-230	2.1043E-08	448.85	897.70	0.00E+00	9.45E-06	1.89E-05		
Th-232	5.2972E-12	448.85	897.70	0.00E+00	2.38E-09	4.76E-09		
Tl-208	1.7474E-07	448.85	897.70	0.00E+00	7.84E-05	1.57E-04		
U-232	4.7368E-07	448.85	897.70	0.00E+00	2.13E-04	4.25E-04		
U-233	2.5097E-08	448.85	897.70	0.00E+00	1.13E-05	2.25E-05		
U-234	5.0000E-05	448.85	897.70	0.00E+00	2.24E-02	4.49E-02		
U-235	-1.4489E-06	448.85	0.00	1.35E-03	6.98E-04	1.35E-03		
U-236	7.5824E-06	448.85	897.70	0.00E+00	3.40E-03	6.81E-03		
U-238	-2.6129E-07	448.85	0.00	2.32E-03	2.21E-03	2.32E-03		
Y-90	9.1699E-01	448.85	897.70	0.00E+00	4.12E+02	8.23E+02		
Other Radionuclides					6.03E+02	1.21E+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 PWR Template on all but one parameter (enrichment) making PWR a reasonable match
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	8.280254777	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	293.90	448.85	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup.
Bounding	316.51	897.70	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
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	Fuel decay start date	1972
SNF ID #	23	Estimates as of	2030
Fuel Units & Descr.	2 - 11 X 11 ROD ARRAY	Template	PWR (Light Water, Zirc, 0 to 5%, U)
Heavy Metal Mass	BOL=262.681kg EOL=250 073kg	Template Burnup(MWd)	61.92
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 00176911
		Template Decay Time ¹	50 years

Estimated
Canister usage:
Bare Fuel Transfer

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	11,990.37	23,980.74	0 00E+00	1 29E-05	2 57E-05		
Am-241	1 4751E-01	11,990.37	23,980.74	0 00E+00	1 77E+03	3 54E+03	0 0150	9 125E+14
Am-242m	2 6809E-04	11,990.37	23,980.74	0 00E+00	3 21E+00	6 43E+00	0 0250	1 829E+14
Am-243	6 2484E-04	11,990.37	23,980.74	0 00E+00	7 49E+00	1 50E+01	0 0375	1 723E+14
C-14	4 7820E-05	11,990.37	23,980.74	0 00E+00	5 73E-01	1 15E+00	0 0575	2 156E+14
Cf-252	8 0297E-07	11,990.37	23,980.74	0 00E+00	9 63E-03	1 93E-02	0 0850	1 007E+14
Cm-243	1 7426E-04	11,990.37	23,980.74	0 00E+00	2 09E+00	4 18E+00	0 1250	6 703E+13
Cm-244	2 7616E-02	11,990.37	23,980.74	0 00E+00	3 31E+02	6 62E+02	0 2250	8 601E+13
Co-60	3 5610E-04	11,990.37	23,980.74	0 00E+00	4 27E+00	8 54E+00	0 3750	3 715E+13
Cs-134	2 6260E-07	11,990.37	23,980.74	0 00E+00	3 15E-03	6 30E-03	0 5750	8 748E+14
Cs-135	1 4433E-05	11,990.37	23,980.74	0 00E+00	1 73E-01	3 46E-01	0 8500	8 542E+12
Cs-137	9 8870E-01	11,990.37	23,980.74	0 00E+00	1 19E+04	2 37E+04	1 2500	5 435E+12
Eu-154	6 0320E-03	11,990.37	23,980.74	0 00E+00	7 23E+01	1 45E+02	1 7500	2 390E+11
Eu-155	2 1770E-04	11,990.37	23,980.74	0 00E+00	2 61E+00	5 22E-00	2 2500	3 928E+07
Fe-55	7 9296E-07	11,990.37	23,980.74	0 00E+00	9 51E-03	1 90E-02	2 7500	1 384E+08
H-3	8 9486E-03	11,990.37	23,980.74	0 00E+00	1 07E+02	2 15E+02	3 5000	9 877E+06
I-129	9 8288E-07	11,990.37	23,980.74	0 00E+00	1 18E-02	2 36E-02	5 0000	4 221E+06
Kr-85	1 0707E-02	11,990.37	23,980.74	0 00E+00	1 28E+02	2 57E+02	7 0000	4 863E+05
Np-237	1 1927E-05	11,990.37	23,980.74	0 00E+00	1 43E-01	2 86E-01	11 0000	5 584E+04
Pa-231	1 4703E-09	11,990.37	23,980.74	0 00E+00	1 76E-05	3 53E-05		
Pb-210	1 6828E-10	11,990.37	23,980.74	0 00E+00	2 02E-06	4 04E-06		
Pm-147	6 9606E-06	11,990.37	23,980.74	0 00E+00	8 35E-02	1 67E-01		
Pu-238	6 6263E-02	11,990.37	23,980.74	0 00E+00	7 95E+02	1 59E+03		
Pu-239	1 1618E-02	11,990.37	23,980.74	0 00E+00	1 39E+02	2 79E+02		
Pu-240	1 5142E-02	11,990.37	23,980.74	0 00E+00	1 82E+02	3 63E+02		
Pu-241	4 3766E-01	11,990.37	23,980.74	0 00E+00	5 25E+03	1 05E+04		
Pu-242	6 4260E-05	11,990.37	23,980.74	0 00E+00	7 71E-01	1 54E+00		
Ra-226	3 8501E-10	11,990.37	23,980.74	0 00E+00	4 62E-06	9 23E-06		
Ra-228	5 2955E-12	11,990.37	23,980.74	0 00E+00	6 35E-08	1 27E-07		
Ru-106	2 0413E-14	11,990.37	23,980.74	0 00E+00	2 45E-10	4 90E-10		
Se-79	1 2376E-05	11,990.37	23,980.74	0 00E+00	1 48E-01	2 97E-01		
Sn-126	2 5210E-05	11,990.37	23,980.74	0 00E+00	3 02E-01	6 05E-01		
Sr-90	6 4163E-01	11,990.37	23,980.74	0 00E+00	7 69E+03	1 54E+04		
Tc-99	3 9357E-04	11,990.37	23,980.74	0 00E+00	4 72E+00	9 44E+00		
Th-229	1 5644E-10	11,990.37	23,980.74	0 00E+00	1 88E-06	3 75E-06		
Th-230	2 7972E-08	11,990.37	23,980.74	0 00E+00	3 35E-04	6 71E-04		
Th-232	5 3036E-12	11,990.37	23,980.74	0 00E+00	6 36E-08	1 27E-07		
Tl-208	1 5136E-07	11,990.37	23,980.74	0 00E+00	1 81E-03	3 63E-03		
U-232	4 1005E-07	11,990.37	23,980.74	0 00E+00	4 92E-03	9 83E-03		
U-233	2 5856E-08	11,990.37	23,980.74	0 00E+00	3 10E-04	6 20E-04		
U-234	5 2665E-05	11,990.37	23,980.74	0 00E+00	6 31E-01	1 26E+00		
U-235	-1 4487E-06	11,990.37	0 00	1 69E-02	0 00E+00	1 69E-02		
U-236	7 5888E-06	11,990.37	23,980.74	0 00E+00	9 10E-02	1 82E-01		
U-238	-2 6129E-07	11,990.37	0 00	8 57E-02	8 25E-02	8 57E-02		
Y-90	6 4180E-01	11,990.37	23,980.74	0 00E+00	7 70E+03	1 54E+04		
Other Radionuclides					1 14E+04	2 29E+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	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	2.982	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	5 310.89	11,990.37	
Bounding	5 318.51	23 980.74	

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	1.30	2.26	
Bounding	2.61	4.51	

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: BRP-C
 SNF ID #: 24
 Fuel Units & Descr: 4 - 11 X 11 ROD ARRAY
 Heavy Metal Mass BOL=468 948kg, EOL=459 844kg
 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,
 Bare Fuel Transfer

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)					
Ac-227	1 0733E-09	11,298.83	11,298.83	11,722.29	0 00E+00	1 21E-05	1 26E-05	Avg MeV						
Am-241	1 4751E-01	11,298.83	11,298.83	11,722.29	0 00E+00	1 67E+03	1 73E+03	0 0150	4 460E+14					
Am-242m	2 6809E-04	11,298.83	11,298.83	11,722.29	0 00E+00	3 03E+00	3 14E+00	0 0250	8 939E+13					
Am-243	6 2484E-04	11,298.83	11,298.83	11,722.29	0 00E+00	7 06E+00	7 32E+00	0 0375	8 423E+13					
C-14	4 7820E-05	11,298.83	11,298.83	11,722.29	0 00E+00	5 40E-01	5 61E-01	0 0575	1 054E+14					
Cl-36	8 0297E-07	11,298.83	11,298.83	11,722.29	0 00E+00	9 07E-03	9 41E-03	0 0850	4 925E+13					
Cm-243	1 7426E-04	11,298.83	11,298.83	11,722.29	0 00E+00	1 97E+00	2 04E+00	0 1250	3 276E+13					
Cm-244	2 7616E-02	11,298.83	11,298.83	11,722.29	0 00E+00	3 12E+02	3 24E+02	0 2250	4 205E+13					
Co-60	3 5610E-04	11,298.83	11,298.83	11,722.29	0 00E+00	4 02E+00	4 17E+00	0 3750	1 816E+13					
Cs-134	2 6260E-07	11,298.83	11,298.83	11,722.29	0 00E+00	2 97E-03	3 08E-03	0 5750	4 276E+14					
Cs-135	1 4433E-05	11,298.83	11,298.83	11,722.29	0 00E+00	1 63E-01	1 69E-01	0 8500	4 175E+12					
Cs-137	9 8870E-01	11,298.83	11,298.83	11,722.29	0 00E+00	1 12E+04	1 16E+04	1 2500	2 657E+12					
Eu-154	6 0320E-03	11,298.83	11,298.83	11,722.29	0 00E+00	6 82E+01	7 07E+01	1 7500	1 168E+11					
Eu-155	2 1770E-04	11,298.83	11,298.83	11,722.29	0 00E+00	2 46E+00	2 55E+00	2 2500	1 920E+07					
Fe-55	7 9296E-07	11,298.83	11,298.83	11,722.29	0 00E+00	8 96E-03	9 30E-03	2 7500	6 767E+07					
H-3	8 9486E-03	11,298.83	11,298.83	11,722.29	0 00E+00	1 01E+02	1 05E+02	3 5000	4 828E+06					
I-129	9 8288E-07	11,298.83	11,298.83	11,722.29	0 00E+00	1 11E-02	1 15E-02	5 0000	2 064E+06					
Kr-85	1 0707E-02	11,298.83	11,298.83	11,722.29	0 00E+00	1 21E+02	1 26E+02	7 0000	2 377E+05					
Np-237	1 1927E-05	11,298.83	11,298.83	11,722.29	0 00E+00	1 35E-01	1 40E-01	11 0000	2 730E+04					
Pa-231	1 4703E-09	11,298.83	11,298.83	11,722.29	0 00E+00	1 66E-05	1 72E-05							
Pb-210	1 6828E-10	11,298.83	11,298.83	11,722.29	0 00E+00	1 90E-06	1 97E-06							
Pm-147	6 9606E-06	11,298.83	11,298.83	11,722.29	0 00E+00	7 86E-02	8 16E-02							
Pu-238	6 6263E-02	11,298.83	11,298.83	11,722.29	0 00E+00	7 49E+02	7 77E+02							
Pu-239	1 1618E-02	11,298.83	11,298.83	11,722.29	0 00E+00	1 31E+02	1 36E+02							
Pu-240	1 5142E-02	11,298.83	11,298.83	11,722.29	0 00E+00	1 71E+02	1 78E+02							
Pu-241	4 3766E-01	11,298.83	11,298.83	11,722.29	0 00E+00	4 95E+03	5 13E+03							
Pu-242	6 4260E-05	11,298.83	11,298.83	11,722.29	0 00E+00	7 26E-01	7 53E-01							
Ra-226	3 8501E-10	11,298.83	11,298.83	11,722.29	0 00E+00	4 35E-06	4 51E-06							
Ra-228	5 2955E-12	11,298.83	11,298.83	11,722.29	0 00E+00	5 98E-08	6 21E-08							
Ru-106	2 0413E-14	11,298.83	11,298.83	11,722.29	0 00E+00	2 31E-10	2 39E-10							
Se-79	1 2376E-05	11,298.83	11,298.83	11,722.29	0 00E+00	1 40E-01	1 45E-01							
Sn-126	2 5210E-05	11,298.83	11,298.83	11,722.29	0 00E+00	2 85E-01	2 96E-01							
Sr-90	6 4163E-01	11,298.83	11,298.83	11,722.29	0 00E+00	7 25E+03	7 52E+03							
Tc-99	3 9357E-04	11,298.83	11,298.83	11,722.29	0 00E+00	4 45E+00	4 61E+00							
Th-229	1 5644E-10	11,298.83	11,298.83	11,722.29	0 00E+00	1 77E-06	1 83E-06							
Th-230	2 7972E-08	11,298.83	11,298.83	11,722.29	0 00E+00	3 16E-04	3 28E-04							
Th-232	5 3036E-12	11,298.83	11,298.83	11,722.29	0 00E+00	5 99E-08	6 22E-08							
Ti-208	1 5136E-07	11,298.83	11,298.83	11,722.29	0 00E+00	1 71E-03	1 77E-03							
U-232	4 1005E-07	11,298.83	11,298.83	11,722.29	0 00E+00	4 63E-03	4 81E-03							
U-233	2 5856E-08	11,298.83	11,298.83	11,722.29	0 00E+00	2 92E-04	3 03E-04							
U-234	5 2665E-05	11,298.83	11,298.83	11,722.29	0 00E+00	5 95E-01	6 17E-01							
U-235	-1 4487E-06	11,298.83	0 00	3 67E-02	2 04E-02	3 67E-02								
U-236	7 5888E-06	11,298.83	11,298.83	11,722.29	0 00E+00	8 57E-02	8 90E-02							
U-238	-2 6129E-07	11,298.83	0 00	1 52E-01	1 49E-01	1 52E-01								
Y-90	6 4180E-01	11,298.83	11,298.83	11,722.29	0 00E+00	7 25E+03	7 52E+03							
Other Radionuclides						1 08E+04	1 12E+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	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	3 626	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	11,298.83	8 657 09	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup taken directly from SFD (converted to MWd).
Bounding	11 722.29	17,314 19	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 69	0 77	0 99
Bounding	0 71	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=548.282kg EOL=508.336kg
 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
 Bare Fuel Transfer

Radionuclide	CI/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	37,986.38	75,972.75	0.00E+00	4.08E-05	8.15E-05	Avg MeV	
Am-241	1.4751E-01	37,986.38	75,972.75	0.00E+00	5.60E+03	1.12E+04	0.0150	2.891E+15
Am-242m	2.6809E-04	37,986.38	75,972.75	0.00E+00	1.02E+01	2.04E+01	0.0250	5.793E+14
Am-243	6.2484E-04	37,986.38	75,972.75	0.00E+00	2.37E+01	4.75E+01	0.0375	5.459E+14
C-14	4.7820E-05	37,986.38	75,972.75	0.00E+00	1.82E+00	3.63E+00	0.0575	6.831E+14
Cl-36	8.0297E-07	37,986.38	75,972.75	0.00E+00	3.05E-02	6.10E-02	0.0850	3.192E+14
Cm-243	1.7426E-04	37,986.38	75,972.75	0.00E+00	6.62E+00	1.32E+01	0.1250	2.123E+14
Cm-244	2.7616E-02	37,986.38	75,972.75	0.00E+00	1.05E+03	2.10E+03	0.2250	2.725E+14
Co-60	3.5610E-04	37,986.38	75,972.75	0.00E+00	1.35E+01	2.71E+01	0.3750	1.177E+14
Cs-134	2.6260E-07	37,986.38	75,972.75	0.00E+00	9.98E-03	2.00E-02	0.5750	2.771E+15
Cs-135	1.4433E-05	37,986.38	75,972.75	0.00E+00	5.48E-01	1.10E+00	0.8500	2.706E+13
Cs-137	9.8870E-01	37,986.38	75,972.75	0.00E+00	3.76E+04	7.51E+04	1.2500	1.722E+13
Eu-154	6.0320E-03	37,986.38	75,972.75	0.00E+00	2.29E+02	4.58E+02	1.7500	7.571E+11
Eu-155	2.1770E-04	37,986.38	75,972.75	0.00E+00	8.27E+00	1.65E+01	2.2500	1.244E+08
Fe-55	7.9296E-07	37,986.38	75,972.75	0.00E+00	3.01E-02	6.02E-02	2.7500	4.386E+08
H-3	8.9486E-03	37,986.38	75,972.75	0.00E+00	3.40E+02	6.80E+02	3.5000	3.129E+07
I-129	9.8288E-07	37,986.38	75,972.75	0.00E+00	3.73E-02	7.47E-02	5.0000	1.337E+07
Kr-85	1.0707E-02	37,986.38	75,972.75	0.00E+00	4.07E+02	8.13E+02	7.0000	1.540E+06
Np-237	1.1927E-05	37,986.38	75,972.75	0.00E+00	4.53E-01	9.06E-01	11.0000	1.769E+05
Pa-231	1.4703E-09	37,986.38	75,972.75	0.00E+00	5.59E-05	1.12E-04		
Pb-210	1.6828E-10	37,986.38	75,972.75	0.00E+00	6.39E-06	1.28E-05		
Pm-147	6.9606E-06	37,986.38	75,972.75	0.00E+00	2.64E-01	5.29E-01		
Pu-238	6.6263E-02	37,986.38	75,972.75	0.00E+00	2.52E+03	5.03E+03		
Pu-239	1.1618E-02	37,986.38	75,972.75	0.00E+00	4.41E+02	8.83E+02		
Pu-240	1.5142E-02	37,986.38	75,972.75	0.00E+00	5.75E+02	1.15E+03		
Pu-241	4.3766E-01	37,986.38	75,972.75	0.00E+00	1.66E+04	3.33E+04		
Pu-242	6.4260E-05	37,986.38	75,972.75	0.00E+00	2.44E+00	4.88E+00		
Ra-226	3.8501E-10	37,986.38	75,972.75	0.00E+00	1.46E-05	2.93E-05		
Ra-228	5.2955E-12	37,986.38	75,972.75	0.00E+00	2.01E-07	4.02E-07		
Ru-106	2.0413E-14	37,986.38	75,972.75	0.00E+00	7.75E-10	1.55E-09		
Se-79	1.2376E-05	37,986.38	75,972.75	0.00E+00	4.70E-01	9.40E-01		
Sn-126	2.5210E-05	37,986.38	75,972.75	0.00E+00	9.58E-01	1.92E+00		
Sr-90	6.4163E-01	37,986.38	75,972.75	0.00E+00	2.44E+04	4.87E+04		
Tc-99	3.9357E-04	37,986.38	75,972.75	0.00E+00	1.50E+01	2.99E+01		
Th-229	1.5644E-10	37,986.38	75,972.75	0.00E+00	5.94E-06	1.19E-05		
Th-230	2.7972E-08	37,986.38	75,972.75	0.00E+00	1.06E-03	2.13E-03		
Th-232	5.3036E-12	37,986.38	75,972.75	0.00E+00	2.01E-07	4.03E-07		
Tl-208	1.5136E-07	37,986.38	75,972.75	0.00E+00	5.75E-03	1.15E-02		
U-232	4.1005E-07	37,986.38	75,972.75	0.00E+00	1.56E-02	3.12E-02		
U-233	2.5856E-08	37,986.38	75,972.75	0.00E+00	9.82E-04	1.96E-03		
U-234	5.2665E-05	37,986.38	75,972.75	0.00E+00	2.00E+00	4.00E+00		
U-235	-1.4487E-06	37,986.38	0.00	3.40E-02	0.00E+00	3.40E-02		
U-236	7.5888E-06	37,986.38	75,972.75	0.00E+00	2.88E-01	5.77E-01		
U-238	-2.6129E-07	37,986.38	0.00	1.79E-01	1.69E-01	1.79E-01		
Y-90	6.4180E-01	37,986.38	75,972.75	0.00E+00	2.44E+04	4.88E+04		
Other Radionuclides					3.62E+04	7.24E+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	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	2.873	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	900.83	37,986.38	
Bounding	926.60	75,972.75	

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	1.98	42.17	
Bounding	3.96	81.99	

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: BRP-D2
 SNF ID #: 26
 Fuel Units & Descr: 2 - 7 X 7 ROD ARRAY
 Heavy Metal Mass: BOL=233 593kg; EOL=217 098kg
 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:
 Bare Fuel Transfer

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	15,685.20	31,370.41	0 00E+00	1 68E-05	3 37E-05	Avg MeV	
Am-241	1 4751E-01	15,685.20	31,370.41	0 00E+00	2 31E+03	4 63E+03	0 0150	1 194E+15
Am-242m	2 6809E-04	15,685.20	31,370.41	0 00E+00	4 21E+00	8 41E+00	0 0250	2 392E+14
Am-243	6 2484E-04	15,685.20	31,370.41	0 00E+00	9 80E+00	1 96E+01	0 0375	2 254E+14
C-14	4 7820E-05	15,685.20	31,370.41	0 00E+00	7 50E-01	1 50E+00	0 0575	2 821E+14
Ct-36	8 0297E-07	15,685.20	31,370.41	0 00E+00	1 26E-02	2 52E-02	0 0850	1 318E+14
Cm-243	1 7426E-04	15,685.20	31,370.41	0 00E+00	2 73E+00	5 47E+00	0 1250	8 768E+13
Cm-244	2 7616E-02	15,685.20	31,370.41	0 00E+00	4 33E+02	8 66E+02	0 2250	1 125E+14
Co-60	3 5610E-04	15,685.20	31,370.41	0 00E+00	5 59E+00	1 12E+01	0 3750	4 860E+13
Cs-134	2 6260E-07	15,685.20	31,370.41	0 00E+00	4 12E-03	8 24E-03	0 5750	1 144E+15
Cs-135	1 4433E-05	15,685.20	31,370.41	0 00E+00	2 26E-01	4 53E-01	0 8500	1 117E+13
Cs-137	9 8870E-01	15,685.20	31,370.41	0 00E+00	1 55E+04	3 10E+04	1 2500	7 110E+12
Eu-154	6 0320E-03	15,685.20	31,370.41	0 00E+00	9 46E+01	1 89E+02	1 7500	3 126E+11
Eu-155	2 1770E-04	15,685.20	31,370.41	0 00E+00	3 41E+00	6 83E+00	2 2500	5 138E+07
Fe-55	7 9296E-07	15,685.20	31,370.41	0 00E+00	1 24E-02	2 49E-02	2 7500	1 811E+08
H-3	8 9486E-03	15,685.20	31,370.41	0 00E+00	1 40E+02	2 81E+02	3 5000	1 292E+07
I-129	9 8288E-07	15,685.20	31,370.41	0 00E+00	1 54E-02	3 08E-02	5 0000	5 522E+06
Kr-85	1 0707E-02	15,685.20	31,370.41	0 00E+00	1 68E+02	3 36E+02	7 0000	6 361E+05
Np-237	1 1927E-05	15,685.20	31,370.41	0 00E+00	1 87E-01	3 74E-01	11 0000	7 304E+04
Pa-231	1 4703E-09	15,685.20	31,370.41	0 00E+00	2 31E-05	4 61E-05		
Pb-210	1 6828E-10	15,685.20	31,370.41	0 00E+00	2 64E-06	5 28E-06		
Pm-147	6 9606E-06	15,685.20	31,370.41	0 00E+00	1 09E-01	2 18E-01		
Pu-238	6 6263E-02	15,685.20	31,370.41	0 00E+00	1 04E+03	2 08E+03		
Pu-239	1 1618E-02	15,685.20	31,370.41	0 00E+00	1 82E+02	3 64E+02		
Pu-240	1 5142E-02	15,685.20	31,370.41	0 00E+00	2 38E+02	4 75E+02		
Pu-241	4 3766E-01	15,685.20	31,370.41	0 00E+00	6 86E+03	1 37E+04		
Pu-242	6 4260E-05	15,685.20	31,370.41	0 00E+00	1 01E+00	2 02E+00		
Ra-226	3 8501E-10	15,685.20	31,370.41	0 00E+00	6 04E-06	1 21E-05		
Ra-228	5 2955E-12	15,685.20	31,370.41	0 00E+00	8 31E-08	1 66E-07		
Ru-106	2 0413E-14	15,685.20	31,370.41	0 00E+00	3 20E-10	6 40E-10		
Se-79	1 2376E-05	15,685.20	31,370.41	0 00E+00	1 94E-01	3 88E-01		
Sn-126	2 5210E-05	15,685.20	31,370.41	0 00E+00	3 95E-01	7 91E-01		
Sr-90	6 4163E-01	15,685.20	31,370.41	0 00E+00	1 01E+04	2 01E+04		
Tc-99	3 9357E-04	15,685.20	31,370.41	0 00E+00	6 17E+00	1 23E+01		
Th-229	1 5644E-10	15,685.20	31,370.41	0 00E+00	2 45E-06	4 91E-06		
Th-230	2 7972E-08	15,685.20	31,370.41	0 00E+00	4 39E-04	8 77E-04		
Th-232	5 3036E-12	15,685.20	31,370.41	0 00E+00	8 32E-08	1 66E-07		
Tl-208	1 5136E-07	15,685.20	31,370.41	0 00E+00	2 37E-03	4 75E-03		
U-232	4 1005E-07	15,685.20	31,370.41	0 00E+00	6 43E-03	1 29E-02		
U-233	2 5856E-08	15,685.20	31,370.41	0 00E+00	4 06E-04	8 11E-04		
U-234	5 2665E-05	15,685.20	31,370.41	0 00E+00	8 26E-01	1 65E+00		
U-235	-1 4487E-06	15,685.20	0 00	1 42E-02	0 00E+00	1 42E-02		
U-236	7 5888E-06	15,685.20	31,370.41	0 00E+00	1 19E-01	2 38E-01		
U-238	-2 6129E-07	15,685.20	0 00	7 63E-02	7 22E-02	7 63E-02		
Y-90	6 4180E-01	15,685.20	31,370.41	0 00E+00	1 01E+04	2 01E+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	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	2 811	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	1 061 91	15,685.20	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup.
Bounding	1 641 46	31 370 41	

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	Fuel decay start date	1972
SNF ID #	27	Estimates as of	2030
Fuel Units & Descr	18 - 9 X 9 ROD ARRAY	Template	PWR (Light Water, Zirc, 0 to 5%, U)
Heavy Metal Mass	BOL=2443 466kg EOL=2420.588kg	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*
Bare Fuel Transfer

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	1 0733E-09	29,160 32	33,700 28	0 00E+00	3 13E-05	3 62E-05	Avg MeV	
Am-241	1 4751E-01	29,160 32	33,700 28	0 00E+00	4 30E+03	4 97E+03	0 0150	1.282E+15
Am-242m	2 6809E-04	29,160 32	33,700 28	0 00E+00	7 82E+00	9 03E+00	0 0250	2.570E+14
Am-243	6 2484E-04	29,160 32	33,700 28	0 00E+00	1 82E+01	2 11E+01	0 0375	2.421E+14
C-14	4 7820E-05	29,160 32	33,700 28	0 00E+00	1 39E+00	1 61E+00	0 0575	3.030E+14
Cl-36	8 0297E-07	29,160 32	33,700 28	0 00E+00	2 34E-02	2 71E-02	0 0850	1.416E+14
Cm-243	1 7426E-04	29,160 32	33,700 28	0 00E+00	5 08E+00	5 87E+00	0 1250	9.419E+13
Cm-244	2 7616E-02	29,160 32	33 700 28	0 00E+00	8 05E+02	9 31E+02	0.2250	1.209E+14
Co-60	3 5610E-04	29,160 32	33,700 28	0 00E+00	1 04E+01	1 20E+01	0 3750	5.220E+13
Cs-134	2 6260E-07	29,160 32	33,700 28	0 00E+00	7 66E-03	8 85E-03	0 5750	1.229E+15
Cs-135	1 4433E-05	29,160 32	33,700 28	0 00E+00	4.21E-01	4 86E-01	0 8500	1.200E+13
Cs-137	9 8870E-01	29,160 32	33,700 28	0 00E+00	2 88E+04	3 33E+04	1.2500	7.638E+12
Eu-154	6 0320E-03	29,160 32	33,700 28	0 00E+00	1 76E+02	2 03E+02	1 7500	3.358E+11
Eu-155	2 1770E-04	29,160 32	33,700 28	0 00E+00	6 35E+00	7 34E+00	2 2500	5.520E+07
Fe-55	7 9296E-07	29,160 32	33,700 28	0 00E+00	2.31E-02	2 67E-02	2 7500	1.945E+08
H-3	8 9486E-03	29,160.32	33,700 28	0 00E+00	2 61E+02	3 02E+02	3 5000	1.388E+07
I-129	9 8288E-07	29,160 32	33,700 28	0 00E+00	2 87E-02	3 31E-02	5 0000	5.933E+06
Kr-85	1 0707E-02	29,160.32	33,700 28	0 00E+00	3 12E+02	3 61E+02	7 0000	6.835E+05
Np-237	1 1927E-05	29,160 32	33,700 28	0 00E+00	3.48E-01	4 02E-01	11 0000	7.849E+04
Pa-231	1 4703E-09	29,160.32	33,700 28	0 00E+00	4.29E-05	4 95E-05		
Pb-210	1 6828E-10	29,160 32	33,700 28	0 00E+00	4 91E-06	5 67E-06		
Pm-147	6 9606E-06	29,160.32	33,700 28	0 00E+00	2.03E-01	2.35E-01		
Pu-238	6 6263E-02	29,160.32	33,700 28	0 00E+00	1 93E+03	2 23E+03		
Pu-239	1 1618E-02	29,160.32	33,700 28	0 00E+00	3 39E+02	3 92E+02		
Pu-240	1 5142E-02	29,160.32	33,700 28	0 00E+00	4 42E+02	5 10E+02		
Pu-241	4.3766E-01	29,160.32	33,700 28	0 00E+00	1.28E+04	1 47E+04		
Pu-242	6 4260E-05	29,160.32	33,700 28	0 00E+00	1 87E+00	2 17E+00		
Ra-226	3 8501E-10	29,160.32	33,700 28	0 00E+00	1.12E-05	1.30E-05		
Ra-228	5.2955E-12	29 160.32	33,700 28	0 00E+00	1.54E-07	1.78E-07		
Ru-106	2 0413E-14	29,160.32	33,700 28	0 00E+00	5 95E-10	6 88E-10		
Se-79	1.2376E-05	29,160.32	33,700 28	0 00E+00	3 61E-01	4 17E-01		
Sn-126	2 5210E-05	29,160.32	33,700 28	0 00E+00	7.35E-01	8 50E-01		
Sr-90	6 4163E-01	29,160.32	33,700 28	0 00E+00	1.87E+04	2.16E+04		
Tc-99	3.9357E-04	29,160.32	33,700 28	0 00E+00	1.15E+01	1.33E+01		
Th-229	1.5644E-10	29,160.32	33,700 28	0 00E+00	4.56E-06	5.27E-06		
Th-230	2.7972E-08	29,160 32	33,700 28	0 00E+00	8 16E-04	9 43E-04		
Th-232	5.3036E-12	29,160 32	33,700 28	0 00E+00	1.55E-07	1 79E-07		
Th-208	1.5136E-07	29,160.32	33,700 28	0 00E+00	4 41E-03	5 10E-03		
U-232	4.1005E-07	29,160 32	33,700 28	0 00E+00	1.20E-02	1.38E-02		
U-233	2.5856E-08	29,160 32	33,700 28	0 00E+00	7.54E-04	8 71E-04		
U-234	5.2665E-05	29,160 32	33,700 28	0 00E+00	1.54E+00	1 77E+00		
U-235	-1 4487E-06	29,160 32	0 00	1 58E-01	1 16E-01	1 58E-01	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	7.5888E-06	29,160 32	33,700 28	0 00E+00	2.21E-01	2.56E-01	5.27E+02	6 10E+02
U-238	-2 6129E-07	29,160 32	0 00	7 97E-01	7 89E-01	7 97E-01	Total	Total
Y-90	6 4180E-01	29,160 32	33,700 28	0 00E+00	1 87E+04	2 16E+04		
Other Radionuclides					2 78E+04	3.21E+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	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	2 995	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal	29 160 32	21,755 90	Nominal burnup taken directly from SFD (converted to MWd)
Bounding	33 700 28	43 511 79	Bounding burnup taken directly from SFD (converted to MWd)

Checks			Estimated EOL HM/Grven EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.34	0.75	1.00
Bounding	0.39	1.29	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name BRP-EG
 SNF ID #: 28
 Fuel Units & Descr: 33 - 9 X 9 ROD ARRAY
 Heavy Metal Mass. BOL=4566 956kg, EOL=4419.278kg
 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
 Bare Fuel Transfer

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 _a						Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 0733E-09	140,435 08	280,870 16	0 00E+00	1 51E-04	3 01E-04	Avg MeV		
Am-241	1 4751E-01	140,435 08	280,870 16	0 00E+00	2 07E+04	4 14E+04	0 0150	1 069E+16	
Am-242m	2 6809E-04	140,435 08	280,870 16	0 00E+00	3 76E+01	7 53E+01	0 0250	2 142E+15	
Am-243	6 2484E-04	140,435 08	280,870 16	0 00E+00	8 77E+01	1 75E+02	0 0375	2 018E+15	
C-14	4 7820E-05	140,435 08	280,870 16	0 00E+00	6.72E+00	1 34E+01	0 0575	2 525E+15	
Cl-36	8 0297E-07	140,435 08	280,870 16	0 00E+00	1 13E-01	2.26E-01	0 0850	1 180E+15	
Cm-243	1 7426E-04	140,435 08	280,870 16	0 00E+00	2 45E+01	4 89E+01	0 1250	7 850E+14	
Cm-244	2 7616E-02	140,435 08	280,870 16	0 00E+00	3 88E+03	7 76E+03	0.2250	1 007E+15	
Co-60	3 5610E-04	140,435 08	280,870 16	0 00E+00	5 00E+01	1 00E+02	0 3750	4 351E+14	
Cs-134	2 6260E-07	140,435 08	280,870 16	0 00E+00	3 69E-02	7.38E-02	0 5750	1 025E+16	
Cs-135	1 4433E-05	140,435 08	280,870 16	0 00E+00	2.03E+00	4 05E+00	0 8500	1 000E+14	
Cs-137	9 8870E-01	140,435 08	280,870 16	0 00E+00	1.39E+05	2.78E+05	1 2500	6 366E+13	
Eu-154	6 0320E-03	140,435 08	280,870 16	0 00E+00	8.47E+02	1 69E+03	1 7500	2 799E+12	
Eu-155	2 1770E-04	140,435 08	280,870 16	0 00E+00	3 06E+01	6 11E+01	2.2500	4 600E+08	
Fe-55	7 9296E-07	140,435 08	280,870 16	0 00E+00	1.11E-01	2.23E-01	2 7500	1 621E+09	
H-3	8 9486E-03	140,435 08	280,870 16	0 00E+00	1.26E+03	2 51E+03	3 5000	1 157E+08	
I-129	9 8288E-07	140,435 08	280,870 16	0 00E+00	1 38E-01	2.76E-01	5 0000	4 944E+07	
Kr-85	1 0707E-02	140,435 08	280,870 16	0 00E+00	1.50E+03	3 01E+03	7 0000	5 695E+06	
Np-237	1 1927E-05	140,435 08	280,870 16	0 00E+00	1 67E+00	3 35E+00	11 0000	6 540E+05	
Pa-231	1 4703E-09	140,435 08	280,870 16	0 00E+00	2 06E-04	4 13E-04			
Pb-210	1 6828E-10	140,435 08	280,870 16	0 00E+00	2.36E-05	4.73E-05			
Pm-147	6 9606E-06	140,435 08	280,870 16	0 00E+00	9.78E-01	1 96E+00			
Pu-238	6 6263E-02	140,435 08	280,870 16	0 00E+00	9 31E+03	1 86E+04			
Pu-239	1 1618E-02	140,435 08	280,870 16	0 00E+00	1 63E+03	3 26E+03			
Pu-240	1 5142E-02	140,435 08	280,870 16	0 00E+00	2 13E+03	4 25E+03			
Pu-241	4 3766E-01	140,435 08	280,870 16	0 00E+00	6.15E+04	1 23E+05			
Pu-242	6 4260E-05	140,435 08	280,870 16	0 00E+00	9 02E+00	1 80E+01			
Ra-226	3 8501E-10	140,435 08	280,870 16	0 00E+00	5 41E-05	1 08E-04			
Ra-228	5 2955E-12	140,435 08	280,870 16	0 00E+00	7 44E-07	1 49E-06			
Ru-106	2 0413E-14	140,435 08	280,870 16	0 00E+00	2 87E-09	5 73E-09			
Se-79	1 2376E-05	140,435 08	280,870 16	0 00E+00	1 74E+00	3 48E+00			
Sn-126	2 5210E-05	140,435 08	280,870 16	0 00E+00	3 54E+00	7 08E+00			
Sr-90	6 4163E-01	140,435 08	280,870 16	0 00E+00	9 01E+04	1 80E+05			
Tc-99	3 9357E-04	140,435 08	280,870 16	0 00E+00	5 53E+01	1 11E+02			
Th-229	1 5644E-10	140,435 08	280,870 16	0 00E+00	2 20E-05	4 39E-05			
Th-230	2 7972E-08	140,435 08	280,870 16	0 00E+00	3 93E-03	7 86E-03			
Th-232	5 3036E-12	140,435 08	280,870 16	0 00E+00	7 45E-07	1 49E-06			
Tl-208	1 5136E-07	140,435 08	280,870 16	0 00E+00	2 13E-02	4.25E-02			
U-232	4 1005E-07	140,435 08	280,870 16	0 00E+00	5 76E-02	1 15E-01			
U-233	2 5856E-08	140,435 08	280,870.16	0 00E+00	3 63E-03	7.26E-03			
U-234	5 2665E-05	140,435 08	280,870 16	0.00E+00	7 40E+00	1 48E+01			
U-235	-1 4487E-06	140,435 08	0 00	3 47E-01	1 43E-01	3 47E-01			
U-236	7 5888E-06	140,435 08	280,870.16	0 00E+00	1 07E+00	2 13E+00			
U-238	-2 6129E-07	140,435 08	0 00	1 48E+00	1 44E+00	1 48E+00			
Y-90	6 4180E-01	140,435 08	280,870.16	0 00E+00	9 01E+04	1 80E+05			
Other Radionuclides					1 34E+05	2 68E+05			

Thermal Power	
Nominal Heat 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	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	3 513	0 to 5	

Burnup Summary (MWD) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	60,840 99	140 435 08	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding	83,858 44	280 870 16	Bounding burnup assumed to be twice nominal burnup

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal	0 88	2.31	1 00
Bounding	1 76	3.35	

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-EGF	Fuel decay start date	1973
SNF ID #	1081	Estimates as of	2030
Fuel Units & Descr	4 - 9 X 9 ROD ARRAY	Template	PWR (Light Water, Zirc 0 to 5%, U)
Heavy Metal Mass	BOL=553.686kg EOL=541 107kg	*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
Bare Fuel Transfer

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-09	11,962.22	23,924.45	0.00E+00	1.28E-05	2.57E-05	Avg MeV	
Am-241	1.4751E-01	11,962.22	23,924.45	0.00E+00	1.76E+03	3.53E+03	0.0150	9.103E+14
Am-242m	2.6809E-04	11,962.22	23,924.45	0.00E+00	3.21E+00	6.41E+00	0.0250	1.824E+14
Am-243	6.2484E-04	11,962.22	23,924.45	0.00E+00	7.47E+00	1.49E+01	0.0375	1.719E+14
C-14	4.7820E-05	11,962.22	23,924.45	0.00E+00	5.72E-01	1.14E+00	0.0575	2.151E+14
Cf-252	8.0297E-07	11,962.22	23,924.45	0.00E+00	9.61E-03	1.92E-02	0.0850	1.005E+14
Cm-243	1.7426E-04	11,962.22	23,924.45	0.00E+00	2.08E+00	4.17E+00	0.1250	6.687E+13
Cm-244	2.7616E-02	11,962.22	23,924.45	0.00E+00	3.30E+02	6.61E+02	0.2250	8.581E+13
Co-60	3.5610E-04	11,962.22	23,924.45	0.00E+00	4.26E+00	8.52E+00	0.3750	3.706E+13
Cs-134	2.6260E-07	11,962.22	23,924.45	0.00E+00	3.14E-03	6.28E-03	0.5750	8.727E+14
Cs-135	1.4433E-05	11,962.22	23,924.45	0.00E+00	1.73E-01	3.45E-01	0.8500	8.522E+12
Cs-137	9.8870E-01	11,962.22	23,924.45	0.00E+00	1.18E+04	2.37E+04	1.2500	5.423E+12
Eu-154	6.0320E-03	11,962.22	23,924.45	0.00E+00	7.22E+01	1.44E+02	1.7500	2.384E+11
Eu-155	2.1770E-04	11,962.22	23,924.45	0.00E+00	2.60E+00	5.21E+00	2.2500	3.918E+07
Fe-55	7.9296E-07	11,962.22	23,924.45	0.00E+00	9.49E-03	1.90E-02	2.7500	1.381E+08
H-3	8.9486E-03	11,962.22	23,924.45	0.00E+00	1.07E+02	2.14E+02	3.5000	9.854E+06
I-129	9.8288E-07	11,962.22	23,924.45	0.00E+00	1.18E-02	2.35E-02	5.0000	4.211E+06
Kr-85	1.0707E-02	11,962.22	23,924.45	0.00E+00	1.28E+02	2.56E+02	7.0000	4.851E+05
Np-237	1.1927E-05	11,962.22	23,924.45	0.00E+00	1.43E-01	2.85E-01	11.0000	5.571E+04
Pa-231	1.4703E-09	11,962.22	23,924.45	0.00E+00	1.76E-05	3.52E-05		
Pb-210	1.6828E-10	11,962.22	23,924.45	0.00E+00	2.01E-06	4.03E-06		
Pm-147	6.9606E-06	11,962.22	23,924.45	0.00E+00	8.33E-02	1.67E-01		
Pu-238	6.6263E-02	11,962.22	23,924.45	0.00E+00	7.93E+02	1.59E+03		
Pu-239	1.1618E-02	11,962.22	23,924.45	0.00E+00	1.39E+02	2.78E+02		
Pu-240	1.5142E-02	11,962.22	23,924.45	0.00E+00	1.81E+02	3.62E+02		
Pu-241	4.3766E-01	11,962.22	23,924.45	0.00E+00	5.24E+03	1.05E+04		
Pu-242	6.4260E-05	11,962.22	23,924.45	0.00E+00	7.69E-01	1.54E+00		
Ra-226	3.8501E-10	11,962.22	23,924.45	0.00E+00	4.61E-06	9.21E-06		
Ra-228	5.2955E-12	11,962.22	23,924.45	0.00E+00	6.33E-08	1.27E-07		
Ru-106	2.0413E-14	11,962.22	23,924.45	0.00E+00	2.44E-10	4.88E-10		
Se-79	1.2376E-05	11,962.22	23,924.45	0.00E+00	1.48E-01	2.96E-01		
Sn-126	2.5210E-05	11,962.22	23,924.45	0.00E+00	3.02E-01	6.03E-01		
Sr-90	6.4163E-01	11,962.22	23,924.45	0.00E+00	7.68E+03	1.54E+04		
Tc-99	3.9357E-04	11,962.22	23,924.45	0.00E+00	4.71E+00	9.42E+00		
Th-229	1.5644E-10	11,962.22	23,924.45	0.00E+00	1.87E-06	3.74E-06		
Th-230	2.7972E-08	11,962.22	23,924.45	0.00E+00	3.35E-04	6.69E-04		
Th-232	5.3036E-12	11,962.22	23,924.45	0.00E+00	6.34E-08	1.27E-07		
Tl-208	1.5136E-07	11,962.22	23,924.45	0.00E+00	1.81E-03	3.62E-03		
U-232	4.1005E-07	11,962.22	23,924.45	0.00E+00	4.91E-03	9.81E-03		
U-233	2.5856E-08	11,962.22	23,924.45	0.00E+00	3.09E-04	6.19E-04		
U-234	5.2665E-05	11,962.22	23,924.45	0.00E+00	6.30E-01	1.26E+00		
U-235	-1.4487E-06	11,962.22	0.00	4.16E-02	2.43E-02	4.16E-02		
U-236	7.5888E-06	11,962.22	23,924.45	0.00E+00	9.08E-02	1.82E-01		
U-238	-2.6129E-07	11,962.22	0.00	1.80E-01	1.76E-01	1.80E-01		
Y-90	6.4180E-01	11,962.22	23,924.45	0.00E+00	7.68E+03	1.54E+04		
Other Radionuclides					1.14E+04	2.28E+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	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	3.478	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate ²
	From SFD	Estimated	
Nominal	8,552.79	11,962.22	
Bounding	8,583.24	23,924.45	

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

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.62	1.40	
Bounding	1.23	2.79	

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: BRP-EP	¹ Fuel decay start date: 1974
SNF ID #: 29	Estimates as of: 2030
Fuel Units & Descr: 3 - 9 X 9 ROD ARRAY	Template: (Worst Case)
Heavy Metal Mass BOL=369 99kg, EOL=351 853kg	² Template Burnup(MWd): 62.5
ROD Storage Site: INEEL	Template BOL Heavy Metal Mass (MT): 0 00186865
	Template Decay Time: 50 years

Estimated
Canister usage:
Bare Fuel Transfer

II. Estimates							Gamma Sources	
	m	x _n	x _b	b	y _n	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/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	17,236 64	34,473 28	0 00E+00	4 34E-02	8 69E-02	Avg. MeV	
Am-241	8 6432E+00	17,236 64	34,473 28	0 00E+00	1 49E+05	2 98E+05	0 0150	2 953E+16
Am-242m	1 5728E-02	17,236 64	34,473 28	0 00E+00	2 71E+02	5 42E+02	0 0250	5 771E+15
Am-243	1 6288E-02	17,236 64	34,473 28	0 00E+00	2 81E+02	5 62E+02	0 0375	4 879E+15
C-14	1 2068E-01	17,236 64	34,473 28	0 00E+00	2 08E+03	4 16E+03	0 0575	9 216E+15
Cf-252	2 2849E-03	17,236 64	34,473 28	0 00E+00	3 94E+01	7 88E+01	0 0850	3 089E+15
Cm-243	6 0144E-04	17,236 64	34,473 28	0 00E+00	1 04E+01	2 07E+01	0 1250	2 186E+15
Cm-244	9 4880E-02	17,236 64	34,473 28	0 00E+00	1 64E+03	3 27E+03	0 2250	2 674E+15
Co-60	3 9052E+00	17,236 64	34,473 28	0 00E+00	6 73E+04	1 35E+05	0 3750	1 157E+15
Cs-134	2 2139E-06	17,236 64	34,473 28	0 00E+00	3 82E-02	7 63E-02	0 5750	1 915E+16
Cs-135	4 3976E-04	17,236 64	34,473 28	0 00E+00	7 58E+00	1 52E+01	0 8500	4 194E+14
Cs-137	1 4887E+01	17,236 64	34,473 28	0 00E+00	2 57E+05	5 13E+05	1 2500	1 028E+16
Eu-154	3 7342E-01	17,236 64	34,473 28	0 00E+00	6 44E+03	1 29E+04	1 7500	1 236E+13
Eu-155	8 4893E-03	17,236 64	34,473 28	0 00E+00	1 46E+02	2 93E+02	2 2500	5 344E+10
Fe-55	5 3750E-03	17,236 64	34,473 28	0 00E+00	9 26E+01	1 85E+02	2 7500	9 197E+10
H-3	1 0472E-01	17,236 64	34,473 28	0 00E+00	1 80E+03	3 61E+03	3 5000	5 569E+07
I-129	1 0618E-05	17,236 64	34,473 28	0 00E+00	1 83E-01	3 66E-01	5 0000	2 353E+07
Kr-85	2 2717E-01	17,236 64	34,473 28	0 00E+00	3 92E+03	7 83E+03	7 0000	2 678E+06
Np-237	1 6400E-04	17,236 64	34,473 28	0 00E+00	2 83E+00	5 65E+00	11 0000	3 055E+05
Pa-231	2 8688E-06	17,236 64	34,473 28	0 00E+00	4 94E-02	9 89E-02		
Pb-210	4 7312E-08	17,236 64	34,473 28	0 00E+00	8 16E-04	1 63E-03		
Pm-147	3 2198E-04	17,236 64	34,473 28	0 00E+00	5 55E+00	1 11E+01		
Pu-238	-1 1924E+00	17,236 64	0 00	4 75E+04	2 70E+04	4 75E+04		
Pu-239	-4 8600E-02	17,236 64	0 00	5 75E+03	4 92E+03	5 75E+03		
Pu-240	-3 0127E-01	17,236 64	0 00	7 35E+03	2 15E+03	7 35E+03		
Pu-241	-1 2917E-02	17,236 64	0 00	1 89E+06	0 00E+00	1 89E+06		
Pu-242	-1 1381E-04	17,236 64	0 00	3 18E+01	2 98E+01	3 18E+01		
Ra-226	1 0760E-07	17,236 64	34,473 28	0 00E+00	1 85E-03	3 71E-03		
Ra-228	6 0160E-07	17,236 64	34,473 28	0 00E+00	1 04E-02	2 07E-02		
Ru-106	1 3388E-13	17,236 64	34,473 28	0 00E+00	2 31E-09	4 62E-09		
Se-79	1 9179E-04	17,236 64	34,473 28	0 00E+00	3 31E+00	6 61E+00		
Sn-126	1 6689E-04	17,236 64	34,473 28	0 00E+00	2 87E+00	5 75E+00		
Sr-90	1 3859E+01	17,236 64	34,473 28	0 00E+00	2 39E+05	4 78E+05		
Tc-99	6 7678E-03	17,236 64	34,473 28	0 00E+00	1 17E+02	2 33E+02		
Th-229	2 2592E-06	17,236 64	34,473 28	0 00E+00	3 89E-02	7 79E-02		
Th-230	7 5955E-06	17,236 64	34,473 28	0 00E+00	1 31E-01	2 62E-01		
Th-232	6 0208E-07	17,236 64	34,473 28	0 00E+00	1 04E-02	2 08E-02		
Tl-208	7 5795E-05	17,236 64	34,473 28	0 00E+00	1 31E+00	2 61E+00		
U-232	2 0521E-04	17,236 64	34,473 28	0 00E+00	3 54E+00	7 07E+00		
U-233	3 6128E-04	17,236 64	34,473 28	0 00E+00	6 23E+00	1 25E+01		
U-234	1 2788E-02	17,236 64	34,473 28	0 00E+00	2 20E+02	4 41E+02		
U-235	5 7486E-04	17,236 64	34,473 28	1 59E-01	1 01E+01	2 00E+01		
U-236	2 3485E-04	17,236 64	34,473 28	0 00E+00	4 05E+00	8 10E+00		
U-238	1 1581E-04	17,236 64	34,473 28	1 98E-02	2 02E+00	4 01E+00		
Y-90	1 3861E+01	17,236 64	34,473 28	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 fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding	ZIRC	SST/Inconel	
BOL HM Constituents	Pu and U	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 65	17 236 64	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding	7 131 56	34 473 28	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	1.39	2.61	31.12
Bounding	2.79	4.83	

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 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 104kg EOL=1756 759kg	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
Bare Fuel Transfer

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	40,268.00	80,535.99	0.00E+00	4.32E-05	8.64E-05	Avg MeV	
Am-241	1.4751E-01	40,268.00	80,535.99	0.00E+00	5.94E+03	1.19E+04	0.0150	3.064E+15
Am-242m	2.6809E-04	40,268.00	80,535.99	0.00E+00	1.08E+01	2.16E+01	0.0250	6.141E+14
Am-243	6.2484E-04	40,268.00	80,535.99	0.00E+00	2.52E+01	5.03E+01	0.0375	5.787E+14
C-14	4.7820E-05	40,268.00	80,535.99	0.00E+00	1.93E+00	3.85E+00	0.0575	7.241E+14
Ct-36	8.0297E-07	40,268.00	80,535.99	0.00E+00	3.23E-02	6.47E-02	0.0850	3.383E+14
Cm-243	1.7426E-04	40,268.00	80,535.99	0.00E+00	7.02E+00	1.40E+01	0.1250	2.251E+14
Cm-244	2.7616E-02	40,268.00	80,535.99	0.00E+00	1.11E+03	2.22E+03	0.2250	2.889E+14
Co-60	3.5610E-04	40,268.00	80,535.99	0.00E+00	1.43E+01	2.87E+01	0.3750	1.248E+14
Cs-134	2.6260E-07	40,268.00	80,535.99	0.00E+00	1.06E-02	2.11E-02	0.5750	2.938E+15
Cs-135	1.4433E-05	40,268.00	80,535.99	0.00E+00	5.81E-01	1.16E+00	0.8500	2.869E+13
Cs-137	9.8870E-01	40,268.00	80,535.99	0.00E+00	3.98E+04	7.96E+04	1.2500	1.825E+13
Eu-154	6.0320E-03	40,268.00	80,535.99	0.00E+00	2.43E+02	4.86E+02	1.7500	8.025E+11
Eu-155	2.1770E-04	40,268.00	80,535.99	0.00E+00	8.77E+00	1.75E+01	2.2500	1.319E+08
Fe-55	7.9296E-07	40,268.00	80,535.99	0.00E+00	3.19E-02	6.39E-02	2.7500	4.649E+08
H-3	8.9486E-03	40,268.00	80,535.99	0.00E+00	3.60E+02	7.21E+02	3.5000	3.317E+07
I-129	9.8288E-07	40,268.00	80,535.99	0.00E+00	3.96E-02	7.92E-02	5.0000	1.418E+07
Kr-85	1.0707E-02	40,268.00	80,535.99	0.00E+00	4.31E+02	8.62E+02	7.0000	1.633E+06
Np-237	1.1927E-05	40,268.00	80,535.99	0.00E+00	4.80E-01	9.61E-01	11.0000	1.875E+05
Pa-231	1.4703E-09	40,268.00	80,535.99	0.00E+00	5.92E-05	1.18E-04		
Pb-210	1.6828E-10	40,268.00	80,535.99	0.00E+00	6.78E-06	1.36E-05		
Pm-147	6.9606E-06	40,268.00	80,535.99	0.00E+00	2.80E-01	5.61E-01		
Pu-238	6.6263E-02	40,268.00	80,535.99	0.00E+00	2.67E+03	5.34E+03		
Pu-239	1.1618E-02	40,268.00	80,535.99	0.00E+00	4.68E+02	9.36E+02		
Pu-240	1.5142E-02	40,268.00	80,535.99	0.00E+00	6.10E+02	1.22E+03		
Pu-241	4.3766E-01	40,268.00	80,535.99	0.00E+00	1.76E+04	3.52E+04		
Pu-242	6.4260E-05	40,268.00	80,535.99	0.00E+00	2.59E+00	5.18E+00		
Ra-226	3.8501E-10	40,268.00	80,535.99	0.00E+00	1.55E-05	3.10E-05		
Ra-228	5.2955E-12	40,268.00	80,535.99	0.00E+00	2.13E-07	4.26E-07		
Ru-106	2.0413E-14	40,268.00	80,535.99	0.00E+00	8.22E-10	1.64E-09		
Se-79	1.2376E-05	40,268.00	80,535.99	0.00E+00	4.98E-01	9.97E-01		
Sn-126	2.5210E-05	40,268.00	80,535.99	0.00E+00	1.02E+00	2.03E+00		
Sr-90	6.4163E-01	40,268.00	80,535.99	0.00E+00	2.58E+04	5.17E+04		
Tc-99	3.9357E-04	40,268.00	80,535.99	0.00E+00	1.58E+01	3.17E+01		
Th-229	1.5644E-10	40,268.00	80,535.99	0.00E+00	6.30E-06	1.26E-05		
Th-230	2.7972E-08	40,268.00	80,535.99	0.00E+00	1.13E-03	2.25E-03		
Th-232	5.3036E-12	40,268.00	80,535.99	0.00E+00	2.14E-07	4.27E-07		
Tl-208	1.5136E-07	40,268.00	80,535.99	0.00E+00	6.09E-03	1.22E-02		
U-232	4.1005E-07	40,268.00	80,535.99	0.00E+00	1.65E-02	3.30E-02		
U-233	2.5856E-08	40,268.00	80,535.99	0.00E+00	1.04E-03	2.08E-03		
U-234	5.2665E-05	40,268.00	80,535.99	0.00E+00	2.12E+00	4.24E+00	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-1.4487E-06	40,268.00	0.00	1.37E-01	7.83E-02	1.37E-01	7.28E+02	1.46E+03
U-236	7.5888E-06	40,268.00	80,535.99	0.00E+00	3.06E-01	6.11E-01	Total	Total
U-238	-2.6129E-07	40,268.00	0.00	5.83E-01	5.73E-01	5.83E-01		
Y-90	6.4180E-01	40,268.00	80,535.99	0.00E+00	2.58E+04	5.17E+04		
Other Radionuclides					3.84E+04	7.67E+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	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	3.515	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	18 908.58	40,268.00	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding	25 797.35	80,535.99	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.64	2.13	1.00
Bounding	1.28	3.12	

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: BRP-F-PU
 SNF ID #: 1082
 Fuel Units & Descr: 2 - 9 X 9 ROD ARRAY
 Heavy Metal Mass BOL=269 592kg, EOL=263 82kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1974
 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:
 Bare Fuel Transfer

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	1 0733E-09	5,489 09	10,978 18	0 00E+00	5 89E-06	1 18E-05		
Am-241	1 4751E-01	5,489 09	10,978 18	0 00E+00	8.10E+02	1 62E+03	0 0150	4 177E+14
Am-242m	2 6809E-04	5,489 09	10,978 18	0 00E+00	1 47E+00	2 94E+00	0 0250	8 371E+13
Am-243	6 2484E-04	5,489 09	10,978 18	0 00E+00	3 43E+00	6 86E+00	0 0375	7 888E+13
C-14	4 7820E-05	5,489 09	10,978 18	0 00E+00	2 62E-01	5 25E-01	0 0575	9 871E+13
Cl-36	8 0297E-07	5,489 09	10,978 18	0 00E+00	4 41E-03	8 82E-03	0 0850	4 612E+13
Cm-243	1 7426E-04	5,489 09	10,978 18	0 00E+00	9 57E-01	1 91E+00	0 1250	3 068E+13
Cm-244	2 7616E-02	5,489 09	10,978 18	0 00E+00	1 52E+02	3 03E+02	0 2250	3 938E+13
Co-60	3 5610E-04	5,489 09	10,978 18	0 00E+00	1 95E+00	3 91E+00	0 3750	1 701E+13
Cs-134	2 6260E-07	5,489 09	10,978 18	0 00E+00	1 44E-03	2 88E-03	0 5750	4 005E+14
Cs-135	1 4433E-05	5,489 09	10,978 18	0 00E+00	7 92E-02	1 58E-01	0 8500	3 910E+12
Cs-137	9 8870E-01	5,489 09	10,978 18	0 00E+00	5 43E+03	1 09E+04	1 2500	2 488E+12
Eu-154	6 0320E-03	5,489 09	10,978 18	0 00E+00	3 31E+01	6 62E+01	1 7500	1 094E+11
Eu-155	2 1770E-04	5,489 09	10,978 18	0 00E+00	1.19E+00	2 39E+00	2 2500	1 798E+07
Fe-55	7 9296E-07	5,489 09	10,978 18	0 00E+00	4 35E-03	8.71E-03	2 7500	6 337E+07
H-3	8 9486E-03	5,489 09	10,978 18	0 00E+00	4 91E+01	9 82E+01	3 5000	4 522E+06
I-129	9 8288E-07	5,489 09	10,978 18	0 00E+00	5 40E-03	1.08E-02	5 0000	1 922E+06
Kr-85	1 0707E-02	5,489 09	10,978 18	0 00E+00	5 88E+01	1 18E+02	7 0000	2 226E+05
Np-237	1 1927E-05	5,489 09	10,978 18	0 00E+00	6.55E-02	1.31E-01	11 0000	2 556E+04
Pa-231	1.4703E-09	5,489 09	10,978 18	0 00E+00	8 07E-06	1 61E-05		
Pb-210	1 6828E-10	5,489 09	10,978 18	0 00E+00	9 24E-07	1 85E-06		
Pm-147	6 9606E-06	5,489 09	10,978 18	0 00E+00	3.82E-02	7 64E-02		
Pu-238	6 6263E-02	5,489 09	10,978 18	0 00E+00	3 64E+02	7 27E+02		
Pu-239	1 1618E-02	5,489 09	10,978 18	0 00E+00	6 38E+01	1 28E+02		
Pu-240	1 5142E-02	5,489 09	10,978 18	0 00E+00	8 31E+01	1 66E+02		
Pu-241	4 3766E-01	5,489 09	10,978 18	0 00E+00	2 40E+03	4 80E+03		
Pu-242	6 4260E-05	5,489 09	10,978 18	0 00E+00	3 53E-01	7 05E-01		
Ra-226	3 8501E-10	5,489 09	10,978 18	0 00E+00	2.11E-06	4 23E-06		
Ra-228	5 2955E-12	5,489 09	10,978 18	0 00E+00	2 91E-08	5 81E-08		
Ru-106	2 0413E-14	5,489 09	10,978 18	0 00E+00	1 12E-10	2 24E-10		
Se-79	1 2376E-05	5,489 09	10,978 18	0 00E+00	6 79E-02	1 36E-01		
Sn-126	2 5210E-05	5,489 09	10,978 18	0 00E+00	1 38E-01	2 77E-01		
Sr-90	6 4163E-01	5,489 09	10,978 18	0 00E+00	3 52E+03	7 04E+03		
Tc-99	3 9357E-04	5,489 09	10,978 18	0 00E+00	2.16E+00	4 32E+00		
Th-229	1 5644E-10	5,489 09	10,978 18	0 00E+00	8 59E-07	1 72E-06		
Th-230	2 7972E-08	5,489 09	10,978 18	0 00E+00	1 54E-04	3 07E-04		
Th-232	5 3036E-12	5,489 09	10,978 18	0 00E+00	2 91E-08	5 82E-08		
Tl-208	1 5136E-07	5,489 09	10,978 18	0 00E+00	8 31E-04	1 66E-03		
U-232	4 1005E-07	5,489 09	10,978 18	0 00E+00	2.25E-03	4 50E-03		
U-233	2 5856E-08	5,489 09	10,978 18	0 00E+00	1 42E-04	2 84E-04		
U-234	5.2665E-05	5,489 09	10,978 18	0.00E+00	2 89E-01	5 78E-01		
U-235	-1 4487E-06	5,489 09	0 00	2.05E-02	1 26E-02	2.05E-02		
U-236	7 5888E-06	5,489 09	10,978 18	0 00E+00	4.17E-02	8.33E-02		
U-238	-2 6129E-07	5,489 09	0 00	8.74E-02	8 60E-02	8 74E-02		
Y-90	6 4180E-01	5,489 09	10,978 18	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	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	3.525	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	4,154 69	5 489 09	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding	4,193 24	10,978 18	

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: CONNECTICUT YANKEE (S004)
 SNF ID #: 34
 Fuel Units & Descr: 1 - 15 X 15 ROD ARRAY
 Heavy Metal Mass: BOL=407.843kg, EOL=393.774kg
 ROD Storage Site: INEEL

Fuel decay start date: 1975
 Estimates as of: 2030
 Template: Pathfinder (Light Water SST 60 to 100%, U)
 Template Burnup (MWd): 6.01
 Template BOL Heavy Metal Mass (MT): 0.00012882
 Template Decay Time: 50 years

Estimated
 Canister usage:
 Bare Fuel Transfer

Radionuclide	II. Estimates		Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Gamma Sources	
	m	x _a				Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.4276E-08	13,290.34	26,580.68	4.56E-04	9.11E-04	Avg MeV	
Am-241	1.1458E-04	13,290.34	26,580.68	1.52E+00	3.05E+00	0.0150	1.386E+15
Am-242m	7.9468E-09	13,290.34	26,580.68	1.06E-04	2.11E-04	0.0250	2.880E+14
Am-243	9.8386E-10	13,290.34	26,580.68	1.31E-05	2.62E-05	0.0375	2.497E+14
C-14	2.2978E-04	13,290.34	26,580.68	3.05E+00	6.11E+00	0.0575	2.686E+14
Cl-36	1.2261E-06	13,290.34	26,580.68	1.63E-02	3.26E-02	0.0850	1.622E+14
Cm-243	1.7271E-10	13,290.34	26,580.68	2.30E-06	4.59E-06	0.1250	1.053E+14
Cm-244	1.3058E-09	13,290.34	26,580.68	1.74E-05	3.47E-05	0.2250	1.398E+14
Co-60	9.8636E-03	13,290.34	26,580.68	1.31E+02	2.62E+02	0.3750	6.099E+13
Cs-134	1.9617E-08	13,290.34	26,580.68	2.61E-04	5.21E-04	0.5750	1.015E+15
Cs-135	3.0316E-05	13,290.34	26,580.68	4.03E-01	8.06E-01	0.8500	1.003E+13
Cs-137	1.0263E+00	13,290.34	26,580.68	1.36E+04	2.73E+04	1.2500	2.283E+13
Eu-154	2.0017E-04	13,290.34	26,580.68	2.66E+00	5.32E+00	1.7500	2.581E+11
Eu-155	8.9575E-05	13,290.34	26,580.68	1.14E+00	2.28E+00	2.2500	1.308E+08
Fe-55	2.2646E-05	13,290.34	26,580.68	3.01E-01	6.02E-01	2.7500	1.782E+07
H-3	1.0835E-03	13,290.34	26,580.68	1.44E+01	2.88E+01	3.5000	2.250E+03
I-129	7.3195E-07	13,290.34	26,580.68	9.73E-03	1.95E-02	5.0000	9.405E+02
Kr-85	1.5661E-02	13,290.34	26,580.68	2.08E+02	4.16E+02	7.0000	1.053E+02
Np-237	1.1494E-06	13,290.34	26,580.68	1.53E-02	3.06E-02	11.0000	1.191E+01
Pa-231	5.8070E-08	13,290.34	26,580.68	7.72E-04	1.54E-03		
Pb-210	1.2985E-12	13,290.34	26,580.68	1.73E-08	3.45E-08		
Pm-147	2.2196E-05	13,290.34	26,580.68	2.95E-01	5.90E-01		
Pu-238	2.6223E-04	13,290.34	26,580.68	3.49E+00	6.97E+00		
Pu-239	6.6739E-04	13,290.34	26,580.68	8.87E+00	1.77E+01		
Pu-240	8.6705E-05	13,290.34	26,580.68	1.15E+00	2.30E+00		
Pu-241	3.4759E-04	13,290.34	26,580.68	4.62E+00	9.24E+00		
Pu-242	1.9717E-09	13,290.34	26,580.68	2.62E-05	5.24E-05		
Ra-226	3.0000E-12	13,290.34	26,580.68	3.99E-08	7.97E-08		
Ra-228	8.3328E-12	13,290.34	26,580.68	1.11E-07	2.21E-07		
Ru-106	6.1464E-15	13,290.34	26,580.68	8.17E-11	1.63E-10		
Se-79	1.3221E-05	13,290.34	26,580.68	1.76E-01	3.51E-01		
Sn-126	1.1491E-05	13,290.34	26,580.68	1.53E-01	3.05E-01		
Sr-90	9.5541E-01	13,290.34	26,580.68	1.27E+04	2.54E+04		
Tc-99	4.6656E-04	13,290.34	26,580.68	6.20E+00	1.24E+01		
Th-229	1.9085E-11	13,290.34	26,580.68	2.54E-07	5.07E-07		
Th-230	2.1913E-10	13,290.34	26,580.68	2.91E-06	5.82E-06		
Th-232	8.3478E-12	13,290.34	26,580.68	1.11E-07	2.22E-07		
Tl-208	1.8752E-08	13,290.34	26,580.68	2.49E-04	4.98E-04		
U-232	5.0782E-08	13,290.34	26,580.68	6.75E-04	1.35E-03		
U-233	3.2596E-09	13,290.34	26,580.68	4.33E-05	8.66E-05		
U-234	3.9817E-07	13,290.34	26,580.68	5.29E-03	1.06E-02		
U-235	-2.7761E-06	13,290.34	0.00	3.53E-02	0.00E+00		
U-236	1.6190E-05	13,290.34	26,580.68	2.15E-01	4.30E-01		
U-238	-2.8547E-09	13,290.34	0.00	1.32E-01	1.32E-01		
Y-90	9.5557E-01	13,290.34	26,580.68	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	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	4.00000037	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	13,139.89	13,290.34	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding		26,580.68	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.70	1.01	1.00
Bounding	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: CP-5 CONVERTER CYLINDERS
 SNF ID #: 36
 Fuel Units & Descr: 2 - CONVERTER CYLINDERS
 Heavy Metal Mass: BOL=1.231kg, EOL=1.206kg
 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

Radionuclide	CuMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Actvty (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.2320E-09	24.54	49.08	0.00E+00	1.53E-07	3.06E-07	Avg. MeV	
Am-241	2.3540E-02	24.54	49.08	0.00E+00	5.78E-01	1.16E+00	0.0150	2.395E+12
Am-242m	3.3060E-06	24.54	49.08	0.00E+00	8.11E-05	1.62E-04	0.0250	4.954E+11
Am-243	2.0560E-06	24.54	49.08	0.00E+00	5.05E-05	1.01E-04	0.0375	4.358E+11
C-14	1.1244E-03	24.54	49.08	0.00E+00	2.76E-02	5.52E-02	0.0575	4.768E+11
Cl-36	8.3760E-11	24.54	49.08	0.00E+00	2.06E-09	4.11E-09	0.0850	2.782E+11
Cm-243	3.4960E-07	24.54	49.08	0.00E+00	8.58E-06	1.72E-05	0.1250	1.817E+11
Cm-244	5.8860E-06	24.54	49.08	0.00E+00	1.44E-04	2.89E-04	0.2250	2.396E+11
Co-60	8.9560E-03	24.54	49.08	0.00E+00	2.20E-01	4.40E-01	0.3750	1.043E+11
Cs-134	5.1180E-08	24.54	49.08	0.00E+00	1.26E-06	2.51E-06	0.5750	1.846E+12
Cs-135	7.9140E-06	24.54	49.08	0.00E+00	1.94E-04	3.88E-04	0.8500	1.876E+10
Cs-137	1.0122E+00	24.54	49.08	0.00E+00	2.48E+01	4.97E+01	1.2500	4.005E+10
Eu-154	2.0260E-03	24.54	49.08	0.00E+00	4.97E-02	9.94E-02	1.7500	4.935E+08
Eu-155	7.7180E-05	24.54	49.08	0.00E+00	1.89E-03	3.79E-03	2.2500	2.207E+05
Fe-55	1.0538E-06	24.54	49.08	0.00E+00	2.59E-05	5.17E-05	2.7500	6.985E+04
H-3	1.0256E-02	24.54	49.08	0.00E+00	2.52E-01	5.03E-01	3.5000	2.484E+02
I-129	7.5020E-07	24.54	49.08	0.00E+00	1.84E-05	3.68E-05	5.0000	1.042E+02
Kr-85	1.4492E-02	24.54	49.08	0.00E+00	3.56E-01	7.11E-01	7.0000	1.172E+01
Np-237	5.6900E-06	24.54	49.08	0.00E+00	1.40E-04	2.79E-04	11.0000	1.330E+00
Pa-231	9.4900E-09	24.54	49.08	0.00E+00	2.33E-07	4.66E-07		
Pb-210	8.6720E-09	24.54	49.08	0.00E+00	2.13E-07	4.26E-07		
Pm-147	1.8906E-05	24.54	49.08	0.00E+00	4.64E-04	9.28E-04		
Pu-238	5.7080E-03	24.54	49.08	0.00E+00	1.40E-01	2.80E-01		
Pu-239	1.8736E-02	24.54	49.08	0.00E+00	4.60E-01	9.20E-01		
Pu-240	8.3420E-03	24.54	49.08	0.00E+00	2.05E-01	4.09E-01		
Pu-241	7.0960E-02	24.54	49.08	0.00E+00	1.74E+00	3.48E+00		
Pu-242	2.0400E-06	24.54	49.08	0.00E+00	5.01E-05	1.00E-04		
Ra-226	1.9722E-08	24.54	49.08	0.00E+00	4.84E-07	9.68E-07		
Ra-228	1.1912E-09	24.54	49.08	0.00E+00	2.92E-08	5.85E-08		
Ru-106	1.0798E-14	24.54	49.08	0.00E+00	2.65E-13	5.30E-13		
Se-79	1.2522E-05	24.54	49.08	0.00E+00	3.07E-04	6.15E-04		
Sn-126	1.2052E-05	24.54	49.08	0.00E+00	2.96E-04	5.91E-04		
Sr-90	8.8440E-01	24.54	49.08	0.00E+00	2.17E+01	4.34E+01		
Tc-99	4.4120E-04	24.54	49.08	0.00E+00	1.08E-02	2.17E-02		
Th-229	5.6400E-09	24.54	49.08	0.00E+00	1.38E-07	2.77E-07		
Th-230	1.3922E-06	24.54	49.08	0.00E+00	3.42E-05	6.83E-05		
Th-232	1.1926E-09	24.54	49.08	0.00E+00	2.93E-08	5.85E-08		
Tl-208	4.0060E-08	24.54	49.08	0.00E+00	9.83E-07	1.97E-06		
U-232	1.0738E-07	24.54	49.08	0.00E+00	2.63E-06	5.27E-06		
U-233	9.1640E-07	24.54	49.08	0.00E+00	2.25E-05	4.50E-05	Thermal Power	
U-234	2.3440E-03	24.54	49.08	0.00E+00	5.75E-02	1.15E-01	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2.3296E-06	24.54	0.00	2.47E-03	2.42E-03	2.47E-03	3.16E-01	6.32E-01
U-236	2.6620E-05	24.54	49.08	0.00E+00	6.53E-04	1.31E-03	Total	Total
U-238	-1.3291E-07	24.54	0.00	2.90E-05	2.57E-05	2.90E-05		
Y-90	8.8460E-01	24.54	49.08	0.00E+00	2.17E+01	4.34E+01		
Other Radionuclides					2.37E+01	4.74E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	HEAVY WATER	HEAVY WATER
Fuel Cladding	ZIRC	ZIRC
BOL HM Constituents	U	U
BOL Enrichment %	93	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		24.54
Bounding		49.08

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	1.37	
Bounding	2.73	

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	DOE TEST & EXPERIMENTAL (ALUM)	¹ Fuel decay start date	1979
SNF ID #	42	Estimates as of	2030
Fuel Units & Descr	10 - CANISTER OF SCRAP	Template	(Worst Case)
Heavy Metal Mass	BOL= , EOL=31 05kg	² Template Burnup(MWd)	62.5
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 00186865
		Template Decay Time	50 years

Estimated
Canister usage
18"x10"
0 08

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	2 5200E-06	29,508 45	29,508 45	0 00E+00	7.44E-02	7.44E-02	Avg MeV	
Am-241	8 6432E+00	29,508 45	29,508 45	0 00E+00	2 55E+05	2 55E+05	0 0150	2 501E+16
Am-242m	1 5728E-02	29,508 45	29,508 45	0 00E+00	4 64E+02	4 64E+02	0 0250	4 939E+15
Am-243	1 6288E-02	29,508 45	29,508 45	0 00E+00	4 81E+02	4 81E+02	0 0375	4 176E+15
C-14	1 2068E-01	29,508 45	29,508 45	0 00E+00	3 56E+03	3 56E+03	0 0575	7 889E+15
Cl-36	2 2849E-03	29,508 45	29,508 45	0 00E+00	6 74E+01	6 74E+01	0 0850	2 644E+15
Cm-243	6 0144E-04	29,508 45	29,508 45	0 00E+00	1 77E+01	1 77E+01	0 1250	1 871E+15
Cm-244	9 4880E-02	29,508 45	29,508 45	0 00E+00	2 80E+03	2 80E+03	0 2250	2 288E+15
Co-60	3 9052E+00	29,508 45	29,508 45	0 00E+00	1 15E+05	1 15E+05	0 3750	9 906E+14
Cs-134	2 2139E-06	29,508 45	29,508 45	0 00E+00	6 53E-02	6 53E-02	0 5750	1 639E+16
Cs-135	4 3976E-04	29,508 45	29,508 45	0 00E+00	1 30E+01	1 30E+01	0 8500	3 590E+14
Cs-137	1 4887E+01	29,508 45	29,508 45	0 00E+00	4 39E+05	4 39E+05	1 2500	8 800E+15
Eu-154	3 7342E-01	29,508 45	29,508 45	0 00E+00	1 10E+04	1 10E+04	1 7500	1 058E+13
Eu-155	8 4893E-03	29,508 45	29,508 45	0 00E+00	2 51E+02	2 51E+02	2 2500	4 573E+10
Fe-55	5 3750E-03	29,508 45	29,508 45	0 00E+00	1 59E+02	1 59E+02	2 7500	7 872E+10
H-3	1 0472E-01	29,508 45	29,508 45	0 00E+00	3 09E+03	3 09E+03	3 5000	4 286E+07
I-129	1 0618E-05	29,508 45	29,508 45	0 00E+00	3 13E-01	3 13E-01	5 0000	1 811E+07
Kr-85	2 2717E-01	29,508 45	29,508 45	0 00E+00	6 70E+03	6 70E+03	7 0000	2 063E+06
Np-237	1 6400E-04	29,508 45	29,508 45	0 00E+00	4 84E+00	4 84E+00	11 0000	2 353E+05
Pa-231	2 8688E-06	29,508 45	29,508 45	0 00E+00	8 47E-02	8 47E-02		
Pb-210	4 7312E-08	29,508 45	29,508 45	0 00E+00	1 40E-03	1 40E-03		
Pm-147	3 2198E-04	29,508 45	29,508 45	0 00E+00	9 50E+00	9 50E+00		
Pu-238	-1 1924E+00	29,508 45	0 00	7 98E+03	0 00E+00	7 98E+03		
Pu-239	-4 8600E-02	29,508 45	0 00	9 66E+02	0 00E+00	9 66E+02		
Pu-240	-3 0127E-01	29,508 45	0 00	1 23E+03	0 00E+00	1 23E+03		
Pu-241	-1 2917E+02	29,508 45	0 00	3 17E+05	0 00E+00	3 17E+05		
Pu-242	-1 1381E-04	29,508 45	0 00	5 34E+00	1 98E+00	5 34E+00		
Ra-226	1 0760E-07	29,508 45	29,508 45	0 00E+00	3 18E-03	3 18E-03		
Ra-228	6 0160E-07	29,508 45	29,508 45	0 00E+00	1 78E-02	1 78E-02		
Ru-106	1 3388E-13	29,508 45	29,508 45	0 00E+00	3 95E-09	3 95E-09		
Se-79	1 9179E-04	29,508 45	29,508 45	0 00E+00	5 66E+00	5 66E+00		
Sn-126	1 6669E-04	29,508 45	29,508 45	0 00E+00	4 92E+00	4 92E+00		
Sr-90	1 3859E+01	29,508 45	29,508 45	0 00E+00	4 09E+05	4 09E+05		
Tc-99	6 7678E-03	29,508 45	29,508 45	0 00E+00	2 00E+02	2 00E+02		
Th-229	2 2592E-06	29,508 45	29,508 45	0 00E+00	6 67E-02	6 67E-02		
Th-230	7 5955E-06	29,508 45	29,508 45	0 00E+00	2 24E-01	2 24E-01		
Th-232	-4 2431E-09	29,508 45	0 00	1 26E-03	1 13E-03	1 26E-03		
Tl-208	7 5795E-05	29,508 45	29,508 45	0 00E+00	2 24E+00	2 24E+00		
U-232	2 0521E-04	29,508 45	29,508 45	0 00E+00	6 06E+00	6 06E+00		
U-233	3 6128E-04	29,508 45	29,508 45	0 00E+00	1 07E+01	1 07E+01		
U-234	1 2788E-02	29,508 45	29,508 45	0 00E+00	3 77E+02	3 77E+02		
U-235	5 7486E-04	29,508 45	29,508 45	2 67E-02	1 70E+01	1 70E+01		
U-236	2 3485E-04	29,508 45	29,508 45	0 00E+00	6 93E+00	6 93E+00		
U-238	1 1581E-04	29,508 45	29,508 45	3 32E-03	3 42E+00	3 42E+00		
Y-90	1 3861E+01	29,508 45	29,508 45	0 00E+00	4 09E+05	4 09E+05		
Other Radionuclides					1 52E+06	1 52E+06		

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.58E+04	1.62E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		29 508 45	Nominal burnup set equal to bounding burnup
Bounding		29 508 45	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		586.76
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: DOE TEST & EXPERIMENTAL (SST)
 SNF ID #: 857
 Fuel Units & Descr: 10 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL = , EOL=31 05kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1979
 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 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	2 5200E-06	29,508 45	29,508 45	0 00E+00	7 44E-02	7 44E-02	Avg. MeV	
Am-241	8 6432E+00	29,508 45	29,508 45	0 00E+00	2 55E+05	2 55E+05	0 0150	2 501E+16
Am-242m	1 5728E-02	29,508 45	29,508 45	0 00E+00	4 64E+02	4 64E+02	0 0250	4 939E+15
Am-243	1 6288E-02	29,508 45	29,508 45	0 00E+00	4 81E+02	4 81E+02	0 0375	4 176E+15
C-14	1 2068E-01	29,508 45	29,508 45	0 00E+00	3 56E+03	3 56E+03	0 0575	7 889E+15
Cl-36	2 2849E-03	29,508 45	29,508 45	0 00E+00	6 74E+01	6 74E+01	0 0850	2 644E+15
Cm-243	6 0144E-04	29,508 45	29,508 45	0 00E+00	1 77E+01	1 77E+01	0 1250	1 871E+15
Cm-244	9 4880E-02	29,508 45	29,508 45	0 00E+00	2 80E+03	2 80E+03	0 2250	2 288E+15
Co-60	3 9052E+00	29,508 45	29,508 45	0 00E+00	1 15E+05	1 15E+05	0 3750	9 906E+14
Cs-134	2 2139E-06	29,508 45	29,508 45	0 00E+00	6 53E-02	6 53E-02	0 5750	1 639E+16
Cs-135	4 3976E-04	29,508 45	29,508 45	0 00E+00	1 30E+01	1 30E+01	0 8500	3 590E+14
Cs-137	1 4887E+01	29,508 45	29,508 45	0 00E+00	4 39E+05	4 39E+05	1 2500	8 800E+15
Eu-154	3 7342E-01	29,508 45	29,508 45	0 00E+00	1 10E+04	1 10E+04	1 7500	1 058E+13
Eu-155	8 4893E-03	29,508 45	29,508 45	0 00E+00	2 51E+02	2 51E+02	2 2500	4 573E+10
Fe-55	5 3750E-03	29,508 45	29,508 45	0 00E+00	1 59E+02	1 59E+02	2 7500	7 872E+10
H-3	1 0472E-01	29,508 45	29,508 45	0 00E+00	3 09E+03	3 09E+03	3 5000	4 286E+07
I-129	1 0618E-05	29,508 45	29,508 45	0 00E+00	3 13E-01	3 13E-01	5 0000	1 811E+07
Kr-85	2 2717E-01	29,508 45	29,508 45	0 00E+00	6 70E+03	6 70E+03	7 0000	2 063E+06
Np-237	1 6400E-04	29,508 45	29,508 45	0 00E+00	4 84E+00	4 84E+00	11 0000	2 353E+05
Pa-231	2 8688E-06	29,508 45	29,508 45	0 00E+00	8 47E-02	8 47E-02		
Pb-210	4 7312E-08	29,508 45	29,508 45	0 00E+00	1 40E-03	1 40E-03		
Pm-147	3 2198E-04	29,508 45	29,508 45	0 00E+00	9 50E+00	9 50E+00		
Pu-238	-1 1924E+00	29,508 45	0 00	7 98E+03	0 00E+00	7 98E+03		
Pu-239	-4 8600E-02	29,508 45	0 00	9 66E+02	0 00E+00	9 66E+02		
Pu-240	-3 0127E-01	29,508 45	0 00	1 23E+03	0 00E+00	1 23E+03		
Pu-241	-1 2917E+02	29,508 45	0 00	3 17E+05	0 00E+00	3 17E+05		
Pu-242	-1 1381E-04	29,508 45	0 00	5 34E+00	1 98E+00	5 34E+00		
Ra-226	1 0760E-07	29,508 45	29,508 45	0 00E+00	3 18E-03	3 18E-03		
Ra-228	6 0160E-07	29,508 45	29,508 45	0 00E+00	1 78E-02	1 78E-02		
Ru-106	1 3388E-13	29,508 45	29,508 45	0 00E+00	3 95E-09	3 95E-09		
Se-79	1 9179E-04	29,508 45	29,508 45	0 00E+00	5 66E+00	5 66E+00		
Sn-126	1 6669E-04	29,508 45	29,508 45	0 00E+00	4 92E+00	4 92E+00		
Sr-90	1 3859E+01	29,508 45	29,508 45	0 00E+00	4 09E+05	4 09E+05		
Tc-99	6 7678E-03	29,508 45	29,508 45	0 00E+00	2 00E+02	2 00E+02		
Th-229	2 2592E-06	29,508 45	29,508 45	0 00E+00	6 67E-02	6 67E-02		
Th-230	7 5955E-06	29,508 45	29,508 45	0 00E+00	2 24E-01	2 24E-01		
Th-232	-4 2431E-09	29,508 45	0 00	1 26E-03	1 13E-03	1 26E-03		
Th-208	7 5795E-05	29,508 45	29,508 45	0 00E+00	2 24E+00	2 24E+00		
U-232	2 0521E-04	29,508 45	29,508 45	0 00E+00	6 06E+00	6 06E+00		
U-233	3 6128E-04	29,508 45	29,508 45	0 00E+00	1 07E+01	1 07E+01	Thermal Power	
U-234	1 2788E-02	29,508 45	29,508 45	0 00E+00	3 77E+02	3 77E+02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	5 7486E-04	29,508 45	29,508 45	2 67E-02	1 70E+01	1 70E+01	1 58E+04	1 62E+04
U-236	2 3485E-04	29,508 45	29,508 45	0 00E+00	6 93E+00	6 93E+00		
U-238	1 1581E-04	29,508 45	29,508 45	3 32E-03	3 42E+00	3 42E+00	Total	Total
Y-90	1 3861E+01	29,508 45	29,508 45	0 00E+00	4 09E+05	4 09E+05		
Other Radionuclides					1 52E+06	1 52E+06		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		29 508 45	Nominal burnup set equal to bounding burnup.
Bounding		29,508 45	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		586 76
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 DOE TEST & EXPERIMENTAL (ZIRC)
 SNF ID # 858
 Fuel Units & Descr 10 - CANISTER OF SCRAP
 Heavy Metal Mass BOL= ; EOL=31 05kg
 ROD Storage Site INEEL

¹Fuel decay start date 1979
 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 08

Radionuclide	Ci/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	2.5200E-06	29,508.45	29,508.45	0.00E+00	7.44E-02	7.44E-02	Avg MeV	
Am-241	8.6432E+00	29,508.45	29,508.45	0.00E+00	2.55E+05	2.55E+05	0.0150	2.501E+16
Am-242m	1.5728E-02	29,508.45	29,508.45	0.00E+00	4.64E+02	4.64E+02	0.0250	4.939E+15
Am-243	1.6288E-02	29,508.45	29,508.45	0.00E+00	4.81E+02	4.81E+02	0.0375	4.176E+15
C-14	1.2068E-01	29,508.45	29,508.45	0.00E+00	3.56E+03	3.56E+03	0.0575	7.889E+15
Cl-36	2.2849E-03	29,508.45	29,508.45	0.00E+00	6.74E+01	6.74E+01	0.0850	2.644E+15
Cm-243	6.0144E-04	29,508.45	29,508.45	0.00E+00	1.77E+01	1.77E+01	0.1250	1.871E+15
Cm-244	9.4880E-02	29,508.45	29,508.45	0.00E+00	2.80E+03	2.80E+03	0.2250	2.288E+15
Co-60	3.9052E+00	29,508.45	29,508.45	0.00E+00	1.15E+05	1.15E+05	0.3750	9.906E+14
Cs-134	2.2139E-06	29,508.45	29,508.45	0.00E+00	6.53E-02	6.53E-02	0.5750	1.639E+16
Cs-135	4.3976E-04	29,508.45	29,508.45	0.00E+00	1.30E+01	1.30E+01	0.8500	3.590E+14
Cs-137	1.4887E+01	29,508.45	29,508.45	0.00E+00	4.39E+05	4.39E+05	1.2500	8.800E+15
Eu-154	3.7342E-01	29,508.45	29,508.45	0.00E+00	1.10E+04	1.10E+04	1.7500	1.058E+13
Eu-155	8.4893E-03	29,508.45	29,508.45	0.00E+00	2.51E+02	2.51E+02	2.2500	4.573E+10
Fe-55	5.3750E-03	29,508.45	29,508.45	0.00E+00	1.59E+02	1.59E+02	2.7500	7.872E+10
H-3	1.0472E-01	29,508.45	29,508.45	0.00E+00	3.09E+03	3.09E+03	3.5000	4.286E+07
I-129	1.0618E-05	29,508.45	29,508.45	0.00E+00	3.13E-01	3.13E-01	5.0000	1.811E+07
Kr-85	2.2717E-01	29,508.45	29,508.45	0.00E+00	6.70E+03	6.70E+03	7.0000	2.063E+06
Np-237	1.6400E-04	29,508.45	29,508.45	0.00E+00	4.84E+00	4.84E+00	11.0000	2.353E+05
Pu-238	-1.1924E+00	29,508.45	0.00	7.98E+03	0.00E+00	7.98E+03		
Pu-239	-4.8600E-02	29,508.45	0.00	9.66E+02	0.00E+00	9.66E+02		
Pu-240	-3.0127E-01	29,508.45	0.00	1.23E+03	0.00E+00	1.23E+03		
Pu-241	-1.2917E+02	29,508.45	0.00	3.17E+05	0.00E+00	3.17E+05		
Pu-242	-1.1381E-04	29,508.45	0.00	5.34E+00	1.98E+00	5.34E+00		
Ra-226	1.0760E-07	29,508.45	29,508.45	0.00E+00	3.18E-03	3.18E-03		
Ra-228	6.0160E-07	29,508.45	29,508.45	0.00E+00	1.78E-02	1.78E-02		
Ru-106	1.3388E-13	29,508.45	29,508.45	0.00E+00	3.95E-09	3.95E-09		
Se-79	1.9179E-04	29,508.45	29,508.45	0.00E+00	5.66E+00	5.66E+00		
Sn-126	1.6669E-04	29,508.45	29,508.45	0.00E+00	4.92E+00	4.92E+00		
Sr-90	1.3859E+01	29,508.45	29,508.45	0.00E+00	4.09E+05	4.09E+05		
Tc-99	6.7678E-03	29,508.45	29,508.45	0.00E+00	2.00E+02	2.00E+02		
Th-229	2.2592E-06	29,508.45	29,508.45	0.00E+00	6.67E-02	6.67E-02		
Th-230	7.5955E-06	29,508.45	29,508.45	0.00E+00	2.24E-01	2.24E-01		
Th-232	-4.2431E-09	29,508.45	0.00	1.26E-03	1.13E-03	1.26E-03		
Ti-208	7.5795E-05	29,508.45	29,508.45	0.00E+00	2.24E+00	2.24E+00		
U-232	2.0521E-04	29,508.45	29,508.45	0.00E+00	6.06E+00	6.06E+00		
U-233	3.6128E-04	29,508.45	29,508.45	0.00E+00	1.07E+01	1.07E+01		
U-234	1.2788E-02	29,508.45	29,508.45	0.00E+00	3.77E+02	3.77E+02		
U-235	5.7486E-04	29,508.45	29,508.45	2.67E-02	1.70E+01	1.70E+01		
U-236	2.3485E-04	29,508.45	29,508.45	0.00E+00	6.93E+00	6.93E+00		
U-238	1.1581E-04	29,508.45	29,508.45	3.32E-03	3.42E+00	3.42E+00		
Y-90	1.3861E+01	29,508.45	29,508.45	0.00E+00	4.09E+05	4.09E+05		
Other Radionuclides					1.52E+06	1.52E+06		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		29,508.45	Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding		29,508.45	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	14.21		586.76
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: DRCT	Fuel decay start date: 1981	Estimated Canister usage 18"x15" 3.50
SNF ID #: 701	Estimates as of: 2030	
Fuel Units & Descr: 2856 - ROD	Template: PWR (Light Water, Zirc, 0 to 5%, U)	
Heavy Metal Mass: BOL=6338 892kg, EOL=6144 97kg	Template Burnup(MWd): 61.92	
ROD Storage Site: INEEL	Template BOL Heavy Metal Mass (MT): 0.00176911	
	Template Decay Time: 35 years	

Radionuclide	c	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
								Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	185,919.70	224,650.33	0.00E+00	1.63E-04	1.97E-04	Avg MeV		
Am-241	1.4352E-01	185,919.70	224,650.33	0.00E+00	2.67E+04	3.22E+04	0.0150	1.209E+16	
Am-242m	2.8698E-04	185,919.70	224,650.33	0.00E+00	5.34E+01	6.45E+01	0.0250	2.437E+15	
Am-243	6.2565E-04	185,919.70	224,650.33	0.00E+00	1.16E+02	1.41E+02	0.0375	2.325E+15	
C-14	4.7901E-05	185,919.70	224,650.33	0.00E+00	8.91E+00	1.08E+01	0.0575	2.686E+15	
Cl-36	8.0297E-07	185,919.70	224,650.33	0.00E+00	1.49E-01	1.80E-01	0.0850	1.353E+15	
Cm-243	2.5081E-04	185,919.70	224,650.33	0.00E+00	4.66E+01	5.63E+01	0.1250	9.385E+14	
Cm-244	4.9015E-02	185,919.70	224,650.33	0.00E+00	9.11E+03	1.10E+04	0.2250	1.160E+15	
Co-60	2.5581E-03	185,919.70	224,650.33	0.00E+00	4.76E+02	5.75E+02	0.3750	4.987E+14	
Cs-134	4.0536E-05	185,919.70	224,650.33	0.00E+00	7.54E+00	9.11E+00	0.5750	1.160E+16	
Cs-135	1.4433E-05	185,919.70	224,650.33	0.00E+00	2.68E+00	3.24E+00	0.8500	1.605E+14	
Cs-137	1.3979E+00	185,919.70	224,650.33	0.00E+00	2.60E+05	3.14E+05	1.2500	1.576E+14	
Eu-154	2.0203E-02	185,919.70	224,650.33	0.00E+00	3.76E+03	4.54E+03	1.7500	4.720E+12	
Eu-155	1.7684E-03	185,919.70	224,650.33	0.00E+00	3.29E+02	3.97E+02	2.2500	7.601E+08	
Fe-55	4.3136E-05	185,919.70	224,650.33	0.00E+00	8.02E+00	9.69E+00	2.7500	1.557E+09	
H-3	2.0769E-02	185,919.70	224,650.33	0.00E+00	3.86E+03	4.67E+03	3.5000	1.603E+08	
I-129	9.8288E-07	185,919.70	224,650.33	0.00E+00	1.83E-01	2.21E-01	5.0000	6.856E-07	
Kr-85	2.8214E-02	185,919.70	224,650.33	0.00E+00	5.25E+03	6.34E+03	7.0000	7.902E+06	
Np-237	1.1218E-05	185,919.70	224,650.33	0.00E+00	2.09E+00	2.52E+00	11.0000	9.075E+05	
Pa-231	1.3036E-09	185,919.70	224,650.33	0.00E+00	2.42E-04	2.93E-04			
Pb-210	8.5078E-11	185,919.70	224,650.33	0.00E+00	1.58E-05	1.91E-05			
Pm-147	3.6531E-04	185,919.70	224,650.33	0.00E+00	6.79E+01	8.21E+01			
Pu-238	7.4564E-02	185,919.70	224,650.33	0.00E+00	1.39E+04	1.68E+04			
Pu-239	1.1623E-02	185,919.70	224,650.33	0.00E+00	2.16E+03	2.61E+03			
Pu-240	1.5132E-02	185,919.70	224,650.33	0.00E+00	2.81E+03	3.40E+03			
Pu-241	9.0036E-01	185,919.70	224,650.33	0.00E+00	1.67E+05	2.02E+05			
Pu-242	6.4260E-05	185,919.70	224,650.33	0.00E+00	1.19E+01	1.44E+01			
Ra-226	2.2804E-10	185,919.70	224,650.33	0.00E+00	4.24E-05	5.12E-05			
Ra-228	5.2713E-12	185,919.70	224,650.33	0.00E+00	9.80E-07	1.18E-06			
Ru-106	6.1160E-10	185,919.70	224,650.33	0.00E+00	1.14E-04	1.37E-04			
Se-79	1.2377E-05	185,919.70	224,650.33	0.00E+00	2.30E+00	2.78E+00			
Sn-126	2.5210E-05	185,919.70	224,650.33	0.00E+00	4.69E+00	5.66E+00			
Sr-90	9.1667E-01	185,919.70	224,650.33	0.00E+00	1.70E+05	2.06E+05			
Tc-99	3.9357E-04	185,919.70	224,650.33	0.00E+00	7.32E+01	8.84E+01			
Th-229	1.2057E-10	185,919.70	224,650.33	0.00E+00	2.24E-05	2.71E-05			
Th-230	2.1043E-08	185,919.70	224,650.33	0.00E+00	3.91E-03	4.73E-03			
Th-232	5.2972E-12	185,919.70	224,650.33	0.00E+00	9.85E-07	1.19E-06			
Th-208	1.7474E-07	185,919.70	224,650.33	0.00E+00	3.25E-02	3.93E-02			
U-232	4.7368E-07	185,919.70	224,650.33	0.00E+00	8.81E-02	1.06E-01			
U-233	2.5097E-08	185,919.70	224,650.33	0.00E+00	4.67E-03	5.64E-03			
U-234	5.0000E-05	185,919.70	224,650.33	0.00E+00	9.30E+00	1.12E+01			
U-235	-1.4489E-06	185,919.70	0.00	3.60E-01	9.11E-02	3.60E-01			
U-236	7.5824E-06	185,919.70	224,650.33	0.00E+00	1.41E+00	1.70E+00			
U-238	-2.6129E-07	185,919.70	0.00	2.07E+00	2.03E+00	2.07E+00			
Y-90	9.1699E-01	185,919.70	224,650.33	0.00E+00	1.70E+05	2.06E+05			
Other Radionuclides					2.50E+05	3.02E+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	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	2.631414612	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	185,919.70	184,411.03	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup taken directly from SFD (converted to MWd).
Bounding	224,650.33	368,822.06	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.84	0.99	1.00
Bounding	1.01	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 DRCT
 SNF ID # 756
 Fuel Units & Descr 6936 - ROD
 Heavy Metal Mass BOL=15512 364kg EOL=15006 036kg
 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	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	8 7758E-10	481,493 98	962,987 96	0 00E+00	4.23E-04	8 45E-04	Avg MeV	
Am-241	1 4352E-01	481,493 98	962,987 96	0 00E+00	6 91E+04	1.38E+05	0 0150	5 181E+16
Am-242m	2 8698E-04	481,493 98	962,987 96	0 00E+00	1.38E+02	2.76E+02	0 0250	1 045E+16
Am-243	6 2565E-04	481,493 98	962,987 96	0 00E+00	3 01E+02	6 02E+02	0 0375	9 965E+15
C-14	4 7901E-05	481,493 98	962,987 96	0 00E+00	2 31E+01	4 61E+01	0 0575	1 151E+16
Cf-252	8 0297E-07	481,493 98	962,987 96	0 00E+00	3 87E-01	7 73E-01	0 0850	5 798E+15
Cm-243	2.5081E-04	481,493 98	962,987 96	0 00E+00	1.21E+02	2 42E+02	0 1250	4.023E+15
Cm-244	4 9015E-02	481,493 98	962,987 96	0 00E+00	2 36E+04	4 72E+04	0 2250	4.971E+15
Co-60	2 5581E-03	481,493 98	962,987 96	0 00E+00	1.23E+03	2 46E+03	0 3750	2 138E+15
Cs-134	4 0536E-05	481,493 98	962,987 96	0 00E+00	1.95E+01	3 90E+01	0.5750	4 972E+16
Cs-135	1 4433E-05	481,493 98	962,987 96	0 00E+00	6 95E+00	1.39E+01	0 8500	6 879E+14
Cs-137	1 9979E+00	481,493 98	962,987 96	0 00E+00	6 73E+05	1.35E+06	1.2500	6 757E+14
Eu-154	2 0203E-02	481,493 98	962,987 96	0 00E+00	9 73E+03	1 95E+04	1 7500	2 023E+13
Eu-155	1 7684E-03	481,493 98	962,987 96	0 00E+00	8 51E+02	1 70E+03	2.2500	3.258E+09
Fe-55	4 3136E-05	481,493 98	962,987 96	0 00E+00	2 08E+01	4 15E+01	2 7500	6 675E+09
H-3	2 0769E-02	481,493 98	962,987 96	0 00E+00	1 00E+04	2 00E+04	3 5000	6.873E+08
I-129	9 8288E-07	481,493 98	962,987 96	0.00E+00	4 73E-01	9 47E-01	5 0000	2.939E+08
Kr-85	2 8214E-02	481,493 98	962,987 96	0 00E+00	1 36E+04	2 72E+04	7 0000	3.387E+07
Np-237	1 1218E-05	481,493 98	962,987 96	0 00E+00	5 40E+00	1.08E+01	11 0000	3 890E+06
Pa-231	1.3036E-09	481,493 98	962,987 96	0 00E+00	6.28E-04	1.26E-03		
Pb-210	8 5078E-11	481,493 98	962,987 96	0 00E+00	4 10E-05	8 19E-05		
Pm-147	3 6531E-04	481,493 98	962,987 96	0 00E+00	1 76E+02	3 52E+02		
Pu-238	7 4564E-02	481,493 98	962,987 96	0 00E+00	3 59E+04	7 18E+04		
Pu-239	1.1623E-02	481,493 98	962,987 96	0 00E+00	5 60E+03	1 12E+04		
Pu-240	1.5132E-02	481,493 98	962,987 96	0 00E+00	7 29E+03	1 46E+04		
Pu-241	9 0036E-01	481,493 98	962,987 96	0.00E+00	4 34E+05	8 67E+05		
Pu-242	6 4260E-06	481,493 98	962,987 96	0 00E+00	3 09E+01	6.19E+01		
Ra-226	2.2804E-10	481,493 98	962,987 96	0 00E+00	1 10E-04	2.20E-04		
Ra-228	5 2713E-12	481,493 98	962,987 96	0 00E+00	2 54E-06	5 08E-06		
Ru-106	6 1160E-10	481,493 98	962,987 96	0 00E+00	2 94E-04	5 89E-04		
Se-79	1.2377E-05	481,493 98	962,987 96	0 00E+00	5 96E+00	1 19E+01		
Sn-126	2 5210E-05	481,493 98	962,987 96	0 00E+00	1.21E+01	2 43E+01		
Sr-90	9 1667E-01	481,493 98	962,987 96	0 00E+00	4 41E+05	8 83E+05		
Tc-99	3.9357E-04	481,493 98	962,987 96	0 00E+00	1 90E+02	3 79E+02		
Th-229	1.2057E-10	481,493 98	962,987 96	0 00E+00	5 81E-05	1.16E-04		
Th-230	2 1043E-08	481,493 98	962,987 96	0 00E+00	1.01E-02	2 03E-02		
Th-232	5.2972E-12	481,493 98	962,987 96	0 00E+00	2.55E-06	5 10E-06		
Ti-208	1 7474E-07	481,493 98	962,987 96	0 00E+00	8 41E-02	1 68E-01		
U-232	4 7368E-07	481,493 98	962,987 96	0 00E+00	2.28E-01	4 56E-01		
U-233	2 5097E-08	481,493 98	962,987 96	0 00E+00	1 21E-02	2 42E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	5 0000E-05	481,493 98	962,987 96	0 00E+00	2 41E+01	4 81E+01	1 11E+04	2.22E+04
U-235	-1.4489E-06	481,493 98	0 00	9 81E-01	2 83E-01	9 81E-01	Total	Total
U-236	7.5824E-06	481,493 98	962,987 96	0 00E+00	3 65E+00	7.30E+00		
U-238	-2 6129E-07	481,493 98	0 00	5 06E+00	4 94E+00	5.06E+00		
Y-90	9 1699E-01	481,493 98	962,987 96	0 00E+00	4 42E+05	8 83E+05		
Other Radionuclides					6 46E+05	1.29E+06		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences ¹
	From SFD	Used	
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	2 925317534	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	454 977.64	481 493.98	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding	549 758 18	962 987 96	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	1 00
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: DRESDEN I (E00161)
 SNF ID #: 928
 Fuel Units & Descr: 1 - 6 X 6 ROD ARRAY
 Heavy Metal Mass: BOL=111 5kg, EOL=109 853kg
 ROD Storage Site: INEEL

Fuel decay start date: 1973
 Estimates as of: 2030
 Template: PWR (Light Water, Zirc, 0 to 5%, U)
 Template Burnup (MWd): 61 92
 Template BOL Heavy Metal Mass (MT): 0 00176911
 Template Decay Time: 50 years

Estimated
 Canister usage:
 Bare Fuel Transfer

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	1,566.22	3,132.44	0 00E+00	1 68E-06	3 36E-06	Avg MeV	
Am-241	1.4751E-01	1,566.22	3,132.44	0 00E+00	2.31E+02	4 62E+02	0 0150	1 192E+14
Am-242m	2 6809E-04	1,566.22	3,132.44	0 00E+00	4.20E-01	8.40E-01	0 0250	2 389E+13
Am-243	6.2484E-04	1,566.22	3,132.44	0 00E+00	9 79E-01	1 96E+00	0 0375	2 251E+13
C-14	4 7820E-05	1,566.22	3,132.44	0 00E+00	7 49E-02	1.50E-01	0 0575	2 816E+13
Cl-36	8 0297E-07	1,566.22	3,132.44	0 00E+00	1 26E-03	2 52E-03	0 0850	1 316E+13
Cm-243	1 7426E-04	1,566.22	3,132.44	0 00E+00	2 73E-01	5 46E-01	0 1250	8 755E+12
Cm-244	2 7616E-02	1,566.22	3,132.44	0 00E+00	4 33E+01	8 65E+01	0 2250	1 124E+13
Co-60	3 5610E-04	1,566.22	3,132.44	0 00E+00	5 58E-01	1 12E+00	0 3750	4 852E+12
Cs-134	2 6260E-07	1,566.22	3,132.44	0 00E+00	4 11E-04	8 23E-04	0 5750	1 143E+14
Cs-135	1 4433E-05	1,566.22	3,132.44	0 00E+00	2.26E-02	4 52E-02	0 8500	1 116E+12
Cs-137	9 8870E-01	1,566.22	3,132.44	0 00E+00	1.55E+03	3 10E+03	1 2500	7 100E+11
Eu-154	6 0320E-03	1,566.22	3,132.44	0 00E+00	9 45E+00	1 89E+01	1 7500	3 122E+10
Eu-155	2 1770E-04	1,566.22	3,132.44	0 00E+00	3 41E-01	6 82E-01	2 2500	5 131E+06
Fe-55	7 9296E-07	1,566.22	3,132.44	0 00E+00	1 24E-03	2 48E-03	2 7500	1 808E+07
H-3	8 9486E-03	1,566.22	3,132.44	0 00E+00	1 40E+01	2 80E+01	3 5000	1 290E+06
I-129	9 8288E-07	1,566.22	3,132.44	0 00E+00	1 54E-03	3 08E-03	5 0000	5 514E+05
Kr-85	1 0707E-02	1,566.22	3,132.44	0 00E+00	1 68E+01	3 35E+01	7 0000	6 352E+04
Np-237	1 1927E-05	1,566.22	3,132.44	0 00E+00	1 87E-02	3 74E-02	11 0000	7 294E+03
Pa-231	1 4703E-09	1,566.22	3,132.44	0 00E+00	2 30E-06	4 61E-06		
Pb-210	1 6828E-10	1,566.22	3,132.44	0 00E+00	2 64E-07	5 27E-07		
Pm-147	6 9606E-06	1,566.22	3,132.44	0 00E+00	1 09E-02	2 18E-02		
Pu-238	6 6263E-02	1,566.22	3,132.44	0 00E+00	1 04E+02	2 08E+02		
Pu-239	1 1618E-02	1,566.22	3,132.44	0 00E+00	1 82E+01	3 64E+01		
Pu-240	1 5142E-02	1,566.22	3,132.44	0 00E+00	2 37E+01	4 74E+01		
Pu-241	4 3766E-01	1,566.22	3,132.44	0 00E+00	6 85E+02	1 37E+03		
Pu-242	6 4260E-05	1,566.22	3,132.44	0 00E+00	1 01E-01	2 01E-01		
Ra-226	3 8501E-10	1,566.22	3,132.44	0 00E+00	6 03E-07	1 21E-06		
Ra-228	5 2955E-12	1,566.22	3,132.44	0 00E+00	8 29E-09	1 66E-08		
Ru-106	2 0413E-14	1,566.22	3,132.44	0 00E+00	3 20E-11	6 39E-11		
Se-79	1 2376E-05	1,566.22	3,132.44	0 00E+00	1 94E-02	3 88E-02		
Sn-126	2 5210E-05	1,566.22	3,132.44	0 00E+00	3 95E-02	7 90E-02		
Sr-90	6 4163E-01	1,566.22	3,132.44	0 00E+00	1 00E+03	2 01E+03		
Tc-99	3 9357E-04	1,566.22	3,132.44	0 00E+00	6 16E-01	1 23E+00		
Th-229	1 5644E-10	1,566.22	3,132.44	0 00E+00	2 45E-07	4 90E-07		
Th-230	2 7972E-08	1,566.22	3,132.44	0 00E+00	4 38E-05	8 76E-05		
Th-232	5 3036E-12	1,566.22	3,132.44	0 00E+00	8 31E-09	1 66E-08		
Tl-208	1 5136E-07	1,566.22	3,132.44	0 00E+00	2 37E-04	4 74E-04		
U-232	4 1005E-07	1,566.22	3,132.44	0 00E+00	6 42E-04	1 28E-03		
U-233	2 5856E-08	1,566.22	3,132.44	0 00E+00	4 05E-05	8 10E-05		
U-234	5 2665E-05	1,566.22	3,132.44	0 00E+00	8 25E-02	1 65E-01		
U-235	-1 4487E-06	1,566.22	0 00	3 62E-03	1 35E-03	3 62E-03		
U-236	7 5888E-06	1,566.22	3,132.44	0 00E+00	1 19E-02	2 38E-02		
U-238	-2 6129E-07	1,566.22	0 00	3 69E-02	3 65E-02	3 69E-02		
Y-90	6 4180E-01	1,566.22	3,132.44	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	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	1 50044843	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	1 533.13	1,566.22	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding		3,132.44	

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)	Fuel decay start date	1973
SNF ID #	47	Estimates as of	2030
Fuel Units & Descr	1 - 6 X 6 ROD ARRAY	Template	PWR (Light Water Zirc, 0 to 5% U)
Heavy Metal Mass	BOL=58 847kg EOL=57 281kg	*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
Bare Fuel Transfer

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	1 0733E-09	1,489 19	2,978 38	0 00E+00	1 60E-06	3 20E-06	0 0150	1 133E+14
Am-241	1 4751E-01	1,489 19	2,978 38	0 00E+00	2 20E+02	4 39E+02	0 0250	2 271E+13
Am-242m	2 6809E-04	1,489 19	2,978 38	0 00E+00	3 99E-01	7 98E-01	0 0375	2 140E+13
Am-243	6 2484E-04	1,489 19	2,978 38	0 00E+00	9 31E-01	1 86E+00	0 0575	2 678E+13
C-14	4 7820E-05	1,489 19	2,978 38	0 00E+00	7 12E-02	1 42E-01	0 0850	1 251E+12
Cl-36	8 0297E-07	1,489 19	2,978 38	0 00E+00	1 20E-03	2 39E-03	0 1250	8 325E+12
Cm-243	1 7426E-04	1,489 19	2,978 38	0 00E+00	2 60E-01	5 19E-01	0 2250	1 068E+13
Cm-244	2 7616E-02	1,489 19	2,978 38	0 00E+00	4 11E+01	8 23E+01	0 3750	4 614E+12
Co-60	3 5610E-04	1,489 19	2,978 38	0 00E+00	5 30E-01	1 06E+00	0 5750	1 086E+14
Cs-134	2 6260E-07	1,489 19	2,978 38	0 00E+00	3 91E-04	7 82E-04	0 8500	1 061E+12
Cs-135	1 4433E-05	1,489 19	2,978 38	0 00E+00	2 15E-02	4 30E-02	1 2500	6 751E+11
Cs-137	9 8870E-01	1,489 19	2,978 38	0 00E+00	1 47E+03	2 94E+03	1 7500	2 969E+10
Eu-154	6 0320E-03	1,489 19	2,978 38	0 00E+00	8 98E+00	1 80E+01	2 2500	4 878E+06
Eu-155	2 1770E-04	1,489 19	2,978 38	0 00E+00	3 24E-01	6 48E-01	2 7500	1 719E+07
Fe-55	7 9296E-07	1,489 19	2,978 38	0 00E+00	1 18E-03	2 36E-03	3 5000	1 227E+06
H-3	8 9486E-03	1,489 19	2,978 38	0 00E+00	1 33E+01	2 67E+01	5 0000	5 243E+05
I-129	9 8288E-07	1,489 19	2,978 38	0 00E+00	1 46E-03	2 93E-03	7 0000	6 040E+04
Kr-85	1 0707E-02	1,489 19	2,978 38	0 00E+00	1 59E+01	3 19E+01	11 0000	6 935E+03
Np-237	1 1927E-05	1,489 19	2,978 38	0 00E+00	1 78E-02	3 55E-02		
Pa-231	1 4703E-09	1,489 19	2,978 38	0 00E+00	2 19E-06	4 38E-06		
Pb-210	1 6828E-10	1,489 19	2,978 38	0 00E+00	2 51E-07	5 01E-07		
Pm-147	6 9606E-06	1,489 19	2,978 38	0 00E+00	1 04E-02	2 07E-02		
Pu-238	6 6263E-02	1,489 19	2,978 38	0 00E+00	9 87E+01	1 97E+02		
Pu-239	1 1618E-02	1,489 19	2,978 38	0 00E+00	1 73E+01	3 46E+01		
Pu-240	1 5142E-02	1,489 19	2,978 38	0 00E+00	2 25E+01	4 51E+01		
Pu-241	4 3766E-01	1,489 19	2,978 38	0 00E+00	6 52E+02	1 30E+03		
Pu-242	6 4260E-05	1,489 19	2,978 38	0 00E+00	9 57E-02	1 91E-01		
Ra-226	3 8501E-10	1,489 19	2,978 38	0 00E+00	5 73E-07	1 15E-06		
Ra-228	5 2955E-12	1,489 19	2,978 38	0 00E+00	7 89E-09	1 58E-08		
Ru-106	2 0413E-14	1,489 19	2,978 38	0 00E+00	3 04E-11	6 08E-11		
Se-79	1 2376E-05	1,489 19	2,978 38	0 00E+00	1 84E-02	3 69E-02		
Sn-126	2 5210E-05	1,489 19	2,978 38	0 00E+00	3 75E-02	7 51E-02		
Sr-90	6 4163E-01	1,489 19	2,978 38	0 00E+00	9 56E+02	1 91E+03		
Tc-99	3 9357E-04	1,489 19	2,978 38	0 00E+00	5 86E-01	1 17E+00		
Th-229	1 5644E-10	1,489 19	2,978 38	0 00E+00	2 33E-07	4 66E-07		
Th-230	2 7972E-08	1,489 19	2,978 38	0 00E+00	4 17E-05	8 33E-05		
Th-232	5 3036E-12	1,489 19	2,978 38	0 00E+00	7 90E-09	1 58E-08		
Ti-208	1 5136E-07	1,489 19	2,978 38	0 00E+00	2 25E-04	4 51E-04		
U-232	4 1005E-07	1,489 19	2,978 38	0 00E+00	6 11E-04	1 22E-03		
U-233	2 5856E-08	1,489 19	2,978 38	0 00E+00	3 85E-05	7 70E-05		
U-234	5 2665E-05	1,489 19	2,978 38	0 00E+00	7 84E-02	1 57E-01		
U-235	-1 4487E-06	1,489 19	0 00	1 91E-03	0 00E+00	1 91E-03		
U-236	7 5888E-06	1,489 19	2,978 38	0 00E+00	1 13E-02	2 26E-02		
U-238	-2 6129E-07	1,489 19	0 00	1 95E-02	1 91E-02	1 95E-02		
Y-90	6 4180E-01	1,489 19	2,978 38	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	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	1.5005013	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	823.86	1,489 19	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding		2,978 38	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.72	1.81	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: DRESII HBR, BR-3, BRP, TMI
 SNF ID #: 50
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL= , EOL=19 608kg
 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:
 18"x10"
 0 01

Radionuclide	m		x _n		x _b		b		y _a		y _b		Gamma Sources	
	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)						
Ac-227	1 0733E-09	18,646.28	18,646.28	0 00E+00	2 00E-05	2 00E-05	Avg MeV							
Am-241	1 4751E-01	18,646.28	18,646.28	0 00E+00	2 75E+03	2 75E+03	0 0150	7 095E+14						
Am-242m	2 6809E-04	18,646.28	18,646.28	0 00E+00	5 00E+00	5 00E+00	0 0250	1 422E+14						
Am-243	6 2484E-04	18,646.28	18,646.28	0 00E+00	1 17E+01	1 17E+01	0 0375	1 340E+14						
C-14	4 7820E-05	18,646.28	18,646.28	0 00E+00	8 92E-01	8 92E-01	0 0575	1 677E+14						
Cf-36	8 0297E-07	18,646.28	18,646.28	0 00E+00	1 50E-02	1 50E-02	0 0850	7 834E+13						
Cm-243	1 7426E-04	18,646.28	18,646.28	0 00E+00	3 25E+00	3 25E+00	0 1250	5 212E+13						
Cm-244	2 7616E-02	18,646.28	18,646.28	0 00E+00	5 15E+02	5 15E+02	0 2250	6 688E+13						
Co-60	3 5610E-04	18,646.28	18,646.28	0 00E+00	6 64E+00	6 64E+00	0 3750	2 888E+13						
Cs-134	2 6260E-07	18,646.28	18,646.28	0 00E+00	4 90E-03	4 90E-03	0 5750	6 802E+14						
Cs-135	1 4433E-05	18,646.28	18,646.28	0 00E+00	2 69E-01	2 69E-01	0 8500	6 642E+12						
Cs-137	9 8870E-01	18,646.28	18,646.28	0 00E+00	1 84E+04	1 84E+04	1 2500	4 226E+12						
Eu-154	6 0320E-03	18,646.28	18,646.28	0 00E+00	1 12E+02	1 12E+02	1 7500	1 858E+11						
Eu-155	2 1770E-04	18,646.28	18,646.28	0 00E+00	4 06E+00	4 06E+00	2 2500	3 054E+07						
Fe-55	7 9296E-07	18,646.28	18,646.28	0 00E+00	1 48E-02	1 48E-02	2 7500	1 076E+08						
H-3	8 9486E-03	18,646.28	18,646.28	0 00E+00	1 67E+02	1 67E+02	3 5000	7 679E+06						
I-129	9 8288E-07	18,646.28	18,646.28	0 00E+00	1 83E-02	1 83E-02	5 0000	3 282E+06						
Kr-85	1 0707E-02	18,646.28	18,646.28	0 00E+00	2 00E+02	2 00E+02	7 0000	3 781E+05						
Np-237	1 1927E-05	18,646.28	18,646.28	0 00E+00	2 22E-01	2 22E-01	11 0000	4 341E+04						
Pa-231	1 4703E-09	18,646.28	18,646.28	0 00E+00	2 74E-05	2 74E-05								
Pb-210	1 6828E-10	18,646.28	18,646.28	0 00E+00	3 14E-06	3 14E-06								
Pm-147	6 9606E-06	18,646.28	18,646.28	0 00E+00	1 30E-01	1 30E-01								
Pu-238	6 6263E-02	18,646.28	18,646.28	0 00E+00	1 24E+03	1 24E+03								
Pu-239	1 1618E-02	18,646.28	18,646.28	0 00E+00	2 17E+02	2 17E+02								
Pu-240	1 5142E-02	18,646.28	18,646.28	0 00E+00	2 82E+02	2 82E+02								
Pu-241	4 3766E-01	18,646.28	18,646.28	0 00E+00	8 16E+03	8 16E+03								
Pu-242	6 4260E-05	18,646.28	18,646.28	0 00E+00	1 20E+00	1 20E+00								
Ra-226	3 8501E-10	18,646.28	18,646.28	0 00E+00	7 18E-06	7 18E-06								
Ra-228	5 2955E-12	18,646.28	18,646.28	0 00E+00	9 87E-08	9 87E-08								
Ru-106	2 0413E-14	18,646.28	18,646.28	0 00E+00	3 81E-10	3 81E-10								
Se-79	1 2376E-05	18,646.28	18,646.28	0 00E+00	2 31E-01	2 31E-01								
Sn-126	2 5210E-05	18,646.28	18,646.28	0 00E+00	4 70E-01	4 70E-01								
Sr-90	6 4163E-01	18,646.28	18,646.28	0 00E+00	1 20E+04	1 20E+04								
Tc-99	3 9357E-04	18,646.28	18,646.28	0 00E+00	7 34E+00	7 34E+00								
Th-229	1 5644E-10	18,646.28	18,646.28	0 00E+00	2 92E-06	2 92E-06								
Th-230	2 7972E-08	18,646.28	18,646.28	0 00E+00	5 22E-04	5 22E-04								
Th-232	5 3036E-12	18,646.28	18,646.28	0 00E+00	9 89E-08	9 89E-08								
Tl-208	1 5136E-07	18,646.28	18,646.28	0 00E+00	2 82E-03	2 82E-03								
U-232	4 1005E-07	18,646.28	18,646.28	0 00E+00	7 65E-03	7 65E-03								
U-233	2 5856E-08	18,646.28	18,646.28	0 00E+00	4 82E-04	4 82E-04								
U-234	5 2665E-05	18,646.28	18,646.28	0 00E+00	9 82E-01	9 82E-01								
U-235	-1 4487E-06	18,646.28	0 00	2 71E-03	0 00E+00	2 71E-03								
U-236	7 5888E-06	18,646.28	18,646.28	0 00E+00	1 42E-01	1 42E-01								
U-238	-2 6129E-07	18,646.28	0 00	1 28E-02	7 88E-03	1 28E-02								
Y-90	6 4180E-01	18,646.28	18,646.28	0 00E+00	1 20E+04	1 20E+04								
Other Radionuclides					1 78E+04	1 78E+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 (unknown)
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal		18 646.28	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding		18 646.28	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	13 58		1 58
Bounding	13 58		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBR-II NITRIDE FUEL EXPR
 SNF ID #: 363
 Fuel Units & Descr: 64 - ROD
 Heavy Metal Mass BOL= , EOL=9 587kg
 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"
 0.32

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	833.80	1,563.38	0.00E+00	5.15E-09	9.67E-09	Avg MeV	
Am-241	1.0666E-01	833.80	1,563.38	2.01E+01	1.12E+02	1.93E+02	0.0150	5.131E+13
Am-242m	1.9247E-03	833.80	1,563.38	0.00E+00	1.60E+00	3.01E+00	0.0250	1.017E+13
Am-243	1.0740E-04	833.80	1,563.38	0.00E+00	8.96E-02	1.68E-01	0.0375	1.181E+13
C-14	2.6042E-05	833.80	1,563.38	0.00E+00	2.17E-02	4.07E-02	0.0575	1.181E+13
Cl-36	3.4243E-10	833.80	1,563.38	0.00E+00	2.86E-07	5.35E-07	0.0850	5.658E+12
Cm-243	4.0629E-04	833.80	1,563.38	0.00E+00	3.39E-01	6.35E-01	0.1250	3.982E+12
Cm-244	1.6024E-03	833.80	1,563.38	0.00E+00	1.34E+00	2.51E+00	0.2250	4.566E+12
Co-60	3.4275E-03	833.80	1,563.38	0.00E+00	2.86E+00	5.36E+00	0.3750	1.979E+12
Cs-134	1.5566E-03	833.80	1,563.38	0.00E+00	1.30E+00	2.43E+00	0.5750	8.019E+13
Cs-135	4.7693E-05	833.80	1,563.38	0.00E+00	3.98E-02	7.46E-02	0.8500	8.379E+11
Cs-137	1.4007E+00	833.80	1,563.38	0.00E+00	1.17E+03	2.19E+03	1.2500	1.003E+12
Eu-154	1.6184E-02	833.80	1,563.38	0.00E+00	1.35E+01	2.53E+01	1.7500	2.269E+10
Eu-155	1.3774E-02	833.80	1,563.38	0.00E+00	1.15E+01	2.15E+01	2.2500	4.553E+06
Fe-55	3.8028E-04	833.80	1,563.38	0.00E+00	3.17E-01	5.95E-01	2.7500	2.591E+07
H-3	3.8454E-03	833.80	1,563.38	0.00E+00	3.21E+00	6.01E+00	3.5000	1.288E+05
I-129	1.2891E-06	833.80	1,563.38	0.00E+00	1.07E-03	2.02E-03	5.0000	4.430E+04
Kr-85	2.7848E-02	833.80	1,563.38	0.00E+00	2.32E+01	4.35E+01	7.0000	5.054E+03
Np-237	3.7516E-06	833.80	1,563.38	0.00E+00	3.13E-03	5.87E-03	11.0000	5.781E+02
Pa-231	1.2488E-11	833.80	1,563.38	0.00E+00	1.04E-08	1.95E-08		
Pb-210	2.4206E-12	833.80	1,563.38	0.00E+00	2.02E-09	3.78E-09		
Pm-147	1.5671E-02	833.80	1,563.38	0.00E+00	1.31E+01	2.45E+01		
Pu-238	1.4877E-02	833.80	1,563.38	0.00E+00	1.24E+01	2.33E+01		
Pu-239	-3.5520E-02	833.80	0.00	1.65E+02	1.35E+02	1.65E+02		
Pu-240	2.0690E-02	833.80	1,563.38	8.38E+01	1.01E+02	1.16E+02		
Pu-241	-1.4799E+00	833.80	0.00	3.76E+03	2.53E+03	3.76E+03		
Pu-242	1.1252E-05	833.80	1,563.38	2.24E-02	3.17E-02	3.99E-02		
Ra-226	7.8524E-12	833.80	1,563.38	0.00E+00	6.55E-09	1.23E-08		
Ra-228	2.4086E-16	833.80	1,563.38	0.00E+00	2.01E-13	3.77E-13		
Ru-106	1.5066E-05	833.80	1,563.38	0.00E+00	1.26E-02	2.36E-02		
Se-79	1.0127E-05	833.80	1,563.38	0.00E+00	8.44E-03	1.58E-02		
Sn-126	4.3902E-05	833.80	1,563.38	0.00E+00	3.66E-02	6.86E-02		
Sr-90	5.0088E-01	833.80	1,563.38	0.00E+00	4.18E+02	7.83E+02		
Tc-99	3.9412E-04	833.80	1,563.38	0.00E+00	3.29E-01	6.16E-01		
Th-229	2.7219E-12	833.80	1,563.38	0.00E+00	2.27E-09	4.26E-09		
Th-230	1.0441E-09	833.80	1,563.38	0.00E+00	8.71E-07	1.63E-06		
Th-232	3.1689E-16	833.80	1,563.38	0.00E+00	2.64E-13	4.95E-13		
Tl-208	4.6636E-07	833.80	1,563.38	0.00E+00	3.89E-04	7.29E-04		
U-232	1.2638E-06	833.80	1,563.38	0.00E+00	1.05E-03	1.98E-03		
U-233	5.7451E-10	833.80	1,563.38	0.00E+00	4.79E-07	8.98E-07		
U-234	4.3044E-06	833.80	1,563.38	0.00E+00	3.59E-03	6.73E-03		
U-235	-7.7765E-09	833.80	0.00	3.39E-05	2.74E-05	3.39E-05		
U-236	1.8050E-07	833.80	1,563.38	0.00E+00	1.50E-04	2.82E-04		
U-238	-1.7914E-07	833.80	0.00	2.47E-03	2.32E-03	2.47E-03		
Y-90	5.0088E-01	833.80	1,563.38	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: This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown)
Reactor Moderator:	From SFD	Used	
	FAST	FAST	
Fuel Cladding:	SST	SST	
BOL HM Constituents	Pu and U	Pu and U	
BOL Enrichment %	10 to 30	10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: 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
	From SFD	Estimated	
Nominal		833.80	
Bounding		1,563.38	

Checks			Estimated EOL HM/Given EOL HM 1.00
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.53		
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 #: 364
 Fuel Units & Descr: 992 - ROD
 Heavy Metal Mass: BOL= , EOL=92 454kg
 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

Radionuclide	m		x _n		b		y _n		Gamma Sources	
	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)	Avg MeV	
Ac-227	6 1822E-12	8,040 82	20,102 04	0 00E+00	4 97E-08	1 24E-07				
Am-241	1 1066E-01	8,040 82	20,102 04	1 94E+02	1 08E+03	2.42E+03	0 0150	6 563E+14		
Am-242m	1 9247E-03	8,040 82	20,102 04	0 00E+00	1 55E+01	3 87E+01	0 0250	1 307E+14		
Am-243	1 0740E-04	8,040 82	20,102 04	0 00E+00	8 64E-01	2.16E+00	0 0375	1 519E+14		
C-14	2 6042E-05	8,040 82	20,102 04	0 00E+00	2 09E-01	5.23E-01	0 0575	1 510E+14		
Cl-36	3 4243E-10	8,040 82	20,102 04	0 00E+00	2 75E-06	6 89E-06	0 0850	7 276E+13		
Cm-243	4 0629E-04	8,040 82	20,102 04	0 00E+00	3.27E+00	8.17E+00	0 1250	5 119E+13		
Cm-244	1 6024E-03	8,040 82	20,102 04	0 00E+00	1.29E+01	3.22E+01	0 2250	5 871E+13		
Co-60	3 4275E-03	8,040 82	20,102 04	0 00E+00	2.76E+01	6 89E+01	0 3750	5 254E+13		
Cs-134	1 5566E-03	8,040 82	20,102 04	0 00E+00	1.25E+01	3.13E+01	0 5750	1 031E+15		
Cs-135	4 7693E-05	8,040 82	20,102 04	0 00E+00	3 83E-01	9 59E-01	0 8500	1 077E+13		
Cs-137	1 4007E+00	8,040 82	20,102 04	0 00E+00	1.13E+04	2.82E+04	1 2500	1 289E+13		
Eu-154	1 6184E-02	8,040 82	20,102 04	0 00E+00	1.30E+02	3.25E+02	1 7500	2 917E+11		
Eu-155	1 3774E-02	8,040 82	20,102 04	0 00E+00	1.11E+02	2.77E+02	2 2500	5 825E+07		
Fe-55	3 8028E-04	8,040 82	20,102 04	0 00E+00	3 06E+00	7 64E+00	2.7500	3.330E+08		
H-3	3 8454E-03	8 040 82	20,102 04	0 00E+00	3 09E+01	7.73E+01	3.5000	1 505E+06		
I-129	1 2891E-06	8,040 82	20,102 04	0 00E+00	1 04E-02	2 59E-02	5 0000	5 056E+05		
Kr-85	2 7848E-02	8,040 82	20,102 04	0 00E+00	2.24E+02	5 60E+02	7 0000	5 770E+04		
Np-237	3 7516E-06	8,040 82	20,102 04	0 00E+00	3 02E-02	7 54E-02	11 0000	6 600E+03		
Pa-231	1 2488E-11	8,040 82	20,102 04	0 00E+00	1 00E-07	2 51E-07				
Pb-210	2 4206E-12	8,040 82	20,102 04	0 00E+00	1 95E-08	4 87E-08				
Pm-147	1 5671E-02	8,040 82	20,102 04	0 00E+00	1.26E+02	3.15E+02				
Pu-238	1 4877E-02	8,040 82	20,102 04	0 00E+00	1.20E+02	2 99E+02				
Pu-239	-3 5520E-02	8,040 82	0 00	1 59E+03	1.31E+03	1.59E+03				
Pu-240	2 0690E-02	8,040 82	20,102 04	8 09E+02	9.75E+02	1.22E+03				
Pu-241	-1 4799E+00	8,040 82	0 00	3 63E+04	2 44E+04	3.63E+04				
Pu-242	1 1252E-05	8,040 82	20,102 04	2 16E-01	3 06E-01	4 42E-01				
Ra-226	7 8524E-12	8,040 82	20,102 04	0 00E+00	6 31E-08	1.58E-07				
Ra-228	2 4086E-16	8,040 82	20,102 04	0 00E+00	1 94E-12	4 84E-12				
Ru-106	1 5066E-05	8,040 82	20,102 04	0 00E+00	1.21E-01	3 03E-01				
Se-79	1 0127E-05	8,040 82	20,102 04	0 00E+00	8 14E-02	2.04E-01				
Sn-126	4 3902E-05	8,040 82	20,102 04	0 00E+00	3 53E-01	8 83E-01				
Sr-90	5 0088E-01	8,040 82	20,102 04	0 00E+00	4 03E+03	1 01E+04				
Tc-99	3 9412E-04	8,040 82	20,102 04	0 00E+00	3.17E+00	7 92E+00				
Th-229	2 7219E-12	8,040 82	20,102 04	0 00E+00	2.19E-08	5 47E-08				
Th-230	1 0441E-09	8,040 82	20,102 04	0 00E+00	8.40E-06	2.10E-05				
Th-232	3 1689E-16	8,040 82	20,102 04	0 00E+00	2.55E-12	6.37E-12				
Th-208	4 6636E-07	8,040 82	20,102 04	0 00E+00	3.75E-03	9.37E-03				
U-232	1.2638E-06	8,040 82	20,102 04	0 00E+00	1.02E-02	2 54E-02				
U-233	5 7451E-10	8,040 82	20,102 04	0 00E+00	4 62E-06	1.15E-05				
U-234	4.3044E-06	8,040 82	20,102 04	0 00E+00	3 46E-02	8 65E-02				
U-235	-7 7765E-09	8,040 82	0 00	3.27E-04	2.64E-04	3.27E-04				
U-236	1.8050E-07	8,040 82	20,102 04	0 00E+00	1.45E-03	3 63E-03				
U-238	-1 7914E-07	8,040 82	0 00	2 38E-02	2.23E-02	2.38E-02				
Y-90	5 0088E-01	8,040 82	20,102 04	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 96E+02	3 89E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary		
Reactor Moderator	From SFD	Used
Fuel Cladding	FAST	FAST
BOL HM Constituents	SST	SST
BOL Enrichment %	Pu and U	Pu and U
		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) ¹		
	From SFD	Estimated
Nominal		8,040 82
Bounding		20 102 04

Basis for burnup used in estimate:
 Nominal burnup taken from SFD and converted to MWd using BOL=100.51kg
 Bounding burnup taken from SFD and converted to MWd using BOL=100.51kg

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 53	
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 OXIDE FUEL EXPER
 SNF ID #: 345
 Fuel Units & Descr. 571 - ROD
 Heavy Metal Mass BOL= , EOL=56 986kg
 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"
 2 86

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 _a						Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-12	4,956 09	12,390 22	0 00E+00	3 06E-08	7 66E-08	Avg MeV		
Am-241	1.1066E-01	4,956 09	12,390 22	1 19E+02	6 68E+02	1 49E+03	0.0150	4 045E+14	
Am-242m	1.9247E-03	4,956 09	12,390 22	0 00E+00	9 54E+00	2 38E+01	0.0250	8 058E+13	
Am-243	1 0740E-04	4,956 09	12,390.22	0 00E+00	5 32E-01	1.33E+00	0.0375	9.362E+13	
C-14	2 6042E-05	4,956.09	12,390.22	0 00E+00	1 29E-01	3 23E-01	0.0575	9 306E+13	
Cl-36	3 4243E-10	4,956 09	12,390.22	0 00E+00	1 70E-06	4 24E-06	0.0850	4 484E+13	
Cm-243	4 0629E-04	4,956 09	12,390.22	0 00E+00	2 01E+00	5 03E+00	0.1250	3 155E+13	
Cm-244	1 6024E-03	4,956 09	12,390.22	0 00E+00	7 94E+00	1 99E+01	0.2250	3 619E+13	
Co-60	3 4275E-03	4,956 09	12,390.22	0 00E+00	1 70E+01	4 25E+01	0.3750	1.569E+13	
Cs-134	1 5566E-03	4,956 09	12,390.22	0 00E+00	7 71E+00	1 93E+01	0.5750	6.355E+14	
Cs-135	4 7693E-05	4,956 09	12,390.22	0 00E+00	2 36E-01	5 91E-01	0.8500	6.640E-12	
Cs-137	1 4007E+00	4,956 09	12,390.22	0 00E+00	6 94E+03	1 74E+04	1.2500	7.948E+12	
Eu-154	1 6184E-02	4,956 09	12,390 22	0 00E+00	8 02E+01	2 01E+02	1.7500	1 798E+11	
Eu-155	1.3774E-02	4,956 09	12,390 22	0 00E+00	6 83E+01	1.71E+02	2.2500	3.591E+07	
Fe-55	3 8028E-04	4,956 09	12,390 22	0 00E+00	1 88E+00	4.71E+00	2.7500	2.053E+08	
H-3	3 8454E-03	4,956 09	12,390 22	0 00E+00	1 91E+01	4 76E+01	3 5000	9.275E+05	
I-129	1.2891E-06	4,956 09	12,390 22	0 00E+00	6 39E-03	1 60E-02	5 0000	3 116E+05	
Kr-85	2.7848E-02	4,956 09	12,390 22	0 00E+00	1.38E+02	3 45E+02	7.0000	3 557E+04	
Np-237	3.7516E-06	4,956 09	12,390 22	0 00E+00	1 86E-02	4 65E-02	11.0000	4 068E+03	
Pa-231	1.2488E-11	4,956 09	12,390.22	0 00E+00	6 19E-08	1 55E-07			
Pb-210	2 4206E-12	4,956 09	12,390 22	0 00E+00	1 20E-08	3 00E-08			
Pm-147	1.5671E-02	4,956 09	12,390.22	0 00E+00	7 77E+01	1 94E+02			
Pu-238	1 4877E-02	4,956 09	12,390.22	0 00E+00	7.37E+01	1 84E+02			
Pu-239	-3 5520E-02	4,956 09	0 00	9 81E+02	8 04E+02	9 81E+02			
Pu-240	2 0690E-02	4,956 09	12,390.22	4 98E+02	6 01E+02	7 55E+02			
Pu-241	-1 4799E+00	4,956 09	0 00	2.24E+04	1 50E+04	2 24E+04			
Pu-242	1 1252E-05	4,956 09	12,390 22	1.33E-01	1 89E-01	2.72E-01			
Ra-226	7 8524E-12	4,956 09	12,390 22	0 00E+00	3 89E-08	9.73E-08			
Ra-228	2 4086E-16	4,956 09	12,390 22	0 00E+00	1.19E-12	2.98E-12			
Ru-106	1 5066E-05	4,956 09	12,390 22	0 00E+00	7.47E-02	1 87E-01			
Se-79	1 0127E-05	4,956 09	12,390 22	0 00E+00	5 02E-02	1.25E-01			
Sn-126	4 3902E-05	4,956 09	12,390 22	0 00E+00	2.18E-01	5 44E-01			
Sr-90	5 0088E-01	4,956 09	12,390 22	0 00E+00	2.48E+03	6.21E+03			
Tc-99	3 9412E-04	4,956 09	12,390 22	0 00E+00	1.95E+00	4 88E+00			
Th-229	2 7219E-12	4,956 09	12,390 22	0 00E+00	1.35E-08	3 37E-08			
Th-230	1.0441E-09	4,956 09	12,390.22	0 00E+00	5 17E-06	1 29E-05			
Th-232	3 1689E-16	4,956 09	12 390 22	0 00E+00	1 57E-12	3 93E-12			
Tl-208	4 6636E-07	4,956 09	12,390.22	0 00E+00	2 31E-03	5 78E-03			
U-232	1.2638E-06	4,956 09	12,390.22	0 00E+00	6 26E-03	1.57E-02			
U-233	5 7451E-10	4,956 09	12,390.22	0 00E+00	2 85E-06	7.12E-06			
U-234	4 3044E-06	4,956 09	12,390.22	0 00E+00	2 13E-02	5.33E-02			
U-235	-7 7765E-09	4,956 09	0 00	2 01E-04	1.63E-04	2.01E-04			
U-236	1 8050E-07	4,956 09	12,390.22	0 00E+00	8 95E-04	2.24E-03			
U-238	-1 7914E-07	4,956 09	0 00	1.47E-02	1.38E-02	1 47E-02			
Y-90	5 0088E-01	4,956 09	12,390 22	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	This Template was used for the following reasons This fuel matches on all parameters except enrichment (unknown)
	FAST	FAST	
Fuel Cladding	SST	SST	
BOL HM Constituents	Pu and U	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=61.951kg Bounding burnup taken from SFD and converted to MWd using BOL=61.951kg
Nominal		4,956 09	
Bounding		12,390.22	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.53		
Bounding	1.31		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FAST REACTOR FUEL
 SNF ID #: 906
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=9.044kg EOL=5.812kg
 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 _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	2.3072E-06	3,071.54	6,143.08	0.00E+00	7.09E-03	1.42E-02		
Am-241	8.4448E+00	3,071.54	6,143.08	0.00E+00	2.59E+04	5.19E+04	0.0150	7.645E+15
Am-242m	1.6848E-02	3,071.54	6,143.08	0.00E+00	5.17E+01	1.03E+02	0.0250	1.498E+15
Am-243	1.6320E-02	3,071.54	6,143.08	0.00E+00	5.01E+01	1.00E+02	0.0375	1.309E+15
C-14	1.2090E-01	3,071.54	6,143.08	0.00E+00	3.71E+02	7.43E+02	0.0575	2.059E+15
Ct-36	2.2849E-03	3,071.54	6,143.08	0.00E+00	7.02E+00	1.40E+01	0.0850	8.037E+14
Cm-243	8.6624E-04	3,071.54	6,143.08	0.00E+00	2.66E+00	5.32E+00	0.1250	6.299E+14
Cm-244	1.6848E-01	3,071.54	6,143.08	0.00E+00	5.17E+02	1.03E+03	0.2250	6.962E+14
Co-60	2.8086E+01	3,071.54	6,143.08	0.00E+00	8.63E+04	1.73E+05	0.3750	2.978E+14
Cs-134	3.4148E-04	3,071.54	6,143.08	0.00E+00	1.05E+00	2.10E+00	0.5750	4.842E+15
Cs-135	4.3976E-04	3,071.54	6,143.08	0.00E+00	1.35E+00	2.70E+00	0.8500	1.850E+14
Cs-137	2.1049E+01	3,071.54	6,143.08	0.00E+00	6.47E+04	1.29E+05	1.2500	1.294E+16
Eu-154	1.2500E+00	3,071.54	6,143.08	0.00E+00	3.84E+03	7.68E+03	1.7500	5.722E+12
Eu-155	6.8986E-02	3,071.54	6,143.08	0.00E+00	2.12E+02	4.24E+02	2.2500	6.784E+10
Fe-55	2.9308E-01	3,071.54	6,143.08	0.00E+00	9.00E+02	1.80E+03	2.7500	1.912E+10
H-3	2.4311E-01	3,071.54	6,143.08	0.00E+00	7.47E+02	1.49E+03	3.5000	1.737E+07
I-129	1.0618E-05	3,071.54	6,143.08	0.00E+00	3.26E-02	6.52E-02	5.0000	7.369E+06
Kr-85	5.9882E-01	3,071.54	6,143.08	0.00E+00	1.84E+03	3.68E+03	7.0000	8.423E+05
Np-237	1.5668E-04	3,071.54	6,143.08	0.00E+00	4.81E-01	9.62E-01	11.0000	9.631E+04
Pa-231	2.8656E-06	3,071.54	6,143.08	0.00E+00	8.80E-03	1.76E-02		
Pb-210	2.3918E-08	3,071.54	6,143.08	0.00E+00	7.35E-05	1.47E-04		
Pm-147	1.6900E-02	3,071.54	6,143.08	0.00E+00	5.19E+01	1.04E+02		
Pu-238	2.9808E+00	3,071.54	6,143.08	0.00E+00	9.16E+03	1.83E+04		
Pu-239	4.1648E-01	3,071.54	6,143.08	0.00E+00	1.28E+03	2.56E+03		
Pu-240	2.9264E-01	3,071.54	6,143.08	0.00E+00	8.99E+02	1.80E+03		
Pu-241	4.8704E+01	3,071.54	6,143.08	0.00E+00	1.50E+05	2.99E+05		
Pu-242	2.4560E-03	3,071.54	6,143.08	0.00E+00	7.54E+00	1.51E+01		
Ra-226	6.4400E-08	3,071.54	6,143.08	0.00E+00	1.98E-04	3.96E-04		
Ra-228	5.9952E-07	3,071.54	6,143.08	0.00E+00	1.84E-03	3.68E-03		
Ru-106	8.5526E-07	3,071.54	6,143.08	0.00E+00	2.63E-03	5.25E-03		
Se-79	1.9181E-04	3,071.54	6,143.08	0.00E+00	5.89E-01	1.18E+00		
Sn-126	1.6671E-04	3,071.54	6,143.08	0.00E+00	5.12E-01	1.02E+00		
Sr-90	1.9799E+01	3,071.54	6,143.08	0.00E+00	6.08E+04	1.22E+05		
Tc-99	6.7678E-03	3,071.54	6,143.08	0.00E+00	2.08E+01	4.16E+01		
Th-229	1.7488E-06	3,071.54	6,143.08	0.00E+00	5.37E-03	1.07E-02		
Th-230	5.8704E-06	3,071.54	6,143.08	0.00E+00	1.80E-02	3.61E-02		
Th-232	-4.2431E-09	3,071.54	0.00	1.83E-04	1.70E-04	1.83E-04		
Tl-208	8.7573E-05	3,071.54	6,143.08	0.00E+00	2.69E-01	5.38E-01		
U-232	2.3706E-04	3,071.54	6,143.08	0.00E+00	7.28E-01	1.46E+00		
U-233	3.6128E-04	3,071.54	6,143.08	0.00E+00	1.11E+00	2.22E+00		
U-234	1.2788E-02	3,071.54	6,143.08	0.00E+00	3.93E+01	7.86E+01		
U-235	5.7486E-04	3,071.54	6,143.08	3.89E-03	1.77E+00	3.54E+00		
U-236	2.3485E-04	3,071.54	6,143.08	0.00E+00	7.21E-01	1.44E+00		
U-238	1.1581E-04	3,071.54	6,143.08	4.84E-04	3.56E-01	7.12E-01		
Y-90	1.9804E+01	3,071.54	6,143.08	0.00E+00	6.08E+04	1.22E+05		
Other Radionuclides					1.89E+05	3.79E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	FAST	(Worst Case)	This fuel didn't closely match any existing templates, therefore the worst case template was used
Fuel Cladding	SST	SST/Inconel	
BOL HM Constituents	Th and U	U, Th, & Pu	
BOL Enrichment %	7.592	0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	904.40	3,071.54	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup.
Bounding		6,143.08	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal	10.15	3.40	
Bounding	20.31		

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: FAST REACTOR FUEL (U/PUC)
 SNF ID #: 1029
 Fuel Units & Descr: 11 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=13.33kg EOL=11.095kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1985
 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"
 0.85

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	6.1822E-12	3,998.94	7,997.88	0.00E+00	2.47E-08	4.94E-08	Avg MeV	
Am-241	1.1066E-01	3,998.94	7,997.88	2.57E+01	4.68E+02	9.11E+02	0.0150	2.583E+14
Am-242m	1.9247E-03	3,998.94	7,997.88	0.00E+00	7.70E+00	1.54E+01	0.0250	5.197E+13
Am-243	1.0740E-04	3,998.94	7,997.88	0.00E+00	4.29E-01	8.59E-01	0.0375	6.043E+13
C-14	2.6042E-05	3,998.94	7,997.88	0.00E+00	1.04E-01	2.08E-01	0.0575	5.936E+13
Cl-36	3.4243E-10	3,998.94	7,997.88	0.00E+00	1.37E-06	2.74E-06	0.0850	2.895E+13
Cm-243	4.0629E-04	3,998.94	7,997.88	0.00E+00	1.62E+00	3.25E+00	0.1250	2.037E+13
Cm-244	1.6024E-03	3,998.94	7,997.88	0.00E+00	6.41E+00	1.28E+01	0.2250	2.336E+13
Co-60	3.4275E-03	3,998.94	7,997.88	0.00E+00	1.37E+01	2.74E+01	0.3750	1.012E+13
Cs-134	1.5566E-03	3,998.94	7,997.88	0.00E+00	6.22E+00	1.24E+01	0.5750	4.102E+14
Cs-135	4.7693E-05	3,998.94	7,997.88	0.00E+00	1.91E-01	3.81E-01	0.8500	4.286E+12
Cs-137	1.4007E+00	3,998.94	7,997.88	0.00E+00	5.60E+03	1.12E+04	1.2500	5.130E+12
Eu-154	1.6184E-02	3,998.94	7,997.88	0.00E+00	6.47E+01	1.29E+02	1.7500	1.161E+11
Eu-155	1.3774E-02	3,998.94	7,997.88	0.00E+00	5.51E+01	1.10E+02	2.2500	2.294E+07
Fe-55	3.8028E-04	3,998.94	7,997.88	0.00E+00	1.52E+00	3.04E+00	2.7500	1.324E+08
H-3	3.8454E-03	3,998.94	7,997.88	0.00E+00	1.54E+01	3.08E+01	3.5000	4.788E+05
I-129	1.2891E-06	3,998.94	7,997.88	0.00E+00	5.16E-03	1.03E-02	5.0000	1.502E+05
Kr-85	2.7848E-02	3,998.94	7,997.88	0.00E+00	1.11E+02	2.23E+02	7.0000	1.716E+04
Np-237	3.7516E-06	3,998.94	7,997.88	0.00E+00	1.50E-02	3.00E-02	11.0000	1.963E+03
Pa-231	1.2488E-11	3,998.94	7,997.88	0.00E+00	4.99E-08	9.99E-08		
Pb-210	2.4206E-12	3,998.94	7,997.88	0.00E+00	9.68E-09	1.94E-08		
Pm-147	1.5671E-02	3,998.94	7,997.88	0.00E+00	6.27E+01	1.25E+02		
Pu-238	1.4877E-02	3,998.94	7,997.88	0.00E+00	5.95E+01	1.19E+02		
Pu-239	-3.5520E-02	3,998.94	0.00	2.11E+02	6.89E+01	2.11E+02		
Pu-240	2.0690E-02	3,998.94	7,997.88	1.07E+02	1.90E+02	2.73E+02		
Pu-241	-1.4799E+00	3,998.94	0.00	4.81E+03	0.00E+00	4.81E+03		
Pu-242	1.1252E-05	3,998.94	7,997.88	2.86E-02	7.36E-02	1.19E-01		
Ra-226	7.8524E-12	3,998.94	7,997.88	0.00E+00	3.14E-08	6.28E-08		
Ra-228	2.4086E-16	3,998.94	7,997.88	0.00E+00	9.63E-13	1.93E-12		
Ru-106	1.5066E-05	3,998.94	7,997.88	0.00E+00	6.02E-02	1.20E-01		
Se-79	1.0127E-05	3,998.94	7,997.88	0.00E+00	4.05E-02	8.10E-02		
Sn-126	4.9902E-05	3,998.94	7,997.88	0.00E+00	1.76E-01	3.51E-01		
Sr-90	5.0088E-01	3,998.94	7,997.88	0.00E+00	2.00E+03	4.01E+03		
Tc-99	3.9412E-04	3,998.94	7,997.88	0.00E+00	1.58E+00	3.15E+00		
Th-229	2.7219E-12	3,998.94	7,997.88	0.00E+00	1.09E-08	2.18E-08		
Th-230	1.0441E-09	3,998.94	7,997.88	0.00E+00	4.18E-06	8.35E-06		
Th-232	3.1689E-16	3,998.94	7,997.88	0.00E+00	1.27E-12	2.53E-12		
Th-208	4.6636E-07	3,998.94	7,997.88	0.00E+00	1.86E-03	3.73E-03		
U-232	1.2638E-06	3,998.94	7,997.88	0.00E+00	5.05E-03	1.01E-02		
U-233	5.7451E-10	3,998.94	7,997.88	0.00E+00	2.30E-06	4.59E-06		
U-234	4.3044E-06	3,998.94	7,997.88	0.00E+00	1.72E-02	3.44E-02		
U-235	-7.7765E-09	3,998.94	0.00	4.33E-05	1.22E-05	4.33E-05		
U-236	1.8050E-07	3,998.94	7,997.88	0.00E+00	7.22E-04	1.44E-03		
U-238	-1.7914E-07	3,998.94	0.00	3.15E-03	2.44E-03	3.15E-03		
Y-90	5.0088E-01	3,998.94	7,997.88	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		
	From SFD	Used
Reactor Moderator	FAST	FAST
Fuel Cladding	SST	SST
BOL HM Constituents	Pu and U	Pu and U
BOL Enrichment %	31.101	10 to 30

Basis for Parameter Differences:
 This Template was used for the following reasons:
 This fuel matches on all parameters except enrichment (very close to 30%)

Burnup Summary (MWd) ²		
	From SFD	Estimated
Nominal	3,998.94	2,231.05
Bounding		7,997.88

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

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	1.97	0.56
Bounding	3.94	

Estimated EOL HM/ Given EOL HM: 0.83

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: FERMICORE I & 2 (CORE FOIL)

SNF ID #: 457

Fuel Units & Descr: 136 - ROD

Heavy Metal Mass: BOL=18.21kg, EOL=17 734kg

ROD Storage Site, INEEL

¹Fuel decay start date: 1972

Estimates as of: 2030

Template: FERMICORE (Fast, Zirc, 10 to 40%, U)

²Template Burnup(MWd)²: 58 6725048

Template BOL Heavy Metal Mass (MT): 0 018774

Template Decay Time: 50 years

Estimated

Canister usage:

18"x10"

0 04

II. Estimates

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg. MeV	
Ac-227	1 4291E-07	419 74	839 48	0 00E+00	6 00E-05	1 20E-04		
Am-241	6 7476E-07	419 74	839 48	0 00E+00	2 83E-04	5 66E-04	0 0150	3 886E+13
Am-242m	0 0000E+00	419 74	839 48	0 00E+00	0 00E+00	0 00E+00	0 0250	8 068E+12
Am-243	8 3651E-15	419 74	839 48	0 00E+00	3 51E-12	7 02E-12	0 0375	7 113E+12
C-14	2 1680E-05	419 74	839 48	0 00E+00	9 10E-03	1 82E-02	0 0575	7 517E+12
Ct-36	5 5188E-08	419 74	839 48	0 00E+00	2 32E-05	4 63E-05	0 0850	4 540E+12
Cm-243	1 0760E-14	419 74	839 48	0 00E+00	4 52E-12	9 03E-12	0 1250	2 768E+12
Cm-244	2 9486E-16	419 74	839 48	0 00E+00	1 24E-13	2 48E-13	0 2250	3 904E+12
Co-60	2 9128E-04	419 74	839 48	0 00E+00	1 22E-01	2 45E-01	0 3750	1 701E+12
Cs-134	4 0326E-09	419 74	839 48	0 00E+00	1 69E-06	3 39E-06	0 5750	3 037E+13
Cs-135	4 4996E-05	419 74	839 48	0 00E+00	1 89E-02	3 78E-02	0 8500	2 768E+11
Cs-137	9 7388E-01	419 74	839 48	0 00E+00	4 09E+02	8 18E+02	1 2500	1 100E+11
Eu-154	5 5290E-05	419 74	839 48	0 00E+00	2 32E-02	4 64E-02	1 7500	7 130E+09
Eu-155	1 7402E-04	419 74	839 48	0 00E+00	7 30E-02	1 46E-01	2 2500	8 771E+05
Fe-55	2 5992E-07	419 74	839 48	0 00E+00	1 09E-04	2 18E-04	2 7500	1 492E+05
H-3	1 5242E-03	419 74	839 48	0 00E+00	6 40E-01	1 28E+00	3 5000	1 653E+02
I-129	1 1426E-06	419 74	839 48	0 00E+00	4 80E-04	9 59E-04	5 0000	5 689E+01
Kr-85	1 4635E-02	419 74	839 48	0 00E+00	6 14E+00	1 23E+01	7 0000	4 932E+00
Np-237	3 3099E-06	419 74	839 48	0 00E+00	1 39E-03	2 78E-03	11 0000	4 595E-01
Pa-231	2 4492E-07	419 74	839 48	0 00E+00	1 03E-04	2 06E-04		
Pb-210	1 7794E-11	419 74	839 48	0 00E+00	7 47E-09	1 49E-08		
Pm-147	2 2021E-05	419 74	839 48	0 00E+00	9 24E-03	1 85E-02		
Pu-238	1 5235E-04	419 74	839 48	0 00E+00	6 39E-02	1 28E-01		
Pu-239	1 9464E-02	419 74	839 48	0 00E+00	8 17E+00	1 63E+01		
Pu-240	6 7817E-05	419 74	839 48	0 00E+00	2 85E-02	5 69E-02		
Pu-241	2 0282E-06	419 74	839 48	0 00E+00	8 51E-04	1 70E-03		
Pu-242	4 3751E-13	419 74	839 48	0 00E+00	1 84E-10	3 67E-10		
Ra-226	4 0632E-11	419 74	839 48	0 00E+00	1 71E-08	3 41E-08		
Ra-228	2 3674E-11	419 74	839 48	0 00E+00	9 94E-09	1 99E-08		
Ru-106	1 0255E-14	419 74	839 48	0 00E+00	4 30E-12	8 61E-12		
Se-79	1 6485E-05	419 74	839 48	0 00E+00	6 92E-03	1 38E-02		
Sn-126	3 7564E-05	419 74	839 48	0 00E+00	1 58E-02	3 15E-02		
Sr-90	8 4333E-01	419 74	839 48	0 00E+00	3 54E+02	7 08E+02		
Tc-99	4 4825E-04	419 74	839 48	0 00E+00	1 88E-01	3 76E-01		
Th-229	6 0880E-11	419 74	839 48	0 00E+00	2 56E-08	5 11E-08		
Th-230	2 8889E-09	419 74	839 48	0 00E+00	1 21E-06	2 43E-06		
Th-232	2 3708E-11	419 74	839 48	0 00E+00	9 95E-09	1 99E-08		
Tl-208	5 0432E-09	419 74	839 48	0 00E+00	2 12E-06	4 23E-06		
U-232	1 3640E-08	419 74	839 48	0 00E+00	5 73E-06	1 15E-05		
U-233	1 0327E-08	419 74	839 48	0 00E+00	4 33E-06	8 67E-06		
U-234	4 9103E-06	419 74	839 48	0 00E+00	2 06E-03	4 12E-03		
U-235	-2 3191E-06	419 74	0 00	1 01E-02	9 14E-03	1 01E-02		
U-236	1 2633E-05	419 74	839 48	0 00E+00	5 30E-03	1 06E-02		
U-238	-9 5407E-08	419 74	0 00	4 55E-03	4 51E-03	4 55E-03		
Y-90	8 4350E-01	419 74	839 48	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	U	
BOL Enrichment %	25 69081404	10 to 40	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	29 14	419 74	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding	50 35	839 48	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	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 FERMICORE1&2 (CORE SHIM) Fuel decay start date 1972
 SNF ID # 69 Estimates as of 2030
 Fuel Units & Descr: 280 - ROD Template FERMICORE (Fast, Zirc 10 to 40% U)
 Heavy Metal Mass: BOL=37 492kg, EOL=36.82kg *Template Burnup(MWd) 58 6725048
 ROD Storage Site INEEL Template BOL Heavy Metal Mass (MT) 0 018774
Template Decay Time 50 years

Estimated
Canister usage
18"x10"
0 07

Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 4291E-07	592 57	1,185 14	0 00E+00	8 47E-05	1 69E-04	Avg MeV	
Am-241	6 7476E-07	592 57	1,185 14	0 00E+00	4 00E-04	8 00E-04	0 0150	5 486E+13
Am-242m	0 0000E+00	592 57	1,185 14	0 00E+00	0 00E+00	0 00E+00	0 0250	1.139E+13
Am-243	8 3651E-15	592 57	1,185 14	0 00E+00	4 96E-12	9 91E-12	0 0375	1.004E+13
C-14	2 1680E-05	592 57	1,185 14	0 00E+00	1.28E-02	2 57E-02	0 0575	1.061E+13
Ct-36	5 5188E-08	592 57	1,185 14	0 00E+00	3.27E-05	6 54E-05	0 0850	6.410E+12
Cm-243	1 0760E-14	592 57	1,185 14	0 00E+00	6 38E-12	1 28E-11	0 1250	4 152E+12
Cm-244	2 9486E-16	592 57	1,185 14	0 00E+00	1.75E-13	3.49E-13	0 2250	5.512E+12
Co-60	2 9128E-04	592 57	1,185 14	0 00E+00	1 73E-01	3 45E-01	0 3750	2 402E+12
Cs-134	4 0326E-09	592 57	1,185 14	0 00E+00	2 39E-06	4 78E-06	0 5750	4 288E+13
Cs-135	4 4996E-05	592 57	1,185 14	0 00E+00	2 67E-02	5 33E-02	0 8500	3 907E+11
Cs-137	9 7388E-01	592 57	1,185 14	0 00E+00	5 77E+02	1 15E+03	1 2500	1 553E+11
Eu-154	5 5290E-05	592 57	1,185 14	0 00E+00	3 28E-02	6 55E-02	1 7500	1 007E+10
Eu-155	1.7402E-04	592 57	1,185 14	0 00E+00	1 03E-01	2 06E-01	2 2500	1 238E+06
Fe-55	2.5992E-07	592 57	1,185 14	0 00E+00	1 54E-04	3 08E-04	2 7500	2.106E+05
H-3	1.5242E-03	592 57	1,185 14	0 00E+00	9 03E-01	1 81E+00	3.5000	2.570E+02
I-129	1 1426E-06	592 57	1,185 14	0 00E+00	6 77E-04	1.35E-03	5.0000	9.051E+01
Kr-85	1 4635E-02	592 57	1,185 14	0 00E+00	8 67E+00	1 73E+01	7.0000	8 138E+00
Np-237	3 3099E-06	592 57	1,185 14	0 00E+00	1.96E-03	3.92E-03	11 0000	7.839E-01
Pa-231	2 4492E-07	592 57	1,185 14	0 00E+00	1 45E-04	2 90E-04		
Pb-210	1 7794E-11	592 57	1,185 14	0 00E+00	1 05E-08	2 11E-08		
Pm-147	2 2021E-05	592 57	1,185 14	0 00E+00	1.30E-02	2 61E-02		
Pu-238	1 5235E-04	592 57	1,185 14	0 00E+00	9 03E-02	1 81E-01		
Pu-239	1 9464E-02	592 57	1,185 14	0 00E+00	1 15E+01	2 31E+01		
Pu-240	6 7817E-05	592 57	1,185 14	0 00E+00	4 02E-02	8 04E-02		
Pu-241	2 0282E-06	592 57	1,185 14	0 00E+00	1 20E-03	2 40E-03		
Pu-242	4.3751E-13	592 57	1,185 14	0 00E+00	2.59E-10	5 19E-10		
Ra-226	4 0632E-11	592 57	1,185 14	0 00E+00	2 41E-08	4 82E-08		
Ra-228	2.3674E-11	592 57	1,185 14	0 00E+00	1 40E-08	2.81E-08		
Ru-106	1 0255E-14	592 57	1,185 14	0 00E+00	6 08E-12	1 22E-11		
Se-79	1 6485E-05	592 57	1,185 14	0 00E+00	9 77E-03	1 95E-02		
Sn-126	3 7564E-05	592 57	1,185 14	0 00E+00	2.23E-02	4 45E-02		
Sr-90	8 4333E-01	592 57	1,185 14	0 00E+00	5 00E+02	9 99E+02		
Tc-99	4 4825E-04	592 57	1,185 14	0 00E+00	2 66E-01	5 31E-01		
Th-229	6 0880E-11	592 57	1,185 14	0 00E+00	3 61E-08	7 22E-08		
Th-230	2 8889E-09	592 57	1,185 14	0 00E+00	1 71E-06	3 42E-06		
Th-232	2 3708E-11	592 57	1,185 14	0 00E+00	1 40E-08	2 81E-08		
Ti-208	5 0432E-09	592 57	1,185 14	0 00E+00	2 99E-06	5 98E-06		
U-232	1.3640E-08	592 57	1,185 14	0 00E+00	8.08E-06	1.62E-05		
U-233	1.0327E-08	592 57	1,185 14	0 00E+00	6.12E-06	1.22E-05		
U-234	4 9103E-06	592 57	1,185 14	0 00E+00	2.91E-03	5 82E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2 3191E-06	592 57	0 00	1 10E-02	9 61E-03	1 10E-02	6.51E+00	1.30E+01
U-236	1.2633E-05	592 57	1,185 14	0 00E+00	7 49E-03	1 50E-02	Total	Total
U-238	-9 5407E-08	592 57	0 00	1 09E-02	1 08E-02	1 09E-02		
Y-90	8 4350E-01	592 57	1,185 14	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*
Reactor Moderator	From SFD: FAST	Used: FAST	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	13 55265123	10 to 40	
Burnup Summary (MWd)²			Basis for burnup used in estimate
	From SFD	Estimated	
Nominal	59 99	592.57	
Bounding	103 67	1 185 14	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	1 00

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel
²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FERMI CORE 1 & 2 (DECLAD)
 SNF ID #: 453
 Fuel Units & Descr: 976 - ROD
 Heavy Metal Mass: BOL=130 686kg, EOL=110 971kg
 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 25

II. Estimates

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 4291E-07	17,384 91	34,769 81	0 00E+00	2 48E-03	4 97E-03	Avg MeV	
Am-241	6 7476E-07	17,384 91	34,769 81	0 00E+00	1 17E-02	2 35E-02	0 0150	1 609E+15
Am-242m	0 0000E+00	17,384 91	34,769 81	0 00E+00	0 00E+00	0 00E+00	0 0250	3 342E+14
Am-243	8 3651E-15	17,384 91	34,769 81	0 00E+00	1 45E-10	2 91E-10	0 0375	2 946E+14
C-14	2 1680E-05	17,384 91	34,769 81	0 00E+00	3 77E-01	7 54E-01	0 0575	3 114E+14
Cl-36	5 5188E-08	17,384 91	34,769 81	0 00E+00	9 59E-04	1 92E-03	0 0850	1 881E+14
Cm-243	1 0760E-14	17,384 91	34,769 81	0 00E+00	1 87E-10	3 74E-10	0 1250	1 218E+14
Cm-244	2 9486E-16	17,384 91	34,769 81	0 00E+00	5 13E-12	1 03E-11	0 2250	1 617E+14
Co-60	2 9128E-04	17,384 91	34,769 81	0 00E+00	5 06E+00	1 01E+01	0 3750	7 046E+13
Cs-134	4 0326E-09	17,384 91	34,769 81	0 00E+00	7 01E-05	1 40E-04	0 5750	1 258E+15
Cs-135	4 4996E-05	17,384 91	34,769 81	0 00E+00	7 82E-01	1 56E+00	0 8500	1 146E+13
Cs-137	9 7388E-01	17,384 91	34,769 81	0 00E+00	1 69E+04	3 39E+04	1 2500	4 556E+12
Eu-154	5 5290E-05	17,384 91	34,769 81	0 00E+00	9 61E-01	1 92E+00	1 7500	2 953E+11
Eu-155	1 7402E-04	17,384 91	34,769 81	0 00E+00	3 03E+00	6 05E+00	2 2500	2 633E+07
Fe-55	2 5922E-07	17,384 91	34,769 81	0 00E+00	4 52E-03	9 04E-03	2 7500	6 177E+06
H-3	1 5242E-03	17,384 91	34,769 81	0 00E+00	2 65E+01	5 30E+01	3 5000	6 003E+03
I-129	1 1426E-06	17,384 91	34,769 81	0 00E+00	1 99E-02	3 97E-02	5 0000	1 995E+03
Kr-85	1 4635E-02	17,384 91	34,769 81	0 00E+00	2 54E+02	5 09E+02	7 0000	1 627E+02
Np-237	3 3099E-06	17,384 91	34,769 81	0 00E+00	5 75E-02	1 15E-01	11 0000	1 425E+01
Pa-231	2 4492E-07	17,384 91	34,769 81	0 00E+00	4 26E-03	8 52E-03		
Pb-210	1 7794E-11	17,384 91	34,769 81	0 00E+00	3 09E-07	6 19E-07		
Pm-147	2 2021E-05	17,384 91	34,769 81	0 00E+00	3 83E-01	7 66E-01		
Pu-238	1 5235E-04	17,384 91	34,769 81	0 00E+00	2 65E+00	5 30E+00		
Pu-239	1 9464E-02	17,384 91	34,769 81	0 00E+00	3 38E+02	6 77E+02		
Pu-240	6 7817E-05	17,384 91	34,769 81	0 00E+00	1 18E+00	2 36E+00		
Pu-241	2 0282E-06	17,384 91	34,769 81	0 00E+00	3 53E-02	7 05E-02		
Pu-242	4 3751E-13	17,384 91	34,769 81	0 00E+00	7 61E-09	1 52E-08		
Ra-226	4 0632E-11	17,384 91	34,769 81	0 00E+00	7 06E-07	1 41E-06		
Ra-228	2 3674E-11	17,384 91	34,769 81	0 00E+00	4 12E-07	8 23E-07		
Ru-106	1 0255E-14	17,384 91	34,769 81	0 00E+00	1 78E-10	3 57E-10		
Se-79	1 6485E-05	17,384 91	34,769 81	0 00E+00	2 87E-01	5 73E-01		
Sn-126	3 7564E-05	17,384 91	34,769 81	0 00E+00	6 53E-01	1 31E+00		
Sr-90	8 4333E-01	17,384 91	34,769 81	0 00E+00	1 47E+04	2 93E+04		
Tc-99	4 4825E-04	17,384 91	34,769 81	0 00E+00	7 79E+00	1 56E+01		
Th-229	6 0880E-11	17,384 91	34,769 81	0 00E+00	1 06E-06	2 12E-06		
Th-230	2 8889E-09	17,384 91	34,769 81	0 00E+00	5 02E-05	1 00E-04		
Th-232	2 3708E-11	17,384 91	34,769 81	0 00E+00	4 12E-07	8 24E-07		
Tl-208	5 0432E-09	17,384 91	34,769 81	0 00E+00	8 77E-05	1 75E-04		
U-232	1 3640E-08	17,384 91	34,769 81	0 00E+00	2 37E-04	4 74E-04		
U-233	1 0327E-08	17,384 91	34,769 81	0 00E+00	1 80E-04	3 59E-04		
U-234	4 9103E-06	17,384 91	34,769 81	0 00E+00	8 54E-02	1 71E-01		
U-235	-2 3191E-06	17,384 91	0 00	7 26E-02	3 22E-02	7 26E-02		
U-236	1 2633E-05	17,384 91	34,769 81	0 00E+00	2 20E-01	4 39E-01		
U-238	-9 5407E-08	17,384 91	0 00	3 26E-02	3 10E-02	3 26E-02		
Y-90	8 4350E-01	17,384 91	34,769 81	0 00E+00	1 47E+04	2 93E+04		
Other Radionuclides					1 70E+04	3 41E+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 cladding.
Fuel Cladding	NONE	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	25 69081404	10 to 40	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	209 10	17,384 91	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding	361 35	34 769 81	

Checks			Estimated EOL HM/Gven 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 FERM CORE 1 & 2 (SECTIONED)
 SNF ID # 454
 Fuel Units & Descr: 980 - ROD
 Heavy Metal Mass BOL=131.222kg EOL=125 048kg
 ROD Storage Site INEEL

¹Fuel decay start date 1972
 Estimates as of 2030
 Template FERM (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

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	1.4291E-07	5,444.25	10,888.49	0.00E+00	7.78E-04	1.56E-03	Avg MeV	
Am-241	6.7476E-07	5,444.25	10,888.49	0.00E+00	3.67E-03	7.35E-03	0.0150	5.040E+14
Am-242m	0.0000E+00	5,444.25	10,888.49	0.00E+00	0.00E+00	0.00E+00	0.0250	1.046E+14
Am-243	8.3651E-15	5,444.25	10,888.49	0.00E+00	4.55E-11	9.11E-11	0.0375	9.226E+13
C-14	2.1680E-05	5,444.25	10,888.49	0.00E+00	1.18E-01	2.36E-01	0.0575	9.750E+13
Cl-36	5.5188E-08	5,444.25	10,888.49	0.00E+00	3.00E-04	6.01E-04	0.0850	5.889E+13
Cm-243	1.0760E-14	5,444.25	10,888.49	0.00E+00	5.86E-11	1.17E-10	0.1250	3.814E+13
Cm-244	2.9486E-16	5,444.25	10,888.49	0.00E+00	1.61E-12	3.21E-12	0.2250	5.064E+13
Co-60	2.9128E-04	5,444.25	10,888.49	0.00E+00	1.59E+00	3.17E+00	0.3750	2.207E+13
Cs-134	4.0326E-09	5,444.25	10,888.49	0.00E+00	2.20E-05	4.39E-05	0.5750	3.939E+14
Cs-135	4.4996E-05	5,444.25	10,888.49	0.00E+00	2.45E-01	4.90E-01	0.8500	3.590E+12
Cs-137	9.7388E-01	5,444.25	10,888.49	0.00E+00	5.30E+03	1.06E+04	1.2500	1.427E+12
Eu-154	5.5290E-05	5,444.25	10,888.49	0.00E+00	3.01E-01	6.02E-01	1.7500	9.248E+10
Eu-155	1.7402E-04	5,444.25	10,888.49	0.00E+00	9.47E-01	1.89E+00	2.2500	1.138E+07
Fe-55	2.5992E-07	5,444.25	10,888.49	0.00E+00	1.42E-03	2.83E-03	2.7500	1.935E+06
H-3	1.5242E-03	5,444.25	10,888.49	0.00E+00	8.30E+00	1.66E+01	3.5000	2.002E+03
I-129	1.1426E-06	5,444.25	10,888.49	0.00E+00	6.22E-03	1.24E-02	5.0000	6.770E+02
Kr-85	1.4635E-02	5,444.25	10,888.49	0.00E+00	7.97E+01	1.59E+02	7.0000	5.697E+01
Np-237	3.3099E-06	5,444.25	10,888.49	0.00E+00	1.80E-02	3.60E-02	11.0000	5.155E+00
Pa-231	2.4492E-07	5,444.25	10,888.49	0.00E+00	1.33E-03	2.67E-03		
Pb-210	1.7794E-11	5,444.25	10,888.49	0.00E+00	9.69E-08	1.94E-07		
Pm-147	2.2021E-05	5,444.25	10,888.49	0.00E+00	1.20E-01	2.40E-01		
Pu-238	1.5235E-04	5,444.25	10,888.49	0.00E+00	8.29E-01	1.66E+00		
Pu-239	1.9464E-02	5,444.25	10,888.49	0.00E+00	1.06E+02	2.12E+02		
Pu-240	6.7817E-05	5,444.25	10,888.49	0.00E+00	3.69E-01	7.38E-01		
Pu-241	2.0282E-06	5,444.25	10,888.49	0.00E+00	1.10E-02	2.21E-02		
Pu-242	4.3751E-13	5,444.25	10,888.49	0.00E+00	2.38E-09	4.76E-09		
Ra-226	4.0632E-11	5,444.25	10,888.49	0.00E+00	2.21E-07	4.42E-07		
Ra-228	2.3674E-11	5,444.25	10,888.49	0.00E+00	1.29E-07	2.58E-07		
Ru-106	1.0255E-14	5,444.25	10,888.49	0.00E+00	5.58E-11	1.12E-10		
Se-79	1.6485E-05	5,444.25	10,888.49	0.00E+00	8.97E-02	1.79E-01		
Sn-126	3.7564E-05	5,444.25	10,888.49	0.00E+00	2.05E-01	4.09E-01		
Sr-90	8.4333E-01	5,444.25	10,888.49	0.00E+00	4.59E+03	9.18E+03		
Tc-99	4.4825E-04	5,444.25	10,888.49	0.00E+00	2.44E+00	4.88E+00		
Th-229	6.0880E-11	5,444.25	10,888.49	0.00E+00	3.31E-07	6.63E-07		
Th-230	2.8889E-09	5,444.25	10,888.49	0.00E+00	1.57E-05	3.15E-05		
Th-232	2.3708E-11	5,444.25	10,888.49	0.00E+00	1.29E-07	2.58E-07		
Ti-208	5.0432E-09	5,444.25	10,888.49	0.00E+00	2.75E-05	5.49E-05		
U-232	1.3640E-08	5,444.25	10,888.49	0.00E+00	7.43E-05	1.49E-04		
U-233	1.0327E-08	5,444.25	10,888.49	0.00E+00	5.62E-05	1.12E-04		
U-234	4.9103E-06	5,444.25	10,888.49	0.00E+00	2.67E-02	5.35E-02		
U-235	-2.3191E-06	5,444.25	0.00	7.29E-02	6.02E-02	7.29E-02		
U-236	1.2633E-05	5,444.25	10,888.49	0.00E+00	6.88E-02	1.38E-01		
U-238	-9.5407E-08	5,444.25	0.00	3.28E-02	3.23E-02	3.28E-02		
Y-90	8.4350E-01	5,444.25	10,888.49	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

		From SFD	Used	Basis for Parameter Differences:
Reactor Moderator		FAST	FAST	
Fuel Cladding		ZIRC	ZIRC	
BOL HM Constituents		U	U	
BOL Enrichment %		25.69081404	10 to 40	

Burnup Summary (MWd)²

		From SFD	Estimated	Basis for burnup used in estimate:
Nominal		209.96	5,444.25	
Bounding		362.83	10,888.49	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	
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=56.238kg, EOL=55 398kg
 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

Radionuclide	m		x _a		y _a		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	1 4291E-07	740.71	1,481 43	0 00E+00	1 06E-04	2 12E-04	Avg. MeV	
Am-241	6 7476E-07	740.71	1,481 43	0 00E+00	5 00E-04	1 00E-03	0 0150	6 857E+13
Am-242m	0 0000E+00	740.71	1,481 43	0 00E+00	0 00E+00	0 00E+00	0 0250	1 424E+13
Am-243	8 3651E-15	740.71	1,481 43	0 00E+00	6 20E-12	1 24E-11	0 0375	1 255E+13
C-14	2 1680E-05	740.71	1,481 43	0 00E+00	1 61E-02	3 21E-02	0 0575	1 327E+13
Cl-36	5 5188E-08	740 71	1,481 43	0 00E+00	4 09E-05	8 18E-05	0 0850	8 013E+12
Cm-243	1 0760E-14	740 71	1,481 43	0 00E+00	7 97E-12	1 59E-11	0 1250	5 189E+12
Cm-244	2 9486E-16	740 71	1,481 43	0 00E+00	2 18E-13	4 37E-13	0 2250	6 890E+12
Co-60	2 9128E-04	740 71	1,481 43	0 00E+00	2 16E-01	4 32E-01	0 3750	3 002E+12
Cs-134	4 0326E-09	740 71	1,481 43	0 00E+00	2 99E-06	5 97E-06	0 5750	5 359E+13
Cs-135	4 4996E-05	740 71	1,481 43	0 00E+00	3 33E-02	6 67E-02	0 8500	4 884E+11
Cs-137	9 7388E-01	740 71	1,481 43	0 00E+00	7 21E+02	1 44E+03	1 2500	1 941E+11
Eu-154	5 5290E-05	740 71	1,481 43	0 00E+00	4 10E-02	8 19E-02	1 7500	1 258E+10
Eu-155	1 7402E-04	740 71	1,481 43	0 00E+00	1 29E-01	2 58E-01	2 2500	1 548E+06
Fe-55	2 5992E-07	740 71	1,481 43	0 00E+00	1 93E-04	3 85E-04	2 7500	2 633E+05
H-3	1 5242E-03	740 71	1,481 43	0 00E+00	1 13E+00	2 26E+00	3 5000	3 241E+02
I-129	1 1426E-06	740 71	1,481 43	0 00E+00	8 46E-04	1 69E-03	5 0000	1 144E+02
Kr-85	1 4635E-02	740 71	1,481 43	0 00E+00	1 08E+01	2 17E+01	7 0000	1 031E-01
Np-237	3 3099E-06	740 71	1,481 43	0 00E+00	2 45E-03	4 90E-03	11.0000	9 957E-01
Pa-231	2 4492E-07	740 71	1,481 43	0 00E+00	1 81E-04	3 63E-04		
Pb-210	1 7794E-11	740 71	1,481 43	0 00E+00	1 32E-08	2 64E-08		
Pm-147	2 2021E-05	740 71	1,481 43	0 00E+00	1 63E-02	3 26E-02		
Pu-238	1 5235E-04	740 71	1,481 43	0 00E+00	1 13E-01	2 26E-01		
Pu-239	1 9464E-02	740 71	1,481 43	0 00E+00	1 44E+01	2 88E+01		
Pu-240	6 7817E-05	740 71	1,481 43	0 00E+00	5 02E-02	1 00E-01		
Pu-241	2 0282E-06	740 71	1 481 43	0 00E+00	1 50E-03	3 00E-03		
Pu-242	4 3751E-13	740 71	1,481 43	0 00E+00	3 24E-10	6 48E-10		
Ra-226	4 0632E-11	740 71	1,481 43	0 00E+00	3 01E-08	6 02E-08		
Ra-228	2 3674E-11	740 71	1,481 43	0 00E+00	1 75E-08	3 51E-08		
Ru-106	1 0255E-14	740 71	1,481 43	0 00E+00	7 60E-12	1 52E-11		
Se-79	1 6485E-05	740 71	1,481 43	0 00E+00	1 22E-02	2 44E-02		
Sn-126	3 7564E-05	740 71	1,481 43	0 00E+00	2 78E-02	5 56E-02		
Sr-90	8 4333E-01	740 71	1,481 43	0 00E+00	6 25E+02	1 25E+03		
Tc-99	4 4825E-04	740 71	1,481 43	0 00E+00	3 32E-01	6 64E-01		
Th-229	6 0880E-11	740 71	1,481 43	0 00E+00	4 51E-08	9 02E-08		
Th-230	2 8889E-09	740 71	1,481 43	0 00E+00	2 14E-06	4 28E-06		
Th-232	2 3708E-11	740 71	1,481 43	0 00E+00	1 76E-08	3 51E-08		
Tl-208	5 0432E-09	740 71	1,481 43	0 00E+00	3 74E-06	7 47E-06		
U-232	1 3640E-08	740 71	1,481 43	0 00E+00	1 01E-05	2 02E-05		
U-233	1 0327E-08	740 71	1,481 43	0 00E+00	7 65E-06	1 53E-05		
U-234	4 9103E-06	740 71	1,481 43	0 00E+00	3 64E-03	7 27E-03		
U-235	2 3191E-06	740 71	0 00	3 12E-02	2 95E-02	3 12E-02		
U-236	1 2633E-05	740.71	1,481.43	0 00E+00	9 36E-03	1 87E-02		
U-238	-9 5407E-08	740.71	0 00	1 40E-02	1 40E-02	1 40E-02		
Y-90	8 4350E-01	740 71	1,481 43	0 00E+00	6 25E+02	1 25E+03		
Other Radionuclides					7 26E+02	1 45E+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	U	
BOL Enrichment %	25 69081404	10 to 40	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	89.98	740 71	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding	155.50	1 481 43	

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 FERM1 CORE 1 & 2 (STD FUEL SUBASSEMBLY) ¹Fuel decay start date 1972
 SNF ID # 456 Estimates as of 2030
 Fuel Units & Descr: 27160 - ROD Template FERM1 (Fast Zirc 10 to 40%, U)
 Heavy Metal Mass BOL=3636 724kg EOL=3566 106kg ²Template Burnup(MWd) 58 6725048
 ROD Storage Site INEEL Template BOL Heavy Metal Mass (MT) 0 018774
 Template Decay Time 50 years

Estimated
Canister usage
18"x10"
7 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 4291E-07	62,269.34	124,538.69	0 00E+00	8 90E-03	1.78E-02	0.0150	5 764E+15
Am-241	6 7476E-07	62,269.34	124,538.69	0 00E+00	4.20E-02	8 40E-02	0.0250	1 197E+15
Am-242m	0 0000E+00	62,269.34	124,538.69	0 00E+00	0 00E+00	0 00E+00	0.0375	1 055E+15
Am-243	8.3651E-15	62,269.34	124,538.69	0 00E+00	5.21E-10	1 04E-09	0.0575	1 115E+15
C-14	2 1680E-05	62,269.34	124,538.69	0 00E+00	1.35E+00	2 70E+00	0.0850	6 736E+14
Ci-36	5 5188E-08	62,269.34	124,538.69	0 00E+00	3 44E-03	6 87E-03	0 1250	4 963E+14
Cm-243	1 0760E-14	62,269.34	124,538.69	0 00E+00	6 70E-10	1 34E-09	0.2250	5 792E+14
Cm-244	2 9486E-16	62,269.34	124,538.69	0 00E+00	1 84E-11	3 67E-11	0 3750	2 524E+14
Co-60	2 9128E-04	62,269.34	124,538.69	0 00E+00	1 81E+01	3 63E+01	0.5750	4 506E+15
Cs-134	4 0326E-09	62,269.34	124,538.69	0 00E+00	2 51E-04	5 02E-04	0.8500	4 106E+13
Cs-135	4 4996E-05	62,269.34	124,538.69	0 00E+00	2 80E+00	5 60E+00	1.2500	1 632E+13
Cs-137	9 7388E-01	62,269.34	124,538.69	0 00E+00	6 06E+04	1.21E+05	1 7500	1 058E+12
Eu-154	5 5290E-05	62,269.34	124,538.69	0 00E+00	3 44E+00	6 89E+00	2.2500	1.301E+08
Eu-155	1.7402E-04	62,269.34	124,538.69	0 00E+00	1 08E+01	2 17E+01	2 7500	2.213E+07
Fe-55	2 5992E-07	62,269.34	124,538.69	0 00E+00	1 62E-02	3 24E-02	3 5000	2 578E+04
H-3	1.5242E-03	62,269.34	124,538.69	0 00E+00	9 49E+01	1 90E+02	5 0000	8 981E+03
I-129	1 1426E-06	62,269.34	124,538.69	0 00E+00	7 11E-02	1 42E-01	7 0000	7.940E+02
Kr-85	1 4635E-02	62,269.34	124,538.69	0 00E+00	9 11E+02	1 82E+03	11 0000	7 534E+01
Np-237	3 3099E-06	62,269.34	124,538.69	0 00E+00	2 06E-01	4 12E-01		
Pa-231	2 4492E-07	62,269.34	124,538.69	0 00E+00	1 53E-02	3 05E-02		
Pb-210	1 7794E-11	62,269.34	124,538.69	0 00E+00	1 11E-06	2.22E-06		
Pm-147	2.2021E-05	62,269.34	124,538.69	0 00E+00	1 37E+00	2 74E+00		
Pu-238	1.5235E-04	62,269.34	124,538.69	0 00E+00	9 49E+00	1.90E+01		
Pu-239	1 9464E-02	62,269.34	124,538.69	0 00E+00	1.21E+03	2.42E+03		
Pu-240	6.7817E-05	62,269.34	124,538.69	0 00E+00	4 22E+00	8 45E+00		
Pu-241	2 0282E-06	62,269.34	124,538.69	0 00E+00	1.26E-01	2 53E-01		
Pu-242	4 3751E-13	62,269.34	124,538.69	0 00E+00	2 72E-08	5 45E-08		
Ra-226	4 0632E-11	62,269.34	124,538.69	0 00E+00	2 53E-06	5 06E-06		
Ra-228	2 3674E-11	62,269.34	124,538.69	0 00E+00	1 47E-06	2 95E-06		
Ru-106	1 0255E-14	62,269.34	124,538.69	0 00E+00	6 39E-10	1.28E-09		
Se-79	1 6485E-05	62,269.34	124,538.69	0 00E+00	1 03E+00	2 05E+00		
Sn-126	3 7564E-05	62,269.34	124,538.69	0 00E+00	2 34E+00	4 68E+00		
Sr-90	8 4333E-01	62,269.34	124,538.69	0 00E+00	5 25E+04	1.05E+05		
Tc-99	4 4825E-04	62,269.34	124,538.69	0 00E+00	2 79E+01	5.58E+01		
Th-229	6 0880E-11	62,269.34	124,538.69	0 00E+00	3.79E-06	7 58E-06		
Th-230	2.8889E-09	62,269.34	124,538.69	0 00E+00	1 80E-04	3 60E-04		
Th-232	2.3708E-11	62,269.34	124,538.69	0 00E+00	1 48E-06	2 95E-06		
Ti-208	5 0432E-09	62,269.34	124,538.69	0 00E+00	3 14E-04	6 28E-04		
U-232	1.3640E-08	62,269.34	124,538.69	0 00E+00	8 49E-04	1.70E-03		
U-233	1 0327E-08	62,269.34	124,538.69	0 00E+00	6 43E-04	1.29E-03		
U-234	4 9103E-06	62,269.34	124,538.69	0 00E+00	3 06E-01	6 12E-01		
U-235	-2.3191E-06	62,269.34	0 00	2.02E+00	1 87E+00	2.02E+00		
U-236	1.2633E-05	62,269.34	124,538.69	0 00E+00	7 87E-01	1.57E+00		
U-238	-9 5407E-08	62,269.34	0 00	9 08E-01	9 02E-01	9 08E-01		
Y-90	8 4350E-01	62,269.34	124,538.69	0 00E+00	5.25E+04	1 05E+05		
Other Radionuclides					6 10E+04	1 22E+05		

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	U	
BOL Enrichment %	25 69081404	10 to 40	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		62,269.34	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding	5,818.76	124,538.69	

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 EXPER
 SNF ID #: 347
 Fuel Units & Descr: 15 - ELEMENT
 Heavy Metal Mass: BOL= : EOL=7.356kg
 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

Radionuclide	Ci/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	6.1822E-12	525.78	652.69	0.00E+00	3.25E-09	4.04E-09	Avg. MeV	
Am-241	1.1066E-01	525.78	652.69	1.52E+01	7.34E+01	8.74E+01	0.0150	2.179E+13
Am-242m	1.9247E-03	525.78	652.69	0.00E+00	1.01E+00	1.26E+00	0.0250	4.253E+12
Am-243	1.0740E-04	525.78	652.69	0.00E+00	5.65E-02	7.01E-02	0.0375	4.933E+12
C-14	2.6042E-05	525.78	652.69	0.00E+00	1.37E-02	1.70E-02	0.0575	5.026E+12
Cl-36	3.4243E-10	525.78	652.69	0.00E+00	1.80E-07	2.24E-07	0.0850	2.362E+12
Cm-243	4.0629E-04	525.78	652.69	0.00E+00	2.14E-01	2.65E-01	0.1250	1.663E+12
Cm-244	1.6024E-03	525.78	652.69	0.00E+00	8.43E-01	1.05E+00	0.2250	1.906E+12
Co-60	3.4275E-03	525.78	652.69	0.00E+00	1.80E+00	2.24E+00	0.3750	8.265E+11
Cs-134	1.5566E-03	525.78	652.69	0.00E+00	8.18E-01	1.02E+00	0.5750	3.348E+11
Cs-135	4.7693E-05	525.78	652.69	0.00E+00	2.51E-02	3.11E-02	0.8500	3.498E+11
Cs-137	1.4007E+00	525.78	652.69	0.00E+00	7.36E+02	9.14E+02	1.2500	4.187E+11
Eu-154	1.6184E-02	525.78	652.69	0.00E+00	8.51E+00	1.06E+01	1.7500	9.471E+09
Eu-155	1.3774E-02	525.78	652.69	0.00E+00	7.24E+00	8.99E+00	2.2500	1.932E+06
Fe-55	3.8028E-04	525.78	652.69	0.00E+00	2.00E-01	2.48E-01	2.7500	1.084E+07
H-3	3.8454E-03	525.78	652.69	0.00E+00	2.02E+00	2.51E+00	3.5000	6.964E+04
I-129	1.2891E-06	525.78	652.69	0.00E+00	6.78E-04	8.41E-04	5.0000	2.524E+04
Kr-85	2.7848E-02	525.78	652.69	0.00E+00	1.46E+01	1.82E+01	7.0000	2.878E+03
Np-237	3.7516E-06	525.78	652.69	0.00E+00	1.97E-03	2.45E-03	11.0000	3.291E+02
Pa-231	1.2488E-11	525.78	652.69	0.00E+00	6.57E-09	8.15E-09		
Pb-210	2.4206E-12	525.78	652.69	0.00E+00	1.27E-09	1.58E-09		
Pm-147	1.5671E-02	525.78	652.69	0.00E+00	8.24E+00	1.02E+01		
Pu-238	1.4877E-02	525.78	652.69	0.00E+00	7.82E+00	9.71E+00		
Pu-239	-3.5520E-02	525.78	0.00	1.25E+02	1.06E+02	1.25E+02		
Pu-240	2.0690E-02	525.78	652.69	6.34E+01	7.43E+01	7.69E+01		
Pu-241	-1.4799E+00	525.78	0.00	2.85E+03	2.07E+03	2.85E+03		
Pu-242	1.1252E-05	525.78	652.69	1.69E-02	2.28E-02	2.43E-02		
Ra-226	7.8524E-12	525.78	652.69	0.00E+00	4.13E-09	5.13E-09		
Ra-228	2.4086E-16	525.78	652.69	0.00E+00	1.27E-13	1.57E-13		
Ru-106	1.5066E-05	525.78	652.69	0.00E+00	7.92E-03	9.83E-03		
Se-79	1.0127E-05	525.78	652.69	0.00E+00	5.32E-03	6.61E-03		
Sn-126	4.3902E-05	525.78	652.69	0.00E+00	2.31E-02	2.87E-02		
Sr-90	5.0088E-01	525.78	652.69	0.00E+00	2.63E+02	3.27E+02		
Tc-99	3.9412E-04	525.78	652.69	0.00E+00	2.07E-01	2.57E-01		
Th-229	2.7219E-12	525.78	652.69	0.00E+00	1.43E-09	1.78E-09		
Th-230	1.0441E-09	525.78	652.69	0.00E+00	5.49E-07	6.81E-07		
Th-232	3.1689E-16	525.78	652.69	0.00E+00	1.67E-13	2.07E-13		
Ti-208	4.6636E-07	525.78	652.69	0.00E+00	2.45E-04	3.04E-04		
U-232	1.2638E-06	525.78	652.69	0.00E+00	6.64E-04	8.25E-04		
U-233	5.7451E-10	525.78	652.69	0.00E+00	3.02E-07	3.75E-07		
U-234	4.3044E-06	525.78	652.69	0.00E+00	2.26E-03	2.81E-03		
U-235	-7.7765E-09	525.78	0.00	2.56E+05	2.15E+05	2.56E+05		
U-236	1.8050E-07	525.78	652.69	0.00E+00	9.49E-05	1.18E-04		
U-238	-1.7914E-07	525.78	0.00	1.86E+03	1.77E+03	1.86E+03		
Y-90	5.0088E-01	525.78	652.69	0.00E+00	2.63E+02	3.27E+02		
Other Radionuclides					7.45E+02	9.25E+02		

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:	Pu and U	Pu and U	
BOL Enrichment %:		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		525.78	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		652.69	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.44		1.00
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 OXIDE EXPERIMENTS** Fuel decay start date **1993**
 SNF ID # **349** Estimates as of **2030**
 Fuel Units & Descr: **1 - HEX ARRAY 91 ROD** Template **FFTF (FAST, SST, 10 to 30% Pu & U)**
 Heavy Metal Mass **BOL= ; EOL=0.249kg** ³Template Burnup(MWd): **5011.2**
 ROD Storage Site: **INEEL** Template BOL Heavy Metal Mass (MT) **0.0329181**
 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	6.1822E-12	33.98	62.29	0.00E+00	2.10E-10	3.85E-10	Avg MeV	
Am-241	1.1066E-01	33.98	62.29	5.46E-01	4.31E+00	7.44E+00	0.0150	2.031E+12
Am-242m	1.9247E-03	33.98	62.29	0.00E+00	6.54E-02	1.20E-01	0.0250	4.051E+11
Am-243	1.0740E-04	33.98	62.29	0.00E+00	3.65E-03	6.69E-03	0.0375	4.707E+11
C-14	2.6042E-05	33.98	62.29	0.00E+00	8.85E-04	1.62E-03	0.0575	4.671E+11
Cf-252	3.4243E-10	33.98	62.29	0.00E+00	1.16E-08	2.13E-08	0.0850	2.255E+11
Co-60	3.4275E-03	33.98	62.29	0.00E+00	1.38E-02	2.53E-02	0.1250	1.586E+11
Cr-51	4.0629E-04	33.98	62.29	0.00E+00	5.44E-02	9.98E-02	0.2250	1.819E+11
Cr-54	1.6024E-03	33.98	62.29	0.00E+00	1.16E-01	2.14E-01	0.3750	7.886E+10
Co-60	3.4275E-03	33.98	62.29	0.00E+00	1.38E-02	2.53E-02	0.5750	3.195E+12
Cs-134	1.5566E-03	33.98	62.29	0.00E+00	5.29E-02	9.70E-02	0.8500	3.338E+10
Cs-135	4.7693E-05	33.98	62.29	0.00E+00	1.62E-03	2.97E-03	1.2500	3.996E+10
Cs-137	1.4007E+00	33.98	62.29	0.00E+00	4.76E+01	8.72E+01	1.7500	9.039E+08
Eu-154	1.6184E-02	33.98	62.29	0.00E+00	5.50E-01	1.01E+00	2.2500	1.803E+05
Eu-155	1.3774E-02	33.98	62.29	0.00E+00	4.68E-01	8.58E-01	2.7500	1.032E+06
Fe-55	3.8028E-04	33.98	62.29	0.00E+00	1.29E-02	2.37E-02	3.5000	4.536E+03
H-3	3.8454E-03	33.98	62.29	0.00E+00	1.31E-01	2.40E-01	5.0000	1.513E+03
I-129	1.2891E-06	33.98	62.29	0.00E+00	4.38E-05	8.03E-05	7.0000	1.727E+02
Kr-85	2.7848E-02	33.98	62.29	0.00E+00	9.46E-01	1.73E+00	11.0000	1.975E+01
Np-237	3.7516E-06	33.98	62.29	0.00E+00	1.27E-04	2.34E-04		
Pa-231	1.2488E-11	33.98	62.29	0.00E+00	4.24E-10	7.78E-10		
Pb-210	2.4206E-12	33.98	62.29	0.00E+00	8.22E-11	1.51E-10		
Pm-147	1.5671E-02	33.98	62.29	0.00E+00	5.32E-01	9.76E-01		
Pu-238	1.4877E-02	33.98	62.29	0.00E+00	5.05E-01	9.27E-01		
Pu-239	-3.5520E-02	33.98	0.00	4.48E+00	3.27E+00	4.48E+00		
Pu-240	2.0690E-02	33.98	62.29	2.28E+00	2.98E+00	3.57E+00		
Pu-241	-1.4799E+00	33.98	0.00	1.02E+02	5.20E+01	1.02E+02		
Pu-242	1.1252E-05	33.98	62.29	6.07E-04	9.90E-04	1.31E-03		
Ra-226	7.8524E-12	33.98	62.29	0.00E+00	2.67E-10	4.89E-10		
Ra-228	2.4086E-16	33.98	62.29	0.00E+00	8.18E-15	1.50E-14		
Ru-106	1.5066E-05	33.98	62.29	0.00E+00	5.12E-04	9.38E-04		
Se-79	1.0127E-05	33.98	62.29	0.00E+00	3.44E-04	6.31E-04		
Sn-126	4.3902E-05	33.98	62.29	0.00E+00	1.49E-03	2.73E-03		
Sr-90	5.0088E-01	33.98	62.29	0.00E+00	1.70E+01	3.12E+01		
Tc-99	3.9412E-04	33.98	62.29	0.00E+00	1.34E-02	2.45E-02		
Th-229	2.7219E-12	33.98	62.29	0.00E+00	9.25E-11	1.70E-10		
Th-230	1.0441E-09	33.98	62.29	0.00E+00	3.55E-08	6.50E-08		
Th-232	3.1689E-16	33.98	62.29	0.00E+00	1.08E-14	1.97E-14		
Tl-208	4.6636E-07	33.98	62.29	0.00E+00	1.58E-05	2.90E-05		
U-232	1.2638E-06	33.98	62.29	0.00E+00	4.29E-05	7.87E-05		
U-233	5.7451E-10	33.98	62.29	0.00E+00	1.95E-08	3.58E-08		
U-234	4.3044E-06	33.98	62.29	0.00E+00	1.46E-04	2.68E-04		
U-235	-7.7765E-09	33.98	0.00	9.20E-07	6.56E-07	9.20E-07		
U-236	1.8050E-07	33.98	62.29	0.00E+00	6.13E-06	1.12E-05		
U-238	-1.7914E-07	33.98	0.00	6.70E-05	6.09E-05	6.70E-05		
Y-90	5.0088E-01	33.98	62.29	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		
	From SFD	Used
Reactor Moderator	FAST	FAST
Fuel Cladding	SST	SST
BOL HM Constituents	Pu and U	Pu and U
BOL Enrichment %	10 to 30	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		33.98
Bounding		62.29

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

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.79	1.00
Bounding	1.45	

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: FSVR
 SNF ID #: 86
 Fuel Units & Descr: 1464 - CARBON COATED PART
 Heavy Metal Mass BOL=15366 583kg, EOL=14725.937kg
 ROD Storage Site: FSV

¹Fuel decay start date: 1989
 Estimates as of: 2030
 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"
 292 80

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	605,875 77	722,229 41	0 00E+00	2 35E+00	2 80E+00	Avg MeV		
Am-241	3 1387E-03	605,875 77	722,229 41	0 00E+00	1 90E+03	2 27E+03	0 0150	5 068E+16	
Am-242m	2 3971E-06	605,875 77	722,229 41	0 00E+00	1 45E+00	1 73E+00	0 0250	1 038E+16	
Am-243	4 6069E-05	605,875 77	722,229 41	0 00E+00	2 79E+01	3 33E+01	0 0375	9 048E+15	
C-14	2 3121E-05	605,875 77	722,229 41	0 00E+00	1 40E+01	1 67E+01	0 0575	9 733E+15	
Cl-36	1 0667E-06	605,875 77	722,229 41	0 00E+00	6 46E-01	7 70E-01	0 0850	5 876E+15	
Cm-243	2 5357E-05	605,875 77	722,229 41	0 00E+00	1 54E+01	1 83E+01	0 1250	3 964E+15	
Cm-244	6 4458E-03	605,875 77	722,229 41	0 00E+00	3 91E+03	4 66E+03	0 2250	5 096E+15	
Co-60	4 5014E-04	605,875 77	722,229 41	0 00E+00	2 73E+02	3 25E+02	0 3750	2 204E+15	
Cs-134	3 8086E-05	605,875 77	722,229 41	0 00E+00	2 31E+01	2 75E+01	0 5750	3 577E+16	
Cs-135	2 4711E-05	605,875 77	722,229 41	0 00E+00	1 50E+01	1 78E+01	0 8500	5 653E+14	
Cs-137	1 3273E+00	605,875 77	722,229 41	0 00E+00	8 04E+05	9 59E+05	1 2500	3 644E+14	
Eu-154	1 5705E-02	605,875 77	722,229 41	0 00E+00	9 52E+03	1 13E+04	1 7500	1 731E+13	
Eu-155	1 0415E-03	605,875 77	722,229 41	0 00E+00	6 31E+02	7 52E+02	2 2500	1 275E+09	
Fe-55	4 4707E-08	605,875 77	722,229 41	0 00E+00	2 71E-02	3 23E-02	2 7500	1 510E+13	
H-3	3 9094E-03	605,875 77	722,229 41	0 00E+00	2 37E+03	2 82E+03	3 5000	7 211E+07	
I-129	1 0092E-06	605,875 77	722,229 41	0 00E+00	6 11E-01	7 29E-01	5 0000	3 075E+07	
Kr-85	3 9519E-02	605,875 77	722,229 41	0 00E+00	2 39E+04	2 85E+04	7 0000	3 533E+06	
Np-237	1 2541E-05	605,875 77	722,229 41	0 00E+00	7 60E+00	9 06E+00	11 0000	4 052E+05	
Pa-231	4 7376E-06	605,875 77	722,229 41	0 00E+00	2 87E+00	3 42E+00			
Pb-210	1 4194E-09	605,875 77	722,229 41	0 00E+00	8 60E-04	1 03E-03			
Pm-147	1 5146E-04	605,875 77	722,229 41	0 00E+00	9 18E+01	1 09E+02			
Pu-238	1 6248E-01	605,875 77	722,229 41	0 00E+00	9 84E+04	1 17E+05			
Pu-239	1 3580E-04	605,875 77	722,229 41	0 00E+00	8 23E+01	9 81E+01			
Pu-240	2 7136E-04	605,875 77	722,229 41	0 00E+00	1 64E+02	1 96E+02			
Pu-241	1 9342E-02	605,875 77	722,229 41	0 00E+00	1 17E+04	1 40E+04			
Pu-242	3 8866E-06	605,875 77	722,229 41	0 00E+00	2 35E+00	2 81E+00			
Ra-226	2 7923E-09	605,875 77	722,229 41	0 00E+00	1 69E-03	2 02E-03			
Ra-228	9 1791E-07	605,875 77	722,229 41	0 00E+00	5 56E-01	6 63E-01			
Ru-106	3 5205E-11	605,875 77	722,229 41	0 00E+00	2 13E-05	2 54E-05			
Se-79	2 1082E-05	605,875 77	722,229 41	0 00E+00	1 28E+01	1 52E+01			
Sn-126	2 2192E-05	605,875 77	722,229 41	0 00E+00	1 34E+01	1 60E+01			
Sr-90	1 2667E+00	605,875 77	722,229 41	0 00E+00	7 67E+05	9 15E+05			
Tc-99	3 3331E-04	605,875 77	722,229 41	0 00E+00	2 02E+02	2 41E+02			
Th-229	1 0612E-05	605,875 77	722,229 41	0 00E+00	6 43E+00	7 66E+00			
Th-230	1 8878E-07	605,875 77	722,229 41	0 00E+00	1 14E-01	1 36E-01			
Th-232	-6.9673E-08	605,875 77	0 00	1 52E+00	1 48E+00	1 52E+00			
Tl-208	5 9530E-04	605,875 77	722,229 41	0 00E+00	3 61E+02	4 30E+02			
U-232	1 6115E-03	605,875 77	722,229 41	0 00E+00	9 76E+02	1 16E+03			
U-233	2 0602E-03	605,875 77	722,229 41	0 00E+00	1 25E+03	1 49E+03			
U-234	2 8939E-04	605,875 77	722,229 41	0 00E+00	1 75E+02	2 09E+02			
U-235	-1 7343E-06	605,875 77	0 00	3 04E+00	1 99E+00	3 04E+00			
U-236	8 6281E-06	605,875 77	722,229 41	0 00E+00	5 23E+00	6 23E+00			
U-238	-5 6065E-09	605,875 77	0 00	3 02E-02	2 68E-02	3 02E-02			
Y-90	1 2667E+00	605,875 77	722,229 41	0 00E+00	7 67E+05	9 15E+05			
Other Radionuclides							7 72E+05	9 20E+05	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	GRAPHITE	GRAPHITE	
Fuel Cladding	GRAPHITE	GRAPHITE	
BOL HM Constituents	Th and U	Th and U	
BOL Enrichment %	93 15	60 to 100	

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		605,875 77	
Bounding	722,229 41	1,211,751 53	

Checks			Estimated EOL HM/Given EOL HM 1 00
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0 39		
Bounding	0 47	1 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: FSVR
 SNF ID #: 85
 Fuel Units & Descr: 744 - CARBON COATED PART
 Heavy Metal Mass BOL=8780 018kg EOL=8626 159kg
 ROD Storage Site INEEL

¹Fuel decay start date 1980
 Estimates as of 2030
 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 50 years

Estimated
 Canister usage:
 18"x15"
 148 80

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	4 2062E-06	145,508 60	412,660 86	0 00E+00	6 12E-01	1 74E+00	Avg MeV	
Am-241	3 2229E-03	145,508 60	412,660 86	0 00E+00	4 69E+02	1 33E+03	0 0150	2 031E+16
Am-242m	2 2381E-06	145,508 60	412,660 86	0 00E+00	3 26E-01	9 24E-01	0 0250	4 146E+15
Am-243	4 6006E-05	145,508 60	412,660 86	0 00E+00	6 69E+00	1 90E+01	0 0375	3 600E+15
C-14	2 3082E-05	145,508 60	412,660 86	0 00E+00	3 36E+00	9 52E+00	0 0575	3 888E+15
Cl-36	1 0667E-06	145,508 60	412,660 86	0 00E+00	1 55E-01	4 40E-01	0 0850	2 346E+15
Cm-243	1 7602E-05	145,508 60	412,660 86	0 00E+00	2 56E+00	7 26E+00	0 1250	1 544E+15
Cm-244	3 6307E-03	145,508 60	412,660 86	0 00E+00	5 28E+02	1 50E+03	0 2250	2 032E+15
Co-60	6 2585E-05	145,508 60	412,660 86	0 00E+00	9 11E+00	2 58E+01	0 3750	8 800E+14
Cs-134	2 4585E-07	145,508 60	412,660 86	0 00E+00	3 58E-02	1 01E-01	0 5750	1 444E+16
Cs-135	2 4711E-05	145,508 60	412,660 86	0 00E+00	3 60E+00	1 02E+01	0 8500	1 805E+14
Cs-137	9 3838E-01	145,508 60	412,660 86	0 00E+00	1 37E+05	3 87E+05	1 2500	8 715E+13
Eu-154	4 6887E-03	145,508 60	412,660 86	0 00E+00	6 82E+02	1 93E+03	1 7500	5 541E+12
Eu-155	1 2793E-04	145,508 60	412,660 86	0 00E+00	1 86E+01	5 28E+01	2 2500	4 610E+08
Fe-55	8 1951E-10	145,508 60	412,660 86	0 00E+00	1 19E-04	3 38E-04	2 7500	7 466E+12
H-3	1 6839E-03	145,508 60	412,660 86	0 00E+00	2 45E+02	6 95E+02	3 5000	2 462E+07
I-129	1 0092E-06	145,508 60	412,660 86	0 00E+00	1 47E-01	4 16E-01	5 0000	1 048E+07
Kr-85	1 4981E-02	145,508 60	412,660 86	0 00E+00	2 18E+03	6 18E+03	7 0000	1 203E+06
Np-237	1 2556E-05	145,508 60	412,660 86	0 00E+00	1 83E+00	5 18E+00	11.0000	1 378E+05
Pa-231	4 7360E-06	145,508 60	412,660 86	0 00E+00	6 89E-01	1 95E+00		
Pb-210	2 1901E-09	145,508 60	412,660 86	0 00E+00	3 19E-04	9 04E-04		
Pm-147	2 8781E-06	145,508 60	412,660 86	0 00E+00	4 19E-01	1 19E+00		
Pu-238	1 4430E-01	145,508 60	412,660 86	0 00E+00	2 10E+04	5 95E+04		
Pu-239	1 3572E-04	145,508 60	412,660 86	0 00E+00	1 97E+01	5 60E+01		
Pu-240	2 7537E-04	145,508 60	412,660 86	0 00E+00	4 01E+01	1 14E+02		
Pu-241	9 3995E-03	145,508 60	412,660 86	0 00E+00	1 37E+03	3 88E+03		
Pu-242	3 8866E-06	145,508 60	412,660 86	0 00E+00	5 66E-01	1 60E+00		
Ra-226	4 1243E-09	145,508 60	412,660 86	0 00E+00	6 00E-04	1 70E-03		
Ra-228	9 1949E-07	145,508 60	412,660 86	0 00E+00	1 34E-01	3 79E-01		
Ru-106	1 1667E-15	145,508 60	412,660 86	0 00E+00	1 70E-10	4 81E-10		
Se-79	2 1074E-05	145,508 60	412,660 86	0 00E+00	3 07E+00	8 70E+00		
Sn-126	2 2192E-05	145,508 60	412,660 86	0 00E+00	3 23E+00	9 16E+00		
Sr-90	8 8642E-01	145,508 60	412,660 86	0 00E+00	1 29E+05	3 66E+05		
Tc-99	3 3323E-04	145,508 60	412,660 86	0 00E+00	4 85E+01	1 38E+02		
Th-229	1 3517E-05	145,508 60	412,660 86	0 00E+00	1 97E+00	5 58E+00		
Th-230	2 2822E-07	145,508 60	412,660 86	0 00E+00	3 32E-02	9 42E-02		
Th-232	-6 9673E-08	145,508 60	0 00	8 68E-01	8 58E-01	8 68E-01		
Tl-208	5 1524E-04	145,508 60	412,660 86	0 00E+00	7 50E+01	2 13E+02		
U-232	1 3950E-03	145,508 60	412,660 86	0 00E+00	2 03E+02	5 76E+02		
U-233	2 0602E-03	145,508 60	412,660 86	0 00E+00	3 00E+02	8 50E+02		
U-234	2 9513E-04	145,508 60	412,660 86	0 00E+00	4 29E+01	1 22E+02		
U-235	-1 7343E-06	145,508 60	0 00	1 74E+00	1 48E+00	1 74E+00		
U-236	8 6281E-06	145,508 60	412,660 86	0 00E+00	1 26E+00	3 56E+00		
U-238	-5 6065E-09	145,508 60	0 00	1 73E-02	1 65E-02	1 73E-02		
Y-90	8 8642E-01	145,508 60	412,660 86	0 00E+00	1 29E+05	3 66E+05		
Other Radionuclides					1 31E+05	3 73E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8 50E+02	1 22E+02
2 33E+03	6 59E+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:	GRAPHITE	GRAPHITE	
BOL HM Constituents:	Th and U	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 60	Nominal burnup calculated from the heavy metal mass destroyed
Bounding	412 660 86	291,017.20	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=2.162kg EOL=2.081kg
 ROD Storage Site: INEEL

Fuel decay start date: 1996
 Estimates as of: 2030
 Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
 Template Burnup(MWd): 1270.275
 Template BOL Heavy Metal Mass (MT): 0.012702752
 Template Decay Time: 25 years

Estimated
 Canister usage:
 HIC
 1.00

Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Actvty (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.3583E-06	76.23	152.45	0.00E+00	2.56E-04	5.12E-04	Avg. MeV	
Am-241	2.8805E-03	76.23	152.45	0.00E+00	2.20E-01	4.39E-01	0.0150	1.357E+13
Am-242m	2.5089E-06	76.23	152.45	0.00E+00	1.91E-04	3.82E-04	0.0250	2.787E+12
Am-243	4.6116E-05	76.23	152.45	0.00E+00	3.52E-03	7.03E-03	0.0375	2.446E+12
C-14	2.3152E-05	76.23	152.45	0.00E+00	1.76E-03	3.53E-03	0.0575	2.613E+12
Cf-252	1.0667E-06	76.23	152.45	0.00E+00	8.13E-05	1.63E-04	0.0850	1.580E+12
Cm-243	3.2339E-05	76.23	152.45	0.00E+00	2.47E-03	4.93E-03	0.1250	1.100E+12
Cm-244	9.4546E-03	76.23	152.45	0.00E+00	7.21E-01	1.44E+00	0.2250	1.372E+12
Co-60	1.6776E-03	76.23	152.45	0.00E+00	1.28E-01	2.56E-01	0.3750	5.920E+11
Cs-134	1.0974E-03	76.23	152.45	0.00E+00	8.36E-02	1.67E-01	0.5750	9.534E+11
Cs-135	2.4711E-05	76.23	152.45	0.00E+00	1.88E-03	3.77E-03	0.8500	1.973E+11
Cs-137	1.6729E+00	76.23	152.45	0.00E+00	1.28E+02	2.55E+02	1.2500	1.558E+11
Eu-154	3.5166E-02	76.23	152.45	0.00E+00	2.68E+00	5.36E+00	1.7500	5.940E+09
Eu-155	4.2148E-03	76.23	152.45	0.00E+00	3.21E-01	6.43E-01	2.2500	4.126E+05
Fe-55	6.4301E-07	76.23	152.45	0.00E+00	4.90E-05	9.80E-05	2.7500	3.511E+09
H-3	6.8528E-03	76.23	152.45	0.00E+00	5.22E-01	1.04E+00	3.5000	2.175E+04
I-129	1.0092E-06	76.23	152.45	0.00E+00	7.69E-05	1.54E-04	5.0000	9.278E+03
Kr-85	7.5440E-02	76.23	152.45	0.00E+00	5.75E+00	1.15E+01	7.0000	1.067E+03
Np-237	1.2525E-05	76.23	152.45	0.00E+00	9.55E-04	1.91E-03	11.0000	1.224E+02
Pa-231	4.7383E-06	76.23	152.45	0.00E+00	3.61E-04	7.22E-04		
Pb-210	9.1476E-10	76.23	152.45	0.00E+00	6.97E-08	1.39E-07		
Pm-147	2.1271E-03	76.23	152.45	0.00E+00	1.62E-01	3.24E-01		
Pu-238	1.7587E-01	76.23	152.45	0.00E+00	1.34E+01	2.68E+01		
Pu-239	1.3580E-04	76.23	152.45	0.00E+00	1.04E-02	2.07E-02		
Pu-240	2.6404E-04	76.23	152.45	0.00E+00	2.01E-02	4.03E-02		
Pu-241	3.1300E-02	76.23	152.45	0.00E+00	2.39E+00	4.77E+00		
Pu-242	3.8866E-06	76.23	152.45	0.00E+00	2.96E-04	5.93E-04		
Ra-226	1.7059E-09	76.23	152.45	0.00E+00	1.30E-07	2.60E-07		
Ra-228	9.1083E-07	76.23	152.45	0.00E+00	6.94E-05	1.39E-04		
Ru-106	3.4126E-08	76.23	152.45	0.00E+00	2.60E-06	5.20E-06		
Se-79	2.1082E-05	76.23	152.45	0.00E+00	1.61E-03	3.21E-03		
Sn-126	2.2200E-05	76.23	152.45	0.00E+00	1.69E-03	3.38E-03		
Sr-90	1.6067E+00	76.23	152.45	0.00E+00	1.22E+02	2.45E+02		
Tc-99	3.3331E-04	76.23	152.45	0.00E+00	2.54E-02	5.08E-02		
Th-229	7.7062E-06	76.23	152.45	0.00E+00	5.87E-04	1.17E-03		
Th-230	1.5020E-07	76.23	152.45	0.00E+00	1.14E-05	2.29E-05		
Th-232	-6.9673E-08	76.23	0.00	2.14E-04	2.09E-04	2.14E-04		
Ti-208	6.5584E-04	76.23	152.45	0.00E+00	5.00E-02	1.00E-01		
U-232	1.7744E-03	76.23	152.45	0.00E+00	1.35E-01	2.71E-01		
U-233	2.0602E-03	76.23	152.45	0.00E+00	1.57E-01	3.14E-01		
U-234	2.8285E-04	76.23	152.45	0.00E+00	2.16E-02	4.31E-02		
U-235	-1.7343E-06	76.23	0.00	4.28E-04	2.95E-04	4.28E-04		
U-236	8.6281E-06	76.23	152.45	0.00E+00	6.58E-04	1.32E-03		
U-238	-5.6065E-09	76.23	0.00	4.25E-06	3.83E-06	4.25E-06		
Y-90	1.6067E+00	76.23	152.45	0.00E+00	1.22E+02	2.45E+02		
Other Radionuclides					1.22E+02	2.44E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	GRAPHITE	GRAPHITE	
Fuel Cladding	GRAPHITE	GRAPHITE	
BOL HM Constituents	Th and U	Th and U	
BOL Enrichment %	92.189	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		76.23	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding		152.45	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.35		1.00
Bounding	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 851kg EOL=3 071kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 Estimates as of: 2030
 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
 HIC
 0 50

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	8.5173E-10	744.21	1,488.42	0.00E+00	6.34E-07	1.27E-06	Avg MeV	
Am-241	1.8331E-03	744.21	1,488.42	0.00E+00	1.36E+00	2.73E+00	0.0150	2.406E+14
Am-242m	1.4129E-06	744.21	1,488.42	0.00E+00	1.05E-03	2.10E-03	0.0250	5.293E+13
Am-243	1.4774E-07	744.21	1,488.42	0.00E+00	1.10E-04	2.20E-04	0.0375	4.508E+13
C-14	1.2871E-04	744.21	1,488.42	0.00E+00	9.58E-02	1.92E-01	0.0575	4.627E+13
Cl-36	2.8120E-06	744.21	1,488.42	0.00E+00	2.09E-03	4.19E-03	0.0850	2.867E+13
Cm-243	1.7940E-07	744.21	1,488.42	0.00E+00	1.34E-04	2.67E-04	0.1250	2.082E+13
Cm-244	1.6962E-06	744.21	1,488.42	0.00E+00	1.26E-03	2.52E-03	0.2250	2.432E+13
Co-60	1.2839E+00	744.21	1,488.42	0.00E+00	9.56E+02	1.91E+03	0.3750	1.234E+13
Cs-134	9.0541E-02	744.21	1,488.42	0.00E+00	6.74E+01	1.35E+02	0.5750	1.641E+14
Cs-135	3.2195E-05	744.21	1,488.42	0.00E+00	2.40E-02	4.79E-02	0.8500	7.041E+12
Cs-137	2.7564E+00	744.21	1,488.42	0.00E+00	2.05E+03	4.10E+03	1.2500	1.430E+14
Eu-154	1.5368E-02	744.21	1,488.42	0.00E+00	1.14E+01	2.29E+01	1.7500	9.531E+10
Eu-155	2.9293E-02	744.21	1,488.42	0.00E+00	2.18E+01	4.36E+01	2.2500	1.536E+11
Fe-55	7.7158E-01	744.21	1,488.42	0.00E+00	5.74E+02	1.15E+03	2.7500	1.219E+09
H-3	1.1111E-02	744.21	1,488.42	0.00E+00	8.27E+00	1.65E+01	3.5000	1.419E+08
I-129	7.3684E-07	744.21	1,488.42	0.00E+00	5.48E-04	1.10E-03	5.0000	7.824E+02
Kr-85	2.5263E-01	744.21	1,488.42	0.00E+00	1.88E+02	3.76E+02	7.0000	8.856E+01
Np-237	1.2427E-06	744.21	1,488.42	0.00E+00	9.25E-04	1.85E-03	11.0000	1.009E+01
Pa-231	3.8511E-09	744.21	1,488.42	0.00E+00	2.87E-06	5.73E-06		
Pb-210	7.3880E-15	744.21	1,488.42	0.00E+00	5.50E-12	1.10E-11		
Pm-147	2.1023E+00	744.21	1,488.42	0.00E+00	1.56E+03	3.13E+03		
Pu-238	1.0383E-03	744.21	1,488.42	0.00E+00	7.73E-01	1.55E+00		
Pu-239	5.5293E-03	744.21	1,488.42	0.00E+00	4.11E+00	8.23E+00		
Pu-240	2.1278E-03	744.21	1,488.42	0.00E+00	1.58E+00	3.17E+00		
Pu-241	1.0195E-01	744.21	1,488.42	0.00E+00	7.59E+01	1.52E+02		
Pu-242	2.3128E-07	744.21	1,488.42	0.00E+00	1.72E-04	3.44E-04		
Ra-226	5.2782E-14	744.21	1,488.42	0.00E+00	3.93E-11	7.86E-11		
Ra-228	1.9338E-10	744.21	1,488.42	0.00E+00	1.44E-07	2.88E-07		
Ru-106	9.1684E-02	744.21	1,488.42	0.00E+00	6.82E+01	1.36E+02		
Se-79	1.3018E-05	744.21	1,488.42	0.00E+00	9.69E-03	1.94E-02		
Sn-126	1.2167E-05	744.21	1,488.42	0.00E+00	9.05E-03	1.81E-02		
Sr-90	2.6045E+00	744.21	1,488.42	0.00E+00	1.94E+03	3.88E+03		
Tc-99	4.4241E-04	744.21	1,488.42	0.00E+00	3.29E-01	6.58E-01		
Th-229	1.3713E-10	744.21	1,488.42	0.00E+00	1.02E-07	2.04E-07		
Th-230	1.8090E-11	744.21	1,488.42	0.00E+00	1.35E-08	2.69E-08		
Th-232	2.5278E-10	744.21	1,488.42	0.00E+00	1.88E-07	3.76E-07		
Tl-208	1.6947E-08	744.21	1,488.42	0.00E+00	1.26E-05	2.52E-05		
U-232	4.8737E-08	744.21	1,488.42	0.00E+00	3.63E-05	7.25E-05		
U-233	1.2203E-07	744.21	1,488.42	0.00E+00	9.08E-05	1.82E-04		
U-234	1.5925E-07	744.21	1,488.42	0.00E+00	1.19E-04	2.37E-04		
U-235	-2.6194E-06	744.21	0.00	1.65E-03	0.00E+00	1.65E-03		
U-236	1.2693E-05	744.21	1,488.42	0.00E+00	9.45E-03	1.89E-02		
U-238	-3.6331E-08	744.21	0.00	1.04E-03	1.01E-03	1.04E-03		
Y-90	2.6060E+00	744.21	1,488.42	0.00E+00	1.94E+03	3.88E+03		
Other Radionuclides					2.68E+03	5.37E+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	This Template was used for the following reasons This fuel matches on all parameters except cladding (SST is conservative)
Fuel Cladding	INCLOY	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	19.787	10 to 20 %	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		744.21	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding		1,488.42	

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: GCRC CAN (1B-8T 1&2)	Fuel decay start date: 1961	Estimated Canister usage: 18"x10" 0.08
SNF ID #: 94	Estimates as of: 2030	
Fuel Units & Descr: 1 - CANISTER OF SCRAP	Template: Pathfinder (Light Water, SST, 60 to 100%, U)	
Heavy Metal Mass: BOL=0.908kg, EOL=0.908kg	Template Burnup (MWd): 6.01	
ROD Storage Site: INEEL	Template BOL Heavy Metal Mass (MT): 0.00012882	
	Template Decay Time: 65 years	

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5940E-08	17.15	34.31	0.00E+00	7.88E-07	1.58E-06	Avg. MeV	
Am-241	1.1471E-04	17.15	34.31	0.00E+00	1.97E-03	3.94E-03	0.0150	1.252E+12
Am-242m	7.4210E-09	17.15	34.31	0.00E+00	1.27E-07	2.55E-07	0.0250	2.602E+11
Am-243	9.8236E-10	17.15	34.31	0.00E+00	1.69E-08	3.37E-08	0.0375	2.261E+11
C-14	2.2928E-04	17.15	34.31	0.00E+00	3.93E-03	7.87E-03	0.0575	2.426E+11
Cl-36	1.2260E-06	17.15	34.31	0.00E+00	2.10E-05	4.21E-05	0.0850	1.466E+11
Cm-243	1.2000E-10	17.15	34.31	0.00E+00	2.06E-09	4.12E-09	0.1250	9.503E+10
Cm-244	7.3577E-10	17.15	34.31	0.00E+00	1.26E-08	2.52E-08	0.2250	1.263E+11
Co-60	1.3732E-03	17.15	34.31	0.00E+00	2.38E-02	4.71E-02	0.3750	5.509E+10
Cs-134	1.2709E-10	17.15	34.31	0.00E+00	2.18E-09	4.36E-09	0.5750	9.267E+11
Cs-135	3.0316E-05	17.15	34.31	0.00E+00	5.20E-04	1.04E-03	0.8500	9.000E+09
Cs-137	7.2579E-01	17.15	34.31	0.00E+00	1.25E+01	2.49E+01	1.2500	6.514E+09
Eu-154	5.9750E-05	17.15	34.31	0.00E+00	1.03E-03	2.05E-03	1.7500	2.315E+08
Eu-155	1.0577E-05	17.15	34.31	0.00E+00	1.81E-04	3.63E-04	2.2500	4.379E+04
Fe-55	4.1631E-07	17.15	34.31	0.00E+00	7.14E-06	1.43E-05	2.7500	1.961E+04
H-3	4.6722E-04	17.15	34.31	0.00E+00	8.02E-03	1.60E-02	3.5000	2.139E+00
I-129	7.3195E-07	17.15	34.31	0.00E+00	1.26E-05	2.51E-05	5.0000	8.847E-01
Kr-85	5.9418E-03	17.15	34.31	0.00E+00	1.02E-01	2.04E-01	7.0000	9.792E-02
Np-237	1.1499E-06	17.15	34.31	0.00E+00	1.97E-05	3.95E-05	11.0000	1.100E-02
Pa-231	7.0899E-08	17.15	34.31	0.00E+00	1.22E-06	2.43E-06		
Pb-210	2.2363E-12	17.15	34.31	0.00E+00	3.84E-11	7.67E-11		
Pm-147	4.2296E-07	17.15	34.31	0.00E+00	7.26E-06	1.45E-05		
Pu-238	2.3295E-04	17.15	34.31	0.00E+00	4.00E-03	7.99E-03		
Pu-239	6.6722E-04	17.15	34.31	0.00E+00	1.14E-02	2.29E-02		
Pu-240	8.6556E-05	17.15	34.31	0.00E+00	1.48E-03	2.97E-03		
Pu-241	1.6889E-04	17.15	34.31	0.00E+00	2.90E-03	5.79E-03		
Pu-242	1.9717E-09	17.15	34.31	0.00E+00	3.38E-08	6.76E-08		
Ra-226	4.5740E-12	17.15	34.31	0.00E+00	7.85E-11	1.57E-10		
Ra-228	8.3511E-12	17.15	34.31	0.00E+00	1.43E-10	2.87E-10		
Ru-106	2.0516E-19	17.15	34.31	0.00E+00	3.52E-18	7.04E-18		
Se-79	1.3220E-05	17.15	34.31	0.00E+00	2.27E-04	4.54E-04		
Sn-126	1.1489E-05	17.15	34.31	0.00E+00	1.97E-04	3.94E-04		
Sr-90	6.6872E-01	17.15	34.31	0.00E+00	1.15E+01	2.29E+01		
Tc-99	4.6639E-04	17.15	34.31	0.00E+00	8.00E-03	1.60E-02		
Th-229	2.3727E-11	17.15	34.31	0.00E+00	4.07E-10	8.14E-10		
Th-230	2.7354E-10	17.15	34.31	0.00E+00	4.69E-09	9.39E-09		
Th-232	8.3594E-12	17.15	34.31	0.00E+00	1.43E-10	2.87E-10		
Tl-208	1.6228E-08	17.15	34.31	0.00E+00	2.78E-07	5.57E-07		
U-232	4.3960E-08	17.15	34.31	0.00E+00	7.54E-07	1.51E-06		
U-233	3.3344E-09	17.15	34.31	0.00E+00	5.72E-08	1.14E-07		
U-234	4.0749E-07	17.15	34.31	0.00E+00	6.99E-06	1.40E-05		
U-235	-2.7761E-06	17.15	0.00	1.83E-03	1.78E-03	1.83E-03		
U-236	1.6190E-05	17.15	34.31	0.00E+00	2.78E-04	5.55E-04		
U-238	-2.8547E-09	17.15	0.00	2.05E-05	2.05E-05	2.05E-05		
Y-90	6.6889E-01	17.15	34.31	0.00E+00	1.15E+01	2.29E+01		
Other Radionuclides					1.56E+01	3.12E+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 cladding (SST is conservative)
Fuel Cladding	NONE	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	93.282	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		17.15	Nominal burnup assumed to be 2% of BOL heavy metal mass Bounding burnup assumed to be twice nominal burnup.
Bounding		34.31	

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 date confirming that irradiation ceased for fuel

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name	GCPE PELLETS (1B-7T-1)	Fuel decay start date	1961
SNF ID #	95	Estimates as of	2030
Fuel Units & Descr	1 - CANISTER OF SCRAP	Template	Pathfinder (Light Water SST 60 to 100% U)
Heavy Metal Mass	BOL=0.074kg, EOL=0.074kg	*Template 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" 0.08
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Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5940E-08	1.40	2.79	0.00E+00	6.41E-08	1.28E-07	Avg MeV	
Am-241	1.1471E-04	1.40	2.79	0.00E+00	1.60E-04	3.20E-04	0.0150	1.019E+11
Am-242m	7.4210E-09	1.40	2.79	0.00E+00	1.04E-08	2.07E-08	0.0250	2.118E+10
Am-243	9.8236E-10	1.40	2.79	0.00E+00	1.37E-09	2.74E-09	0.0375	1.840E+10
C-14	2.2928E-04	1.40	2.79	0.00E+00	3.20E-04	6.40E-04	0.0575	1.975E+10
Cl-36	1.2260E-06	1.40	2.79	0.00E+00	1.71E-06	3.42E-06	0.0850	1.193E+10
Cm-243	1.2000E-10	1.40	2.79	0.00E+00	1.68E-10	3.35E-10	0.1250	7.734E+09
Cm-244	7.3577E-10	1.40	2.79	0.00E+00	1.03E-09	2.05E-09	0.2250	1.028E+10
Co-60	1.3732E-03	1.40	2.79	0.00E+00	1.92E-03	3.83E-03	0.3750	4.484E+09
Cs-134	1.2709E-10	1.40	2.79	0.00E+00	1.77E-10	3.55E-10	0.5750	7.542E+10
Cs-135	3.0316E-05	1.40	2.79	0.00E+00	4.23E-05	8.47E-05	0.8500	7.325E+08
Cs-137	7.2579E-01	1.40	2.79	0.00E+00	1.01E+00	2.03E+00	1.2500	5.302E+08
Eu-154	5.9750E-05	1.40	2.79	0.00E+00	8.34E-05	1.67E-04	1.7500	1.884E+07
Eu-155	1.0577E-05	1.40	2.79	0.00E+00	1.48E-05	2.95E-05	2.2500	3.564E+03
Fe-55	4.1631E-07	1.40	2.79	0.00E+00	5.81E-07	1.16E-06	2.7500	1.596E+03
H-3	4.6722E-04	1.40	2.79	0.00E+00	6.52E-04	1.30E-03	3.5000	1.743E-01
I-129	7.3195E-07	1.40	2.79	0.00E+00	1.02E-06	2.04E-06	5.0000	7.210E-02
Kr-85	5.9418E-03	1.40	2.79	0.00E+00	8.30E-03	1.66E-02	7.0000	7.981E-03
Np-237	1.1499E-06	1.40	2.79	0.00E+00	1.61E-06	3.21E-06	11.0000	8.968E-04
Pa-231	7.0899E-08	1.40	2.79	0.00E+00	9.90E-08	1.98E-07		
Pb-210	2.2363E-12	1.40	2.79	0.00E+00	3.12E-12	6.24E-12		
Pm-147	4.2296E-07	1.40	2.79	0.00E+00	5.91E-07	1.18E-06		
Pu-238	2.3295E-04	1.40	2.79	0.00E+00	3.25E-04	6.50E-04		
Pu-239	6.6722E-04	1.40	2.79	0.00E+00	9.32E-04	1.86E-03		
Pu-240	8.6556E-05	1.40	2.79	0.00E+00	1.21E-04	2.42E-04		
Pu-241	1.6889E-04	1.40	2.79	0.00E+00	2.36E-04	4.72E-04		
Pu-242	1.9717E-09	1.40	2.79	0.00E+00	2.75E-09	5.51E-09		
Ra-226	4.5740E-12	1.40	2.79	0.00E+00	6.39E-12	1.28E-11		
Ra-228	8.3511E-12	1.40	2.79	0.00E+00	1.17E-11	2.33E-11		
Ru-106	2.0516E-19	1.40	2.79	0.00E+00	2.86E-19	5.73E-19		
Se-79	1.3220E-05	1.40	2.79	0.00E+00	1.85E-05	3.69E-05		
Sn-126	1.1489E-05	1.40	2.79	0.00E+00	1.60E-05	3.21E-05		
Sr-90	6.6872E-01	1.40	2.79	0.00E+00	9.34E-01	1.87E+00		
Tc-99	4.6639E-04	1.40	2.79	0.00E+00	6.51E-04	1.30E-03		
Th-229	2.3727E-11	1.40	2.79	0.00E+00	3.31E-11	6.63E-11		
Th-230	2.7354E-10	1.40	2.79	0.00E+00	3.82E-10	7.64E-10		
Th-232	8.3594E-12	1.40	2.79	0.00E+00	1.17E-11	2.33E-11		
Th-208	1.6228E-08	1.40	2.79	0.00E+00	2.27E-08	4.53E-08		
U-232	4.3960E-08	1.40	2.79	0.00E+00	6.14E-08	1.23E-07		
U-233	3.3344E-09	1.40	2.79	0.00E+00	4.66E-09	9.31E-09		
U-234	4.0749E-07	1.40	2.79	0.00E+00	5.69E-07	1.14E-06		
U-235	-2.7761E-06	1.40	0.00	1.49E-04	1.45E-04	1.49E-04		
U-236	1.6190E-05	1.40	2.79	0.00E+00	2.26E-05	4.52E-05		
U-238	-2.8547E-09	1.40	0.00	1.71E-06	1.71E-06	1.71E-06		
Y-90	6.6889E-01	1.40	2.79	0.00E+00	9.34E-01	1.87E+00		
Other Radionuclides					1.27E+00	2.54E+00		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.14E-02	2.27E-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	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	U	U	
BOL Enrichment %	93.1	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal		1.40	Nominal burnup assumed to be 2% of BOL heavy metal mass Bounding burnup assumed to be twice nominal burnup
Bounding		2.79	

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: GETR FILTERS
 SNF ID #: 98
 Fuel Units & Descr: 70 - FILTERS
 Heavy Metal Mass: BOL=4.543kg, EOL=4 417kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1977
 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 56

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg. MeV	
Ac-227	3 4276E-08	119 03	238 05	0 00E+00	4 08E-06	8 16E-06		
Am-241	1 1458E-04	119 03	238 05	0 00E+00	1 36E-02	2 73E-02	0 0150	1 241E+13
Am-242m	7 9468E-09	119 03	238 05	0 00E+00	9 46E-07	1 89E-06	0 0250	2 580E+12
Am-243	9 8386E-10	119 03	238 05	0 00E+00	1 17E-07	2 34E-07	0 0375	2 236E+12
C-14	2 2978E-04	119 03	238 05	0 00E+00	2 74E-02	5 47E-02	0 0575	2 406E+12
Cl-36	1 2261E-06	119 03	238 05	0 00E+00	1 46E-04	2 92E-04	0 0850	1 453E+12
Cm-243	1 7271E-10	119 03	238 05	0 00E+00	2 06E-08	4 11E-08	0 1250	9 427E+11
Cm-244	1 3058E-09	119 03	238 05	0 00E+00	1 55E-07	3 11E-07	0 2250	1 252E+12
Co-60	9 8636E-03	119 03	238 05	0 00E+00	1 17E+00	2 35E+00	0 3750	5 462E+11
Cs-134	1 9617E-08	119 03	238 05	0 00E+00	2 33E-06	4 67E-06	0 5750	9 094E+12
Cs-135	3 0316E-05	119 03	238 05	0 00E+00	3 61E-03	7 22E-03	0 8500	8 979E+10
Cs-137	1 0263E+00	119 03	238 05	0 00E+00	1 22E+02	2 44E+02	1 2500	2 045E+11
Eu-154	2 0017E-04	119 03	238 05	0 00E+00	2 38E-02	4 76E-02	1 7500	2 312E+09
Eu-155	8 5957E-05	119 03	238 05	0 00E+00	1 02E-02	2 05E-02	2 2500	1 172E+06
Fe-55	2 2646E-05	119 03	238 05	0 00E+00	2 70E-03	5 39E-03	2 7500	1 596E+05
H-3	1 0835E-03	119 03	238 05	0 00E+00	1 29E-01	2 58E-01	3 5000	1 472E+01
I-129	7 3195E-07	119 03	238 05	0 00E+00	8 71E-05	1 74E-04	5 0000	6 084E+00
Kr-85	1 5661E-02	119 03	238 05	0 00E+00	1 86E+00	3 73E+00	7 0000	6 728E-01
Np-237	1 1494E-06	119 03	238 05	0 00E+00	1 37E-04	2 74E-04	11 0000	7 556E-02
Pa-231	5 8070E-08	119 03	238 05	0 00E+00	6 91E-06	1 38E-05		
Pb-210	1 2985E-12	119 03	238 05	0 00E+00	1 55E-10	3 09E-10		
Pm-147	2 2196E-05	119 03	238 05	0 00E+00	2 64E-03	5 28E-03		
Pu-238	2 6223E-04	119 03	238 05	0 00E+00	3 12E-02	6 24E-02		
Pu-239	6 6739E-04	119 03	238 05	0 00E+00	7 94E-02	1 59E-01		
Pu-240	8 6705E-05	119 03	238 05	0 00E+00	1 03E-02	2 06E-02		
Pu-241	3 4759E-04	119 03	238 05	0 00E+00	4 14E-02	8 27E-02		
Pu-242	1 9717E-09	119 03	238 05	0 00E+00	2 35E-07	4 69E-07		
Ra-226	3 0000E-12	119 03	238 05	0 00E+00	3 57E-10	7 14E-10		
Ra-228	8 3328E-12	119 03	238 05	0 00E+00	9 92E-10	1 98E-09		
Ru-106	6 1464E-15	119 03	238 05	0 00E+00	7 32E-13	1 46E-12		
Se-79	1 3221E-05	119 03	238 05	0 00E+00	1 57E-03	3 15E-03		
Sn-126	1 1491E-05	119 03	238 05	0 00E+00	1 37E-03	2 74E-03		
Sr-90	9 5541E-01	119 03	238 05	0 00E+00	1 14E+02	2 27E+02		
Tc-99	4 6656E-04	119 03	238 05	0 00E+00	5 55E-02	1 11E-01		
Th-229	1 9085E-11	119 03	238 05	0 00E+00	2 27E-09	4 54E-09		
Th-230	2 1913E-10	119 03	238 05	0 00E+00	2 61E-08	5 22E-08		
Th-232	8 3478E-12	119 03	238 05	0 00E+00	9 94E-10	1 99E-09		
Tl-208	1 8752E-08	119 03	238 05	0 00E+00	2 23E-06	4 46E-06		
U-232	5 0782E-08	119 03	238 05	0 00E+00	6 04E-06	1 21E-05		
U-233	3 2596E-09	119 03	238 05	0 00E+00	3 88E-07	7 76E-07		
U-234	3 9817E-07	119 03	238 05	0 00E+00	4 74E-05	9 48E-05		
U-235	-2 7761E-06	119 03	0 00	9 14E-03	8 81E-03	9 14E-03		
U-236	1 6190E-05	119 03	238 05	0 00E+00	1 93E-03	3 85E-03		
U-238	-2 8547E-09	119 03	0 00	1 05E-04	1 04E-04	1 05E-04		
Y-90	9 5557E-01	119 03	238 05	0 00E+00	1 14E+02	2 27E+02		
Other Radionuclides					1 45E+02	2 90E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1 39E+00	2 78E+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	U	U	
BOL Enrichment %	93 14635987	60 to 100	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		119 03	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding		238 05	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
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 H B ROBINSON (ASSEMBLY)
 SNF ID # 383
 Fuel Units & Descr 1 - ASSEMBLY
 Heavy Metal Mass BOL=236.248kg EOL=229 168kg
 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:
 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	1.0733E-09	6,732.94	13,465.87	0.00E+00	7.23E-06	1.45E-05	0.0150	5.124E+14
Am-241	1.4751E-01	6,732.94	13,465.87	0.00E+00	9.93E+02	1.99E+03	0.0250	1.027E+14
Am-242m	2.6809E-04	6,732.94	13,465.87	0.00E+00	1.81E+00	3.61E+00	0.0375	9.676E+13
Am-243	6.2484E-04	6,732.94	13,465.87	0.00E+00	4.21E+00	8.41E+00	0.0575	1.211E+14
C-14	4.7820E-05	6,732.94	13,465.87	0.00E+00	3.22E-01	6.44E-01	0.0850	5.657E+13
Cl-36	8.0297E-07	6,732.94	13,465.87	0.00E+00	5.41E-03	1.08E-02	0.1250	3.764E+13
Cm-243	1.7426E-04	6,732.94	13,465.87	0.00E+00	1.17E+00	2.35E+00	0.2250	4.830E+13
Cm-244	2.7616E-02	6,732.94	13,465.87	0.00E+00	1.86E+02	3.72E+02	0.3750	2.086E+14
Co-60	3.5610E-04	6,732.94	13,465.87	0.00E+00	2.40E+00	4.80E+00	0.5750	4.912E+13
Cs-134	2.6260E-07	6,732.94	13,465.87	0.00E+00	1.77E-03	3.54E-03	0.8500	4.796E+12
Cs-135	1.4433E-05	6,732.94	13,465.87	0.00E+00	9.72E-02	1.94E-01	1.2500	3.052E+12
Cs-137	9.8870E-01	6,732.94	13,465.87	0.00E+00	6.66E+03	1.33E+04	1.7500	1.342E+11
Eu-154	6.0320E-03	6,732.94	13,465.87	0.00E+00	4.06E+01	8.12E+01	2.2500	2.205E+07
Eu-155	2.1770E-04	6,732.94	13,465.87	0.00E+00	-1.47E+00	2.93E+00	2.7500	7.774E+07
Fe-55	7.9296E-07	6,732.94	13,465.87	0.00E+00	5.34E-03	1.07E-02	3.5000	5.546E+06
H-3	8.9486E-03	6,732.94	13,465.87	0.00E+00	6.03E+01	1.21E+02	5.0000	2.370E+06
I-129	9.8288E-07	6,732.94	13,465.87	0.00E+00	6.62E-03	1.32E-02	7.0000	2.731E+05
Kr-85	1.0707E-02	6,732.94	13,465.87	0.00E+00	7.21E+01	1.44E+02	11.0000	3.135E+04
Np-237	1.1927E-05	6,732.94	13,465.87	0.00E+00	8.03E-02	1.61E-01		
Pa-231	1.4703E-09	6,732.94	13,465.87	0.00E+00	9.90E-06	1.98E-05		
Pb-210	1.6828E-10	6,732.94	13,465.87	0.00E+00	1.13E-06	2.27E-06		
Pm-147	6.9606E-06	6,732.94	13,465.87	0.00E+00	4.69E-02	9.37E-02		
Pu-238	6.6263E-02	6,732.94	13,465.87	0.00E+00	4.46E+02	8.92E+02		
Pu-239	1.1618E-02	6,732.94	13,465.87	0.00E+00	7.82E+01	1.56E+02		
Pu-240	1.5142E-02	6,732.94	13,465.87	0.00E+00	1.02E+02	2.04E+02		
Pu-241	4.3766E-01	6,732.94	13,465.87	0.00E+00	2.95E+03	5.89E+03		
Pu-242	6.4260E-05	6,732.94	13,465.87	0.00E+00	4.33E-01	8.65E-01		
Ra-226	3.8501E-10	6,732.94	13,465.87	0.00E+00	2.59E-06	5.18E-06		
Ra-228	5.2955E-12	6,732.94	13,465.87	0.00E+00	3.57E-08	7.13E-08		
Ru-106	2.0413E-14	6,732.94	13,465.87	0.00E+00	1.37E-10	2.75E-10		
Se-79	1.2376E-05	6,732.94	13,465.87	0.00E+00	8.33E-02	1.67E-01		
Sn-126	2.5210E-05	6,732.94	13,465.87	0.00E+00	1.70E-01	3.39E-01		
Sr-90	6.4163E-01	6,732.94	13,465.87	0.00E+00	4.32E+03	8.64E+03		
Tc-99	3.9357E-04	6,732.94	13,465.87	0.00E+00	2.65E+00	5.30E+00		
Th-229	1.5644E-10	6,732.94	13,465.87	0.00E+00	1.05E-06	2.11E-06		
Th-230	2.7972E-08	6,732.94	13,465.87	0.00E+00	1.88E-04	3.77E-04		
Th-232	5.3036E-12	6,732.94	13,465.87	0.00E+00	3.57E-08	7.14E-08		
Th-238	1.5136E-07	6,732.94	13,465.87	0.00E+00	1.02E-03	2.04E-03		
U-232	4.1005E-07	6,732.94	13,465.87	0.00E+00	2.76E-03	5.52E-03		
U-233	2.5856E-08	6,732.94	13,465.87	0.00E+00	1.74E-04	3.48E-04		
U-234	5.2665E-05	6,732.94	13,465.87	0.00E+00	3.55E-01	7.09E-01		
U-235	-1.4487E-06	6,732.94	0.00	1.48E-02	5.05E-03	1.48E-02		
U-236	7.5888E-06	6,732.94	13,465.87	0.00E+00	5.11E-02	1.02E-01		
U-238	-2.6129E-07	6,732.94	0.00	7.71E-02	7.53E-02	7.71E-02		
Y-90	6.4180E-01	6,732.94	13,465.87	0.00E+00	4.32E+03	8.64E+03		
Other Radionuclides					6.42E+03	1.28E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.22E+02	2.44E+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	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	2.900129144	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	6.617.31	6.732.94	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding		13.465.87	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.81	1.02	1.00
Bounding	1.63		

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: H. B. ROBINSON RODS
 SNF ID #: 864
 Fuel Units & Descr: 12 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=25 088kg, EOL=20 86kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1974
 Estimates as of: 2030
 Template: PWR (Ligh 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
 12 00

Radionuclide	m		x _n		b		y _n		y _b		Gamma Sources	
	CvMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)	Avg MeV			
Ac-227	1 0733E-09	4,021 39	8,042.78	0 00E+00	4.32E-06	8.63E-06						
Am-241	1 4751E-01	4,021 39	8,042.78	0 00E+00	5 93E+02	1 19E+03	0 0150	3 060E+14				
Am-242m	2 6809E-04	4,021 39	8,042.78	0 00E+00	1 08E+00	2 16E+00	0 0250	6 133E+13				
Am-243	6 2484E-04	4,021 39	8,042.78	0 00E+00	2 51E+00	5 03E+00	0 0375	5 779E+13				
C-14	4 7820E-05	4,021 39	8,042.78	0 00E+00	1 92E-01	3 85E-01	0 0575	7 231E+13				
Cl-36	8 0297E-07	4,021 39	8,042.78	0 00E+00	3 23E-03	6 46E-03	0 0850	3 379E+13				
Cm-243	1 7426E-04	4,021 39	8,042.78	0 00E+00	7 01E-01	1 40E+00	0 1250	2 248E+13				
Cm-244	2 7616E-02	4,021.39	8,042.78	0 00E+00	1 11E+02	2 22E+02	0 2250	2 885E+13				
Co-60	3 5610E-04	4,021.39	8,042.78	0 00E+00	1 43E+00	2 86E+00	0 3750	1 246E+13				
Cs-134	2 6260E-07	4,021.39	8,042.78	0 00E+00	1 06E-03	2 11E-03	0 5750	2 934E+14				
Cs-135	1 4433E-05	4,021.39	8,042.78	0 00E+00	5 80E-02	1 16E-01	0 8500	2 865E+12				
Cs-137	9 8870E-01	4,021.39	8,042.78	0 00E+00	3 98E+03	7 95E+03	1 2500	1 823E+12				
Eu-154	6 0320E-03	4,021.39	8,042.78	0 00E+00	2 43E+01	4 85E+01	1 7500	8 015E+10				
Eu-155	2 1770E-04	4,021.39	8,042.78	0 00E+00	8 75E-01	1 75E+00	2 2500	1 317E+07				
Fe-55	7 9296E-07	4,021.39	8,042.78	0 00E+00	3 19E-03	6 38E-03	2 7500	4 643E+07				
H-3	8 9486E-03	4,021.39	8,042.78	0 00E+00	3 60E+01	7 20E+01	3 5000	3 312E+06				
I-129	9 8288E-07	4,021.39	8,042.78	0 00E+00	3 95E-03	7 91E-03	5 0000	1 416E+06				
Kr-85	1 0707E-02	4,021 39	8,042.78	0 00E+00	4 31E+01	8 61E+01	7 0000	1 631E+05				
Np-237	1 1927E-05	4,021 39	8 042.78	0 00E+00	4 80E-02	9 59E-02	11 0000	1 873E+04				
Pa-231	1 4703E-09	4,021.39	8,042.78	0 00E+00	5 91E-06	1 18E-05						
Pb-210	1 6828E-10	4,021 39	8,042.78	0 00E+00	6 77E-07	1 35E-06						
Pm-147	6 9606E-06	4,021 39	8,042.78	0 00E+00	2 80E-02	5 60E-02						
Pu-238	6 6263E-02	4,021 39	8,042.78	0 00E+00	2 66E+02	5 33E+02						
Pu-239	1 1618E-02	4,021 39	8,042.78	0 00E+00	4 67E+01	9 34E+01						
Pu-240	1 5142E-02	4,021 39	8,042.78	0 00E+00	6 09E+01	1 22E+02						
Pu-241	4 3766E-01	4,021 39	8,042.78	0 00E+00	1 76E+03	3 52E+03						
Pu-242	6 4260E-05	4,021 39	8,042.78	0 00E+00	2 58E-01	5 17E-01						
Ra-226	3 8501E-10	4,021 39	8,042.78	0 00E+00	1 55E-06	3 10E-06						
Ra-228	5 2955E-12	4,021 39	8,042.78	0 00E+00	2 13E-08	4 26E-08						
Ru-106	2 0413E-14	4,021 39	8,042.78	0 00E+00	8 21E-11	1 64E-10						
Se-79	1 2376E-05	4,021 39	8,042.78	0 00E+00	4 98E-02	9 95E-02						
Sn-126	2 5210E-05	4,021 39	8,042.78	0 00E+00	1 01E-01	2 03E-01						
Sr-90	6 4163E-01	4,021 39	8,042.78	0 00E+00	2 58E+03	5 16E+03						
Tc-99	3 9357E-04	4,021.39	8,042.78	0 00E+00	1 58E+00	3 17E+00						
Th-229	1 5644E-10	4,021.39	8,042.78	0 00E+00	6 29E-07	1 26E-06						
Th-230	2 7972E-08	4,021.39	8,042.78	0 00E+00	1 12E-04	2 25E-04						
Th-232	5 3036E-12	4,021.39	8,042.78	0 00E+00	2 13E-08	4 27E-08						
Th-208	1 5136E-07	4,021.39	8,042.78	0 00E+00	6 09E-04	1 22E-03						
U-232	4 1005E-07	4,021.39	8,042.78	0 00E+00	1 65E-03	3 30E-03						
U-233	2 5856E-08	4,021.39	8,042.78	0 00E+00	1 04E-04	2 08E-04						
U-234	5 2665E-05	4,021.39	8,042.78	0 00E+00	2 12E-01	4 24E-01						
U-235	-1 4487E-06	4,021 39	0.00	1.57E-03	0 00E+00	1 57E-03						
U-236	7 5888E-06	4,021 39	8,042.78	0 00E+00	3 05E-02	6 10E-02						
U-238	-2 6129E-07	4,021 39	0 00	8.19E-03	7 14E-03	8 19E-03						
Y-90	6 4180E-01	4,021 39	8,042.78	0 00E+00	2 58E+03	5 16E+03						
Other Radionuclides					3 83E+03	7 66E+03						

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ZIRC	ZIRC	
BOL Enrichment %	U	U	
	2 9	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	702.48	4 021.39	Nominal burnup calculated from the heavy metal mass destroyed
Bounding		8 042.78	Bounding burnup assumed to be twice nominal burnup.

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

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel
²Total burnup for all fuel associated with this worksheet must be 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	¹ Fuel decay start date: 1977	Estimated Canister usage: 18"x10" 6 11
SNF ID #: 102	Estimates as of: 2030	
Fuel Units & Descr: 220 - 18 CURVED PLATES	Template as: HFBR (Heavy Water Alum, 40 to 100%, U)	
Heavy Metal Mass: BOL=82 72kg EOL=58 102kg	² Template Burnup(MWd): 164.6	
ROD Storage Site: SRS	Template BOL Heavy Metal Mass (MT): 0.000377	
	Template Decay Time: 50 years	

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	1.4241E-09	22,675.71	45,351.43	0.00E+00	3.23E-05	6.46E-05	0.0150	2.349E+15
Am-241	1.0407E-02	22,675.71	45,351.43	0.00E+00	2.36E+02	4.72E+02	0.0250	4.813E+14
Am-242m	1.1944E-06	22,675.71	45,351.43	0.00E+00	2.71E-02	5.42E-02	0.0375	4.202E+14
Am-243	3.6993E-08	22,675.71	45,351.43	0.00E+00	8.39E-01	1.68E+00	0.0575	4.553E+14
C-14	2.6367E-08	22,675.71	45,351.43	0.00E+00	5.98E-04	1.20E-03	0.0850	2.711E+14
Ct-36	4.4435E-31	22,675.71	45,351.43	0.00E+00	1.01E-26	2.02E-26	0.1250	1.787E+14
Cm-243	2.7503E-06	22,675.71	45,351.43	0.00E+00	6.24E-02	1.25E-01	0.2250	2.340E+14
Cm-244	1.4775E-03	22,675.71	45,351.43	0.00E+00	3.35E+01	6.70E+01	0.3750	1.018E+14
Co-60	9.4350E-07	22,675.71	45,351.43	0.00E+00	2.14E-02	4.28E-02	0.5750	1.719E+15
Cs-134	4.4666E-07	22,675.71	45,351.43	0.00E+00	1.01E-02	2.03E-02	0.8500	2.018E+13
Cs-135	4.2564E-06	22,675.71	45,351.43	0.00E+00	9.65E-02	1.93E-01	1.2500	9.545E+12
Cs-137	1.0182E+00	22,675.71	45,351.43	0.00E+00	2.31E+04	4.62E+04	1.7500	5.479E+11
Eu-154	4.6373E-03	22,675.71	45,351.43	0.00E+00	1.05E+02	2.10E+02	2.2500	4.895E+07
Eu-155	2.1646E-04	22,675.71	45,351.43	0.00E+00	4.91E+00	9.82E+00	2.7500	6.084E+07
Fe-55	4.5838E-07	22,675.71	45,351.43	0.00E+00	1.04E-02	2.08E-02	3.5000	1.134E+06
H-3	8.5966E-04	22,675.71	45,351.43	0.00E+00	1.95E+01	3.90E+01	5.0000	4.805E+05
I-129	6.6403E-07	22,675.71	45,351.43	0.00E+00	1.51E-02	3.01E-02	7.0000	5.481E+04
Kr-85	1.5553E-02	22,675.71	45,351.43	0.00E+00	3.53E+02	7.05E+02	11.0000	6.259E+03
Np-237	3.1665E-05	22,675.71	45,351.43	0.00E+00	7.18E-01	1.44E+00		
Pa-231	2.4380E-09	22,675.71	45,351.43	0.00E+00	5.53E-05	1.11E-04		
Pb-210	1.7394E-10	22,675.71	45,351.43	0.00E+00	3.94E-06	7.89E-06		
Pm-147	8.8578E-06	22,675.71	45,351.43	0.00E+00	2.01E-01	4.02E-01		
Pu-238	1.2120E-01	22,675.71	45,351.43	0.00E+00	2.75E+03	5.50E+03		
Pu-239	6.9441E-04	22,675.71	45,351.43	0.00E+00	1.57E+01	3.15E+01		
Pu-240	3.8299E-04	22,675.71	45,351.43	0.00E+00	8.68E+00	1.74E+01		
Pu-241	3.1731E-02	22,675.71	45,351.43	0.00E+00	7.20E+02	1.44E+03		
Pu-242	3.0911E-06	22,675.71	45,351.43	0.00E+00	7.01E-02	1.40E-01		
Ra-226	4.1239E-10	22,675.71	45,351.43	0.00E+00	9.35E-06	1.87E-05		
Ra-228	4.5680E-14	22,675.71	45,351.43	0.00E+00	1.04E-09	2.07E-09		
Ru-106	8.1713E-15	22,675.71	45,351.43	0.00E+00	1.85E-10	3.71E-10		
Se-79	1.2333E-05	22,675.71	45,351.43	0.00E+00	2.80E-01	5.59E-01		
Sn-126	1.0194E-05	22,675.71	45,351.43	0.00E+00	2.31E-01	4.62E-01		
Sr-90	9.3378E-01	22,675.71	45,351.43	0.00E+00	2.12E+04	4.23E+04		
Tc-99	3.8050E-04	22,675.71	45,351.43	0.00E+00	8.63E+00	1.73E+01		
Th-229	2.9532E-11	22,675.71	45,351.43	0.00E+00	6.70E-07	1.34E-06		
Th-230	3.1981E-08	22,675.71	45,351.43	0.00E+00	7.25E-04	1.45E-03		
Th-232	5.3633E-14	22,675.71	45,351.43	0.00E+00	1.22E-09	2.43E-09		
Ti-208	3.7406E-08	22,675.71	45,351.43	0.00E+00	8.48E-04	1.70E-03		
U-232	1.0134E-07	22,675.71	45,351.43	0.00E+00	2.30E-03	4.60E-03		
U-233	9.2892E-09	22,675.71	45,351.43	0.00E+00	2.11E-04	4.21E-04		
U-234	6.6403E-05	22,675.71	45,351.43	0.00E+00	1.51E+00	3.01E+00		
U-235	-2.8661E-06	22,675.71	0.00	1.66E-01	1.01E-01	-1.66E-01		
U-236	1.6701E-05	22,675.71	45,351.43	0.00E+00	3.79E-01	7.57E-01		
U-238	-9.4194E-09	22,675.71	0.00	1.92E-03	1.71E-03	-1.92E-03		
Y-90	9.3439E-01	22,675.71	45,351.43	0.00E+00	2.12E+04	4.24E+04		
Other Radionuclides					2.22E+04	4.44E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
	From SFD	Used	
Reactor Moderator	HEAVY WATER	HEAVY WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93.08510638	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		22,675.71	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding		45,351.43	

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

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel
²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HFBR
 SNF ID #: 961
 Fuel Units & Descr: 20 - 18 CURVED PLATES
 Heavy Metal Mass: BOL=7.52kg, EOL=5.282kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1977
 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: 50 years

Estimated
 Canister usage
 18"x10"
 0.56

Radionuclide	CI/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	1.4241E-09	2,061.43	4,122.86	0.00E+00	2.94E-06	5.87E-06	Avg MeV	
Am-241	1.0407E-02	2,061.43	4,122.86	0.00E+00	2.15E+01	4.29E+01	0.0150	2.136E+14
Am-242m	1.1944E-06	2,061.43	4,122.86	0.00E+00	2.46E-03	4.92E-03	0.0250	4.376E+13
Am-243	3.6993E-05	2,061.43	4,122.86	0.00E+00	7.63E-02	1.53E-01	0.0375	3.820E+13
C-14	2.6367E-08	2,061.43	4,122.86	0.00E+00	5.44E-05	1.09E-04	0.0575	4.139E+13
Ct-38	4.4435E-31	2,061.43	4,122.86	0.00E+00	9.16E-28	1.83E-27	0.0850	2.464E+13
Cm-243	2.7503E-06	2,061.43	4,122.86	0.00E+00	5.67E-03	1.13E-02	0.1250	1.625E+13
Cm-244	1.4775E-03	2,061.43	4,122.86	0.00E+00	3.05E+00	6.09E+00	0.2250	2.127E+13
Co-60	9.4350E-07	2,061.43	4,122.86	0.00E+00	1.94E-03	3.89E-03	0.3750	9.255E+12
Cs-134	4.4666E-07	2,061.43	4,122.86	0.00E+00	9.21E-04	1.84E-03	0.5750	1.563E+14
Cs-135	4.2564E-06	2,061.43	4,122.86	0.00E+00	8.77E-03	1.75E-02	0.8500	1.835E+12
Cs-137	1.0182E+00	2,061.43	4,122.86	0.00E+00	2.10E+03	4.20E+03	1.2500	8.678E+11
Eu-154	4.6373E-03	2,061.43	4,122.86	0.00E+00	9.56E+00	1.91E+01	1.7500	4.981E+10
Eu-155	2.1646E-04	2,061.43	4,122.86	0.00E+00	4.46E-01	8.92E-01	2.2500	4.450E+06
Fe-55	4.5838E-07	2,061.43	4,122.86	0.00E+00	9.45E-04	1.89E-03	2.7500	5.531E+06
H-3	8.5966E-04	2,061.43	4,122.86	0.00E+00	1.77E+00	3.54E+00	3.5000	1.031E+05
I-129	6.6403E-07	2,061.43	4,122.86	0.00E+00	1.37E-03	2.74E-03	5.0000	4.368E+04
Kr-85	1.5553E-02	2,061.43	4,122.86	0.00E+00	3.21E+01	6.41E+01	7.0000	4.983E+03
Np-237	3.1665E-05	2,061.43	4,122.86	0.00E+00	6.53E-02	1.31E-01	11.0000	5.690E+02
Pa-231	2.4380E-09	2,061.43	4,122.86	0.00E+00	5.03E-06	1.01E-05		
Pb-210	1.7394E-10	2,061.43	4,122.86	0.00E+00	3.59E-07	7.17E-07		
Pm-147	8.8578E-06	2,061.43	4,122.86	0.00E+00	1.83E-02	3.65E-02		
Pu-238	1.2120E-01	2,061.43	4,122.86	0.00E+00	2.50E+02	5.00E+02		
Pu-239	6.9441E-04	2,061.43	4,122.86	0.00E+00	1.43E+00	2.86E+00		
Pu-240	3.8299E-04	2,061.43	4,122.86	0.00E+00	7.90E-01	1.58E+00		
Pu-241	3.1731E-02	2,061.43	4,122.86	0.00E+00	6.54E+01	1.31E+02		
Pu-242	3.0911E-06	2,061.43	4,122.86	0.00E+00	6.37E-03	1.27E-02		
Ra-226	4.1239E-10	2,061.43	4,122.86	0.00E+00	8.50E-07	1.70E-06		
Ra-228	4.5680E-14	2,061.43	4,122.86	0.00E+00	9.42E-11	1.88E-10		
Ru-106	8.1713E-15	2,061.43	4,122.86	0.00E+00	1.68E-11	3.37E-11		
Se-79	1.2333E-05	2,061.43	4,122.86	0.00E+00	2.54E-02	5.08E-02		
Sn-126	1.0194E-05	2,061.43	4,122.86	0.00E+00	2.10E-02	4.20E-02		
Sr-90	9.3378E-01	2,061.43	4,122.86	0.00E+00	1.92E+03	3.85E+03		
Tc-99	3.8050E-04	2,061.43	4,122.86	0.00E+00	7.84E-01	1.57E+00		
Th-229	2.9532E-11	2,061.43	4,122.86	0.00E+00	6.09E-08	1.22E-07		
Th-230	3.1981E-08	2,061.43	4,122.86	0.00E+00	6.59E-05	1.32E-04		
Th-232	5.3633E-14	2,061.43	4,122.86	0.00E+00	1.11E-10	2.21E-10		
Tl-208	3.7406E-08	2,061.43	4,122.86	0.00E+00	7.71E-05	1.54E-04		
U-232	1.0134E-07	2,061.43	4,122.86	0.00E+00	2.09E-04	4.18E-04		
U-233	9.2892E-09	2,061.43	4,122.86	0.00E+00	1.91E-05	3.83E-05		
U-234	6.6403E-05	2,061.43	4,122.86	0.00E+00	1.37E-01	2.74E-01		
U-235	-2.8661E-06	2,061.43	0.00	1.51E-02	9.22E-03	1.51E-02		
U-236	1.6701E-05	2,061.43	4,122.86	0.00E+00	3.44E-02	6.89E-02		
U-238	-9.4194E-09	2,061.43	0.00	1.75E-04	1.55E-04	1.75E-04		
Y-90	9.3439E-01	2,061.43	4,122.86	0.00E+00	1.93E+03	3.85E+03		
Other Radionuclides					2.02E+03	4.04E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.24E+01	6.47E+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	U	
BOL Enrichment %:	93.08510638	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		2,061.43	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding		4,122.86	

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name HFEF FISSION CHAMBERS (U METAL) Fuel decay start date 1994
 SNF ID # 894 Estimates as of 2030
 Fuel Units & Descr: 1 - UNKNOWN Template TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Heavy Metal Mass BOL= , EOL=24 345kg Template 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"
0 01

Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventones(Ci)	Bounding Fuel Inventones(Ci)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6 7038E-09	23,240 11	23,240 11	0 00E+00	1 56E-04	1 56E-04	Avg MeV	
Am-241	3 9068E-03	23,240 11	23,240 11	0 00E+00	9 08E+01	9 08E+01	0 0150	1.622E+15
Am-242m	1.2325E-06	23,240 11	23,240.11	0 00E+00	2 86E-02	2 86E-02	0 0250	3.371E+14
Am-243	1 4732E-07	23,240 11	23,240.11	0 00E+00	3 42E-03	3 42E-03	0 0375	2 928E+14
C-14	1 2824E-04	23,240 11	23,240.11	0 00E+00	2 98E+00	2 98E+00	0 0575	3 155E+14
Cl-36	2 8120E-06	23,240 11	23,240 11	0 00E+00	6 54E-02	6 54E-02	0 0850	1 898E+14
Cm-243	8 6556E-08	23,240 11	23,240 11	0 00E+00	2 01E-03	2 01E-03	0 1250	1.235E+14
Cm-244	5 3835E-07	23,240 11	23,240 11	0 00E+00	1.25E-02	1.25E-02	0.2250	1 635E+14
Co-60	2 4887E-02	23,240 11	23,240 11	0 00E+00	5 78E+02	5 78E+02	0.3750	7 132E+13
Cs-134	3 8030E-06	23,240 11	23,240 11	0 00E+00	8 84E-02	8 84E-02	0.5750	1 193E+15
Cs-135	3 2195E-05	23,240 11	23,240 11	0 00E+00	7.48E-01	7 48E-01	0 8500	1.221E+13
Cs-137	1.3788E+00	23,240 11	23,240 11	0 00E+00	3.20E+04	3 20E+04	1.2500	4 737E+13
Eu-154	1.3711E-03	23,240 11	23,240 11	0 00E+00	3 19E+01	3 19E+01	1 7500	3 168E+11
Eu-155	4 4361E-04	23,240 11	23,240.11	0 00E+00	1.03E+01	1 03E+01	2.2500	2.596E+08
Fe-55	2 6075E-04	23,240 11	23,240 11	0 00E+00	6 06E+00	6 06E+00	2.7500	1 193E+07
H-3	2 0647E-03	23,240 11	23,240 11	0 00E+00	4 80E+01	4 80E+01	3.5000	2.858E+04
I-129	7 3684E-07	23,240 11	23,240 11	0 00E+00	1 71E-02	1 71E-02	5 0000	1.203E+04
Kr-85	3 6346E-02	23,240 11	23,240 11	0 00E+00	8 45E+02	8 45E+02	7.0000	1.357E+03
Np-237	1 2844E-06	23,240.11	23,240 11	0 00E+00	2 98E-02	2 98E-02	11.0000	1.543E+02
Pa-231	1 2352E-08	23,240.11	23,240 11	0 00E+00	2 87E-04	2 87E-04		
Pb-210	3 5338E-13	23,240 11	23,240 11	0 00E+00	8.21E-09	8 21E-09		
Pm-147	7 6346E-04	23,240 11	23,240 11	0 00E+00	1.77E+01	1 77E+01		
Pu-238	8 1970E-04	23,240 11	23,240 11	0 00E+00	1.90E+01	1 90E+01		
Pu-239	5 5248E-03	23,240 11	23,240.11	0 00E+00	1.28E+02	1 28E+02		
Pu-240	2.1203E-03	23,240 11	23,240 11	0 00E+00	4 93E+01	4 93E+01		
Pu-241	2 4075E-02	23,240 11	23,240 11	0 00E+00	5 60E+02	5 60E+02		
Pu-242	2 3128E-07	23,240 11	23,240 11	0 00E+00	5 37E-03	5 37E-03		
Ra-226	9 6481E-13	23,240 11	23,240 11	0 00E+00	2 24E-08	2 24E-08		
Ra-228	2 5188E-10	23,240 11	23,240 11	0 00E+00	5 85E-06	5 85E-06		
Ru-106	1 0214E-10	23,240 11	23,240 11	0 00E+00	2 37E-06	2 37E-06		
Se-79	1 3014E-05	23,240 11	23,240 11	0 00E+00	3 02E-01	3 02E-01		
Sn-126	1 2164E-05	23,240 11	23,240 11	0 00E+00	2 83E-01	2 83E-01		
Sr-90	1.2762E+00	23,240 11	23,240 11	0 00E+00	2 97E+04	2 97E+04		
Tc-99	4 4241E-04	23,240 11	23,240 11	0 00E+00	1.03E+01	1 03E+01		
Th-229	5 9684E-10	23,240 11	23,240 11	0 00E+00	1.39E-05	1 39E-05		
Th-230	9.3880E-11	23,240 11	23,240 11	0 00E+00	2 18E-06	2 18E-06		
Th-232	2.5278E-10	23,240 11	23,240 11	0 00E+00	5 87E-06	5 87E-06		
Ti-208	1.3723E-08	23,240 11	23,240 11	0 00E+00	3 19E-04	3 19E-04		
U-232	3 6932E-08	23,240 11	23,240 11	0 00E+00	8 58E-04	8 58E-04		
U-233	1.2224E-07	23,240 11	23,240 11	0 00E+00	2 84E-03	2 84E-03		
U-234	2 5714E-07	23,240.11	23,240 11	0 00E+00	5 98E-03	5 98E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2 6194E-06	23,240 11	0 00	2 10E-02	0 00E+00	2 10E-02	3 74E+02	3 74E+02
U-236	1.2695E-05	23,240 11	23,240 11	0 00E+00	2 95E-01	2 95E-01	Total	Total
U-238	-3 6331E-08	23,240 11	0 00	1 31E-02	1.22E-02	1 31E-02		
Y-90	1.2765E+00	23,240 11	23,240.11	0 00E+00	2 97E+04	2 97E+04		
Other Radionuclides					3.20E+04	3 20E+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	This Template was used for the following reasons
Fuel Cladding	UNKNOWN	SST	This fuel matches on all parameters except cladding (SST is conservative) and enrichment (unknown)
BOL HM Constituents	U	U	
BOL Enrichment %		10 to 20 1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		23,240 11	Nominal burnup set equal to bounding burnup
Bounding		23,240 11	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	14.00		1 78
Bounding	14.00		

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 KEMA
 SNF ID # 861
 Fuel Units & Descr 14 - CANISTER OF SCRAP
 Heavy Metal Mass BOL=243 783kg EOL=243 755kg
 ROD Storage Site INEEL

¹Fuel decay start date 1979
 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"
 1 00

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	1 0595E-04	27 25	54 50	0 00E+00	2 89E-03	5 77E-03	0 0150	3 414E+12
Am-241	2 4968E-04	27 25	54 50	0 00E+00	6 80E-03	1 36E-02	0 0250	6 486E+11
Am-242m	1 3847E-06	27 25	54 50	0 00E+00	3 77E-05	7 55E-05	0 0375	5 567E+11
Am-243	3 1103E-07	27 25	54 50	0 00E+00	8 48E-06	1 70E-05	0 0575	6 058E+11
C-14	9 2267E-05	27 25	54 50	0 00E+00	2 51E-03	5 03E-03	0 0850	3 929E+11
Cl-36	1 8103E-06	27 25	54 50	0 00E+00	4 93E-05	9 87E-05	0 1250	2 406E+11
Cm-243	2 1248E-07	27 25	54 50	0 00E+00	5 79E-06	1 16E-05	0 2250	3 550E+11
Cm-244	7 9666E-06	27 25	54 50	0 00E+00	2 17E-04	4 34E-04	0 3750	1 402E+11
Co-60	1 2143E-04	27 25	54 50	0 00E+00	3 31E-03	6 62E-03	0 5750	2 152E+12
Cs-134	1 6535E-07	27 25	54 50	0 00E+00	4 51E-06	9 01E-06	0 8500	3 701E+10
Cs-135	2 8639E-05	27 25	54 50	0 00E+00	7 80E-04	1 56E-03	1 2500	1 126E+10
Cs-137	1 0449E+00	27 25	54 50	0 00E+00	2 85E+01	5 69E+01	1 7500	2 946E+09
Eu-154	2 5679E-03	27 25	54 50	0 00E+00	7 00E-02	1 40E-01	2 2500	6 713E+04
Eu-155	8 1175E-05	27 25	54 50	0 00E+00	2 21E-03	4 42E-03	2 7500	2 312E+10
Fe-55	4 2194E-08	27 25	54 50	0 00E+00	1 15E-06	2 30E-06	3 5000	6 434E+02
H-3	9 1673E-04	27 25	54 50	0 00E+00	2 50E-02	5 00E-02	5 0000	1 931E+02
I-129	1 5853E-06	27 25	54 50	0 00E+00	4 32E-05	8 64E-05	7 0000	1 271E+01
Kr-85	2 3741E-02	27 25	54 50	0 00E+00	6 47E-01	1 29E+00	11 0000	8 248E-01
Np-237	1 2747E-07	27 25	54 50	0 00E+00	3 47E-06	6 95E-06		
Pa-231	1 2007E-04	27 25	54 50	0 00E+00	3 27E-03	6 54E-03		
Pb-210	1 8424E-08	27 25	54 50	0 00E+00	5 02E-07	1 00E-06		
Pm-147	4 9829E-06	27 25	54 50	0 00E+00	1 36E-04	2 72E-04		
Pu-238	3 7744E-04	27 25	54 50	0 00E+00	1 03E-02	2 06E-02		
Pu-239	2 7510E-05	27 25	54 50	0 00E+00	7 50E-04	1 50E-03		
Pu-240	1 6175E-05	27 25	54 50	0 00E+00	4 41E-04	8 81E-04		
Pu-241	7 1379E-04	27 25	54 50	0 00E+00	1 94E-02	3 89E-02		
Pu-242	4 0831E-08	27 25	54 50	0 00E+00	1 11E-06	2 23E-06		
Ra-226	2 9038E-08	27 25	54 50	0 00E+00	7 91E-07	1 58E-06		
Ra-228	4 6352E-06	27 25	54 50	0 00E+00	1 26E-04	2 53E-04		
Ru-106	1 3321E-15	27 25	54 50	0 00E+00	3 63E-14	7 26E-14		
Se-79	3 5407E-05	27 25	54 50	0 00E+00	9 65E-04	1 93E-03		
Sn-126	3 9838E-05	27 25	54 50	0 00E+00	1 09E-03	2 17E-03		
Sr-90	1 0449E+00	27 25	54 50	0 00E+00	2 85E+01	5 69E+01		
Tc-99	3 2525E-04	27 25	54 50	0 00E+00	8 86E-03	1 77E-02		
Th-229	8 2305E-05	27 25	54 50	0 00E+00	2 24E-03	4 49E-03		
Th-230	1 2533E-06	27 25	54 50	0 00E+00	3 41E-05	6 83E-05		
Th-232	-9 0328E-08	27 25	0 00	2 57E-02	2 57E-02	2 57E-02		
Th-208	1 2085E-02	27 25	54 50	0 00E+00	3 29E-01	6 59E-01		
U-232	3 2729E-02	27 25	54 50	0 00E+00	8 92E-01	1 78E+00		
U-233	-3 3244E-03	27 25	0 00	8 66E+01	8 65E+01	8 66E+01		
U-234	8 1769E-04	27 25	54 50	0 00E+00	2 23E-02	4 46E-02		
U-235	5 7813E-08	27 25	54 50	1 77E-05	1 93E-05	2 09E-05		
U-236	1 3273E-07	27 25	54 50	0 00E+00	3 62E-06	7 23E-06		
U-238	-3 1121E-10	27 25	0 00	1 13E-05	1 13E-05	1 13E-05		
Y-90	1 0449E+00	27 25	54 50	0 00E+00	2 85E+01	5 69E+01		
Other Radionuclides					3 33E+01	6 67E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3 07E+00	3 62E+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 on all parameters except cladding
BOL HM Constituents	Th and U	Th and U	
BOL Enrichment %	89 895	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate
Nominal	From SFD	Estimated	
Bounding		27 25	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
		54 50	

Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Bounding	0 01		1 00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel
²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: LOFT CENTER FUEL MODULE FP-2 REMAINS
 SNF ID #: 923
 Fuel Units & Descr: 10 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=99 951kg, EOL=99 895kg
 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
 18"x10"
 1 00

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	1 0733E-09	49 45	98 90	0 00E+00	5 31E-08	1 06E-07		
Am-241	1 4751E-01	49 45	98 90	0 00E+00	7 29E+00	1 46E+01	0 0150	3 764E+12
Am-242m	2 6809E-04	49 45	98 90	0 00E+00	1 33E-02	2 65E-02	0 0250	7 542E+11
Am-243	6 2484E-04	49 45	98 90	0 00E+00	3 09E-02	6 18E-02	0 0375	7 106E+11
C-14	4 7820E-05	49 45	98 90	0 00E+00	2 36E-03	4 73E-03	0 0575	8 892E+11
Cl-36	8 0297E-07	49 45	98 90	0 00E+00	3 97E-05	7 94E-05	0 0850	4 156E+11
Cm-243	1 7426E-04	49 45	98 90	0 00E+00	8 62E-03	1 72E-02	0 1250	2 765E+11
Cm-244	2 7616E-02	49 45	98 90	0 00E+00	1 37E+00	2 73E+00	0 2250	3 551E+11
Co-60	3 5610E-04	49 45	98 90	0 00E+00	1 76E-02	3 52E-02	0 3750	1 532E+11
Cs-134	2 6260E-07	49 45	98 90	0 00E+00	1 30E-05	2 60E-05	0 5750	3 608E+12
Cs-135	1 4433E-05	49 45	98 90	0 00E+00	7 14E-04	1 43E-03	0 8500	3 523E+10
Cs-137	9 8870E-01	49 45	98 90	0 00E+00	4 89E+01	9 78E+01	1 2500	2 242E+10
Eu-154	6 0320E-03	49 45	98 90	0 00E+00	2 98E-01	5 97E-01	1 7500	9 855E+08
Eu-155	2 1770E-04	49 45	98 90	0 00E+00	1 08E-02	2 15E-02	2 2500	1 623E+05
Fe-55	7 9296E-07	49 45	98 90	0 00E+00	3 92E-05	7 84E-05	2 7500	5 711E+05
H-3	8 9486E-03	49 45	98 90	0 00E+00	4 43E-01	8 85E-01	3 5000	4 089E+04
I-129	9 8288E-07	49 45	98 90	0 00E+00	4 86E-05	9 72E-05	5 0000	1 748E+04
Kr-85	1 0707E-02	49 45	98 90	0 00E+00	5 29E-01	1 06E+00	7 0000	2 013E+03
Np-237	1 1927E-05	49 45	98 90	0 00E+00	5 90E-04	1 18E-03	11 0000	2 312E+02
Pa-231	1 4703E-09	49 45	98 90	0 00E+00	7 27E-08	1 45E-07		
Pb-210	1 6828E-10	49 45	98 90	0 00E+00	8 32E-09	1 66E-08		
Pm-147	6 9606E-06	49 45	98 90	0 00E+00	3 44E-04	6 88E-04		
Pu-238	6 6263E-02	49 45	98 90	0 00E+00	3 28E+00	6 55E+00		
Pu-239	1 1618E-02	49 45	98 90	0 00E+00	5 75E-01	1 15E+00		
Pu-240	1 5142E-02	49 45	98 90	0 00E+00	7 49E-01	1 50E+00		
Pu-241	4 3766E-01	49 45	98 90	0 00E+00	2 16E+01	4 33E+01		
Pu-242	6 4260E-05	49 45	98 90	0 00E+00	3 18E-03	6 36E-03		
Ra-226	3 8501E-10	49 45	98 90	0 00E+00	1 90E-08	3 81E-08		
Ra-228	5 2955E-12	49 45	98 90	0 00E+00	2 62E-10	5 24E-10		
Ru-106	2 0413E-14	49 45	98 90	0 00E+00	1 01E-12	2 02E-12		
Se-79	1 2376E-05	49 45	98 90	0 00E+00	6 12E-04	1 22E-03		
Sn-126	2 5210E-05	49 45	98 90	0 00E+00	1 25E-03	2 49E-03		
Sr-90	6 4183E-01	49 45	98 90	0 00E+00	3 17E+01	6 35E+01		
Tc-99	3 9357E-04	49 45	98 90	0 00E+00	1 95E-02	3 89E-02		
Th-229	1 5644E-10	49 45	98 90	0 00E+00	7 74E-09	1 55E-08		
Th-230	2 7972E-08	49 45	98 90	0 00E+00	1 38E-06	2 77E-06		
Th-232	5 3036E-12	49 45	98 90	0 00E+00	2 62E-10	5 25E-10		
Tl-208	1 5136E-07	49 45	98 90	0 00E+00	7 48E-06	1 50E-05		
U-232	4 1005E-07	49 45	98 90	0 00E+00	2 03E-05	4 06E-05		
U-233	2 5856E-08	49 45	98 90	0 00E+00	1 28E-06	2 56E-06		
U-234	5 2665E-05	49 45	98 90	0 00E+00	2 60E-03	5 21E-03		
U-235	-1 4487E-06	49 45	0 00	2 10E-02	2 10E-02	2 10E-02		
U-236	7 5888E-06	49 45	98 90	0 00E+00	3 75E-04	7 51E-04		
U-238	-2 6129E-07	49 45	0 00	3 03E-02	3 03E-02	3 03E-02		
Y-90	6 4180E-01	49 45	98 90	0 00E+00	3 17E+01	6 35E+01		
Other Radionuclides					4 71E+01	9 42E+01		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							8 96E-01	1 79E+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 PWR Template on all but one parameter (enrichment) making PWR a reasonable match.
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	9 74	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	47 48	49 45	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding		98 90	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 01	1 04	1 00
Bounding	0 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 LOFT CORNER FUEL MODULE
 SNF ID # 128
 Fuel Units & Descr 4 - 11 X 11 ROD ARRAY
 Heavy Metal Mass BOL=279 864kg EOL=279 053kg
 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
 18"x10"
 2 00

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	1 0733E-09	780.26	1,560.52	0 00E+00	8.37E-07	1 67E-06	Avg. MeV	
Am-241	1.4751E-01	780.26	1,560.52	0 00E+00	1 15E+02	2 30E+02	0 0150	5 938E+13
Am-242m	2 6809E-04	780.26	1,560.52	0 00E+00	2 09E-01	4 18E-01	0 0250	1 190E+13
Am-243	6.2484E-04	780.26	1,560.52	0 00E+00	4 88E-01	9 75E-01	0 0375	1 121E+13
C-14	4 7820E-05	780.26	1,560.52	0 00E+00	3 73E-02	7 46E-02	0 0575	1 403E+13
Cl-36	8 0297E-07	780.26	1,560.52	0 00E+00	6.27E-04	1.25E-03	0 0850	6.556E+12
Cm-243	1 7426E-04	780.26	1,560.52	0 00E+00	1.36E-01	2 72E-01	0 1250	4.362E+12
Cm-244	2 7616E-02	780.26	1,560.52	0 00E+00	2 15E+01	4 31E+01	0 2250	5.598E+12
Co-60	3 5610E-04	780.26	1,560.52	0 00E+00	2.78E-01	5 56E-01	0.3750	2.417E+12
Cs-134	2 6260E-07	780.26	1,560.52	0 00E+00	2 05E-04	4 10E-04	0.5750	5 693E+13
Cs-135	1.4433E-05	780.26	1,560.52	0 00E+00	1.13E-02	2 25E-02	0.8500	5 558E+11
Cs-137	9 8870E-01	780.26	1,560.52	0 00E+00	7 71E+02	1 54E+03	1.2500	3 537E+11
Eu-154	6.0320E-03	780.26	1,560.52	0 00E+00	4 71E+00	9 41E+00	1 7500	1.555E+10
Eu-155	2.1770E-04	780.26	1,560.52	0 00E+00	1.70E-01	3 40E-01	2.2500	2.557E+06
Fe-55	7.9296E-07	780.26	1,560.52	0 00E+00	6 19E-04	1 24E-03	2 7500	9 009E+06
H-3	8 9486E-03	780.26	1,560.52	0 00E+00	6 98E+00	1 40E+01	3.5000	6 432E+05
I-129	9 8288E-07	780.26	1,560.52	0 00E+00	7 67E-04	1 53E-03	5.0000	2 749E+05
Kr-85	1 0707E-02	780.26	1,560.52	0 00E+00	8 35E+00	1 67E+01	7.0000	3 167E+04
Np-237	1 1927E-05	780.26	1,560.52	0 00E+00	9 31E-03	1 86E-02	11.0000	3 636E+03
Pa-231	1 4703E-09	780.26	1,560.52	0 00E+00	1.15E-06	2 29E-06		
Pb-210	1 6828E-10	780.26	1,560.52	0 00E+00	1.31E-07	2 63E-07		
Pm-147	6 9606E-06	780.26	1,560.52	0 00E+00	5 43E-03	1 09E-02		
Pu-238	6 6263E-02	780.26	1,560.52	0 00E+00	5 17E+01	1 03E+02		
Pu-239	1.1618E-02	780.26	1,560.52	0 00E+00	9 07E+00	1 81E+01		
Pu-240	1.5142E-02	780.26	1,560.52	0 00E+00	1 18E+01	2 36E+01		
Pu-241	4 3766E-01	780.26	1,560.52	0 00E+00	3 41E+02	6 83E+02		
Pu-242	6 4260E-05	780.26	1,560.52	0 00E+00	5 01E-02	1 00E-01		
Ra-226	3 8501E-10	780.26	1,560.52	0 00E+00	3 00E-07	6 01E-07		
Ra-228	5.2955E-12	780.26	1,560.52	0 00E+00	4 13E-09	8 26E-09		
Ru-106	2 0413E-14	780.26	1,560.52	0 00E+00	1.59E-11	3 19E-11		
Se-79	1.2376E-05	780.26	1,560.52	0 00E+00	9 66E-03	1 93E-02		
Sn-126	2 5210E-05	780.26	1,560.52	0 00E+00	1 97E-02	3 93E-02		
Sr-90	6 4163E-01	780.26	1,560.52	0 00E+00	5 01E+02	1 00E+03		
Tc-99	3 9357E-04	780.26	1,560.52	0 00E+00	3 07E-01	6 14E-01		
Th-229	1 5644E-10	780.26	1,560.52	0 00E+00	1.22E-07	2 44E-07		
Th-230	2 7972E-08	780.26	1,560.52	0 00E+00	2 18E-05	4 37E-05		
Th-232	5 3036E-12	780.26	1,560.52	0 00E+00	4 14E-09	8 28E-09		
Ti-208	1 5136E-07	780.26	1,560.52	0 00E+00	1.18E-04	2 36E-04		
U-232	4 1005E-07	780.26	1,560.52	0 00E+00	3.20E-04	6 40E-04		
U-233	2 5856E-08	780.26	1,560.52	0 00E+00	2 02E-05	4 03E-05		
U-234	5 2665E-05	780.26	1,560.52	0 00E+00	4 11E-02	8 22E-02		
U-235	-1.4487E-06	780.26	0.00	2 42E-02	2 31E-02	2 42E-02		
U-236	7 5888E-06	780.26	1,560.52	0 00E+00	5 92E-03	1 18E-02		
U-238	-2 6129E-07	780.26	0 00	9 03E-02	9 01E-02	9 03E-02		
Y-90	6 4180E-01	780.26	1,560.52	0 00E+00	5 01E+02	1 00E+03		
Other Radionuclides					7 44E+02	1 49E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	4 000514536	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate ³
	From SFD	Estimated	
Nominal	780.26	771.41	
Bounding		1 560.52	

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		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: LOFT FUEL RODS
 SNF ID #: 924
 Fuel Units & Descr: 2 - ROD
 Heavy Metal Mass: BOL= . EOL=1 895kg
 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
 18"x10"
 0 67

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 0733E-09	11 83	23 65	0 00E+00	1 27E-08	2 54E-08	Avg MeV	
Am-241	1 4751E-01	11 83	23 65	0 00E+00	1 74E+00	3 49E+00	0 0150	9 000E+11
Am-242m	2 6809E-04	11 83	23 65	0 00E+00	3 17E-03	6 34E-03	0 0250	1 804E+11
Am-243	6 2484E-04	11 83	23 65	0 00E+00	7 39E-03	1 48E-02	0 0375	1 700E+11
C-14	4 7820E-05	11 83	23 65	0 00E+00	5 66E-04	1 13E-03	0 0575	2 127E+11
Cl-36	8 0297E-07	11 83	23 65	0 00E+00	9 50E-06	1 90E-05	0 0850	9 937E+10
Cl-243	1 7426E-04	11 83	23 65	0 00E+00	2 06E-03	4 12E-03	0 1250	6 611E+10
Co-244	2 7616E-02	11 83	23 65	0 00E+00	3 27E-01	6 53E-01	0 2250	8 484E+10
Co-60	3 5610E-04	11 83	23 65	0 00E+00	4 21E-03	8 42E-03	0 3750	3 664E+10
Cs-134	2 6260E-07	11 83	23 65	0 00E+00	3 11E-06	6 21E-06	0 5750	8 628E+11
Cs-135	1 4433E-05	11 83	23 65	0 00E+00	1 71E-04	3 41E-04	0 8500	8 425E+09
Cs-137	9 8870E-01	11 83	23 65	0 00E+00	1 17E+01	2 34E+01	1 2500	5 361E+09
Eu-154	6 0320E-04	11 83	23 65	0 00E+00	7 13E-02	1 43E-01	1 7500	2 357E+08
Eu-155	2 1770E-04	11 83	23 65	0 00E+00	2 57E-03	5 15E-03	2 2500	3 874E+04
Fe-55	7 9296E-07	11 83	23 65	0 00E+00	9 38E-06	1 88E-05	2 7500	1 385E+05
H-3	8 9486E-03	11 83	23 65	0 00E+00	1 06E-01	2 12E-01	3 5000	9 744E+03
I-129	9 8288E-07	11 83	23 65	0 00E+00	1 16E-05	2 32E-05	5 0000	4 164E+03
Kr-85	1 0707E-02	11 83	23 65	0 00E+00	1 27E-01	2 53E-01	7 0000	4 797E+02
Np-237	1 1927E-05	11 83	23 65	0 00E+00	1 41E-04	2 82E-04	11 0000	5 509E+01
Pa-231	1 4703E-09	11 83	23 65	0 00E+00	1 74E-08	3 48E-08		
Pb-210	1 6828E-10	11 83	23 65	0 00E+00	1 99E-09	3 98E-09		
Pm-147	6 9606E-06	11 83	23 65	0 00E+00	8 23E-05	1 65E-04		
Pu-238	6 6263E-02	11 83	23 65	0 00E+00	7 84E-01	1 57E+00		
Pu-239	1 1618E-02	11 83	23 65	0 00E+00	1 37E-01	2 75E-01		
Pu-240	1 5142E-02	11 83	23 65	0 00E+00	1 79E-01	3 58E-01		
Pu-241	4 3766E-01	11 83	23 65	0 00E+00	5 18E+00	1 04E+01		
Pu-242	6 4260E-05	11 83	23 65	0 00E+00	7 60E-04	1 52E-03		
Ra-226	3 8501E-10	11 83	23 65	0 00E+00	4 55E-09	9 11E-09		
Ra-228	5 2955E-12	11 83	23 65	0 00E+00	6 26E-11	1 25E-10		
Ru-106	2 0413E-14	11 83	23 65	0 00E+00	2 41E-13	4 83E-13		
Se-79	1 2376E-05	11 83	23 65	0 00E+00	1 46E-04	2 93E-04		
Sn-126	2 5210E-05	11 83	23 65	0 00E+00	2 98E-04	5 96E-04		
Sr-90	6 4163E-01	11 83	23 65	0 00E+00	7 59E+00	1 52E+01		
Tc-99	3 9357E-04	11 83	23 65	0 00E+00	4 65E-03	9 31E-03		
Th-229	1 5644E-10	11 83	23 65	0 00E+00	1 85E-09	3 70E-09		
Th-230	2 7972E-08	11 83	23 65	0 00E+00	3 31E-07	6 62E-07		
Th-232	5 3036E-12	11 83	23 65	0 00E+00	6 27E-11	1 25E-10		
Tl-208	1 5136E-07	11 83	23 65	0 00E+00	1 79E-06	3 58E-06		
U-232	4 1005E-07	11 83	23 65	0 00E+00	4 85E-06	9 70E-06		
U-233	2 5856E-08	11 83	23 65	0 00E+00	3 06E-07	6 12E-07		
U-234	5 2665E-05	11 83	23 65	0 00E+00	6 23E-04	1 25E-03		
U-235	-1 4487E-06	11 83	0 00	1 32E-04	1 15E-04	1 32E-04		
U-236	7 5888E-06	11 83	23 65	0 00E+00	8 97E-05	1 79E-04		
U-238	-2 6129E-07	11 83	0 00	6 20E-04	6 17E-04	6 20E-04		
Y-90	6 4180E-01	11 83	23 65	0 00E+00	7 59E+00	1 52E+01		
Other Radionuclides					1 13E+01	2 25E+01		

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:
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	ZIRC	
BOL Enrichment %	U	U	
		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
		11 83	Nominal burnup taken from SFD and converted to MWd using BOL=1 907kg Bounding burnup assumed to be twice nominal burnup.
Bounding		23 65	

Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/Given Burnup	
	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 6kg EOL=813.026kg**
 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.
18"x10"
4 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	1 0733E-09	2,447.37	4 894 74	0 00E+00	2 63E-06	5.25E-06	Avg MeV							
Am-241	1 4751E-01	2,447.37	4,894 74	0 00E+00	3 61E+02	7 22E+02	0 0150	1.863E+14						
Am-242m	2 6809E-04	2,447.37	4,894 74	0 00E+00	6 56E-01	1 31E+00	0 0250	3 732E+13						
Am-243	6 2484E-04	2,447.37	4,894 74	0 00E+00	1 53E+00	3 06E+00	0 0375	3 517E+13						
C-14	4 7820E-05	2,447.37	4,894 74	0 00E+00	1 17E-01	2.34E-01	0.0575	4 401E+13						
Cl-36	8 0297E-07	2,447.37	4,894 74	0 00E+00	1 97E-03	3 93E-03	0 0850	2 056E+13						
Cm-243	1 7426E-04	2,447.37	4,894 74	0 00E+00	4.26E-01	8 53E-01	0 1250	1.368E+13						
Cm-244	2 7616E-02	2,447.37	4,894 74	0 00E+00	6 76E+01	1.35E+02	0.2250	1 756E+13						
Co-60	3 5610E-04	2,447.37	4,894 74	0 00E+00	8 72E-01	1 74E+00	0.3750	7 582E+12						
Cs-134	2 6260E-07	2,447.37	4,894 74	0 00E+00	6 43E-04	1.29E-03	0.5750	1 786E+14						
Cs-135	1 4433E-05	2,447.37	4,894 74	0 00E+00	3 53E-02	7.06E-02	0.8500	1 743E+12						
Cs-137	9 8870E-01	2,447.37	4,894 74	0 00E+00	2 42E+03	4 84E+03	1.2500	1 109E+12						
Eu-154	6 0320E-03	2,447.37	4,894 74	0 00E+00	1 48E+01	2 95E+01	1 7500	4 878E+10						
Eu-155	2 1770E-04	2,447.37	4,894 74	0 00E+00	5 33E-01	1 07E+00	2.2500	8 019E+06						
Fe-55	7 9296E-07	2,447.37	4,894 74	0 00E+00	1 94E-03	3.88E-03	2 7500	2 826E+07						
H-3	8 9486E-03	2,447.37	4,894 74	0 00E+00	2 19E+01	4.38E+01	3.5000	2 017E+06						
I-129	9 8288E-07	2,447.37	4,894 74	0 00E+00	2 41E-03	4.81E-03	5 0000	8 621E+05						
Kr-85	1 0707E-02	2,447.37	4,894 74	0 00E+00	2 62E+01	5.24E+01	7 0000	9 932E+04						
Np-237	1.1927E-05	2,447.37	4,894 74	0 00E+00	2 92E-02	5 84E-02	11 0000	1 140E+04						
Pa-231	1 4703E-09	2,447.37	4,894 74	0 00E+00	3 60E-06	7.20E-06								
Pb-210	1 6828E-10	2,447.37	4,894 74	0 00E+00	4 12E-07	8.24E-07								
Pm-147	6 9606E-06	2,447.37	4,894 74	0 00E+00	1 70E-02	3 41E-02								
Pu-238	6 6263E-02	2,447.37	4,894 74	0 00E+00	1 62E+02	3.24E+02								
Pu-239	1.1618E-02	2,447.37	4 894 74	0 00E+00	2 84E+01	5 69E+01								
Pu-240	1.5142E-02	2,447.37	4,894 74	0 00E+00	3 71E+01	7.41E+01								
Pu-241	4 3766E-01	2,447.37	4 894 74	0 00E+00	1 07E+03	2 14E+03								
Pu-242	6 4260E-05	2,447.37	4,894 74	0 00E+00	1 57E-01	3 15E-01								
Ra-226	3 8501E-10	2,447.37	4,894 74	0 00E+00	9 42E-07	1 88E-06								
Ra-228	5 2955E-12	2,447.37	4,894 74	0 00E+00	1 30E-08	2 59E-08								
Ru-106	2 0413E-14	2,447.37	4,894 74	0 00E+00	5 00E-11	9 99E-11								
Se-79	1.2376E-05	2,447.37	4,894 74	0 00E+00	3 03E-02	6 06E-02								
Sn-126	2.5210E-05	2,447.37	4,894 74	0 00E+00	6 17E-02	1 23E-01								
Sr-90	6 4163E-01	2,447.37	4,894 74	0 00E+00	1 57E+03	3 14E+03								
Tc-99	3 9357E-04	2,447.37	4,894 74	0 00E+00	9 63E-01	1 93E+00								
Th-229	1.5644E-10	2,447.37	4,894 74	0 00E+00	3 83E-07	7 66E-07								
Th-230	2 7972E-08	2,447.37	4,894 74	0 00E+00	6 85E-05	1 37E-04								
Th-232	5.3036E-12	2,447.37	4,894 74	0 00E+00	1 30E-08	2 60E-08								
Tl-208	1.5136E-07	2,447.37	4,894 74	0 00E+00	3 70E-04	7 41E-04								
U-232	4.1005E-07	2,447.37	4,894 74	0 00E+00	1 00E-03	2 01E-03								
U-233	2 5856E-08	2,447.37	4,894 74	0 00E+00	6 33E-05	1 27E-04								
U-234	5.2665E-05	2,447.37	4,894 74	0 00E+00	1.29E-01	2 58E-01								
U-235	-1 4487E-06	2,447.37	0 00	7 05E-02	6 70E-02	7 05E-02								
U-236	7.5888E-06	2,447.37	4,894 74	0 00E+00	1 86E-02	3 71E-02								
U-238	-2 6129E-07	2,447.37	0 00	2 63E-01	2 63E-01	2 63E-01								
Y-90	6 4180E-01	2,447.37	4,894 74	0 00E+00	1 57E+03	3 14E+03								
Other Radionuclides					2 33E+03	4 66E+03								

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD LIGHT WATER	Used LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	4	0 to 5	
Burnup Summary (MWd)²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	2 418.25	2,447.37	
Bounding		4,894 74	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 09	1 01	
Bounding	0 17		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: LOOSE FUEL ROD STORAGE BASKET (LFRSB)
 SNF ID #: 126
 Fuel Units & Descr: 1 - SCRAP
 Heavy Metal Mass BOL= , EOL=311 112kg
 ROD Storage Site: INEEL

Fuel decay start date: 1983
 Estimates as of: 2030
 Template: Pathfinder (Light Water, SST, 60 to 100%, U)
 *Template Burnup(MWd): 6 01
 Template BOL Heavy Metal Mass (MT): 0 00012882
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x15"
 1 00

II. Estimates

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2 3344E-08	293,891.20	293,891.20	0 00E+00	6 86E-03	6 86E-03	Avg MeV	
Am-241	1 1135E-04	293,891.20	293,891.20	0 00E+00	3.27E+01	3 27E+01	0.0150	2 194E+16
Am-242m	8 5075E-09	293,891.20	293,891.20	0 00E+00	2 50E-03	2 50E-03	0.0250	4.558E+15
Am-243	9 8519E-10	293,891.20	293,891.20	0 00E+00	2 90E-04	2 90E-04	0.0375	3 943E+15
C-14	2 3012E-04	293,891.20	293,891.20	0 00E+00	6 76E+01	6 76E+01	0.0575	4.250E+15
Cl-36	1 2261E-06	293,891.20	293,891.20	0 00E+00	3 60E-01	3 60E-01	0.0850	2.568E+15
Cm-243	2 4875E-10	293,891.20	293,891.20	0 00E+00	7 31E-05	7 31E-05	0.1250	1 667E+15
Cm-244	2 3178E-09	293,891.20	293,891.20	0 00E+00	6 81E-04	6 81E-04	0.2250	2.210E+15
Co-60	7 0849E-02	293,891.20	293,891.20	0 00E+00	2 08E+04	2 08E+04	0.3750	9 641E+14
Cs-134	3 0266E-06	293,891.20	293,891.20	0 00E+00	8 89E-01	8 89E-01	0.5750	1.588E+16
Cs-135	3 0316E-05	293,891.20	293,891.20	0 00E+00	8 91E+00	8 91E+00	0.8500	1 608E+14
Cs-137	1 4511E+00	293,891.20	293,891.20	0 00E+00	4.26E+05	4 26E+05	1.2500	1.598E+15
Eu-154	6 6955E-04	293,891.20	293,891.20	0 00E+00	1 97E+02	1 97E+02	1 7500	4 146E+12
Eu-155	6 9850E-04	293,891.20	293,891.20	0 00E+00	2 05E+02	2 05E+02	2.2500	8.609E+09
Fe-55	1 2318E-03	293,891.20	293,891.20	0 00E+00	3 62E+02	3 62E+02	2.7500	2 488E+08
H-3	2 5141E-03	293,891.20	293,891.20	0 00E+00	7.39E+02	7 39E+02	3.5000	1 755E+04
I-129	7 3195E-07	293,891.20	293,891.20	0 00E+00	2.15E-01	2 15E-01	5.0000	7.217E+03
Kr-85	4 1281E-02	293,891.20	293,891.20	0 00E+00	1.21E+04	1 21E+04	7.0000	7 969E+02
Np-237	1 1489E-06	293,891.20	293,891.20	0 00E+00	3 38E-01	3 38E-01	11 0000	8.942E+01
Pa-231	4 5241E-08	293,891.20	293,891.20	0 00E+00	1 33E-02	1 33E-02		
Pb-210	6 4476E-13	293,891.20	293,891.20	0 00E+00	1 89E-07	1 89E-07		
Pm-147	1 1651E-03	293,891.20	293,891.20	0 00E+00	3.42E+02	3 42E+02		
Pu-238	2 9517E-04	293,891.20	293,891.20	0 00E+00	8 67E+01	8 67E+01		
Pu-239	6 6772E-04	293,891.20	293,891.20	0 00E+00	1 96E+02	1 96E+02		
Pu-240	8 6839E-05	293,891.20	293,891.20	0 00E+00	2 55E+01	2 55E+01		
Pu-241	7 1514E-04	293,891.20	293,891.20	0 00E+00	2 10E+02	2 10E+02		
Pu-242	1 9717E-09	293,891.20	293,891.20	0 00E+00	5.79E-04	5 79E-04		
Ra-226	1 7654E-12	293,891.20	293,891.20	0 00E+00	5.19E-07	5 19E-07		
Ra-228	8 2928E-12	293,891.20	293,891.20	0 00E+00	2.44E-06	2 44E-06		
Ru-106	1 8419E-10	293,891.20	293,891.20	0 00E+00	5 41E-05	5 41E-05		
Se-79	1 3223E-05	293,891.20	293,891.20	0 00E+00	3 89E+00	3 89E+00		
Sn-126	1 1493E-05	293,891.20	293,891.20	0 00E+00	3 38E+00	3 38E+00		
Sr-90	1 3649E+00	293,891.20	293,891.20	0 00E+00	4 01E+05	4 01E+05		
Tc-99	4 6656E-04	293,891.20	293,891.20	0 00E+00	1 37E+02	1 37E+02		
Th-229	1 4547E-11	293,891.20	293,891.20	0 00E+00	4.28E-06	4 28E-06		
Th-230	1 6617E-10	293,891.20	293,891.20	0 00E+00	4 88E-05	4 88E-05		
Th-232	8 3361E-12	293,891.20	293,891.20	0 00E+00	2 45E-06	2 45E-06		
Tl-208	2 1664E-08	293,891.20	293,891.20	0 00E+00	6 37E-03	6 37E-03		
U-232	5 8669E-08	293,891.20	293,891.20	0 00E+00	1 72E-02	1 72E-02		
U-233	3 1847E-09	293,891.20	293,891.20	0 00E+00	9 36E-04	9 36E-04	Thermal Power	
U-234	3 8769E-07	293,891.20	293,891.20	0 00E+00	1 14E-01	1 14E-01	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2 7761E-06	293,891.20	0 00	1 26E+00	4 41E-01	1.26E+00	5 13E+03	5.13E+03
U-236	1 6190E-05	293,891.20	293,891.20	0 00E+00	4 76E+00	4 76E+00	Total	Total
U-238	-2 8547E-09	293,891.20	0 00	1 36E-02	1.27E-02	1 36E-02		
Y-90	1 3652E+00	293,891.20	293,891.20	0 00E+00	4 01E+05	4 01E+05		
Other Radionuclides					4 85E+05	4 85E+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. This fuel matches on all parameters except cladding (SST is conservative) and enrichment (unknown).
Fuel Cladding	UNKNOWN	SST	
BOL HM Constituents	U	U	
BOL Enrichment %		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		293,891.20	Nominal burnup set equal to bounding burnup
Bounding		293,891.20	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	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 LWR SNF SCRAP (ZR/SST) ¹Fuel decay start date 1983
 SNF ID # 940 Estimates as of 2030
 Fuel Units & Descr: 9 - CANISTER OF SCRAP Template PWR (Light Water, Zirc 0 to 5%, U)
 Heavy Metal Mass: BOL=161 862kg EOL=154.224kg ²Template Burnup(MWd) 61.92
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT) 0 00176911
 Template Decay Time 35 years

Estimated
 Canister usage*
 18"x10"
 0 69

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 7758E-10	7,263 66	14,527 32	0 00E+00	6 37E-06	1 27E-05	Avg MeV	
Am-241	1.4352E-01	7,263 66	14,527 32	0 00E+00	1 04E+03	2 09E+03	0 0150	7 817E+14
Am-242m	2.8698E-04	7,263 66	14,527 32	0 00E+00	2 08E+00	4 17E+00	0 0250	1 576E+14
Am-243	6.2565E-04	7,263 66	14,527 32	0 00E+00	4 54E+00	9 09E+00	0 0375	1 503E+14
C-14	4 7901E-05	7,263 66	14,527 32	0 00E+00	3 48E-01	6 96E-01	0 0575	1 737E+14
Cf-252	8 0297E-07	7,263 66	14,527 32	0 00E+00	5 83E-03	1 17E-02	0 0850	8 746E+13
Cm-243	2.5081E-04	7,263 66	14,527 32	0 00E+00	1 82E+00	3 64E+00	0 1250	6 069E+13
Cm-244	4 9015E-02	7,263 66	14,527 32	0 00E+00	3 56E+02	7 12E+02	0 2250	7 500E+13
Co-60	2.5581E-03	7,263 66	14,527 32	0 00E+00	1 86E+01	3 72E+01	0 3750	3 225E+13
Cs-134	4 0536E-05	7,263 66	14,527 32	0 00E+00	2 94E-01	5 89E-01	0 5750	7 501E+14
Cs-135	1 4433E-05	7,263 66	14,527 32	0 00E+00	1 05E-01	2 10E-01	0 8500	1 038E+13
Cs-137	1.3979E+00	7,263 66	14,527 32	0 00E+00	1 02E+04	2 03E+04	1 2500	1 019E+11
Eu-154	2 0203E-02	7,263 66	14,527 32	0 00E+00	1 47E+02	2 94E+02	1 7500	3 052E+11
Eu-155	1 7684E-03	7,263 66	14,527 32	0 00E+00	1 28E+01	2 57E+01	2 2500	4 915E+07
Fe-55	4 3136E-05	7,263 66	14,527 32	0 00E+00	3 13E-01	6 27E-01	2 7500	1 007E+08
H-3	2 0769E-02	7,263 66	14,527 32	0 00E+00	1 51E+02	3 02E+02	3 5000	1 037E+07
I-129	9 8288E-07	7,263 66	14,527 32	0 00E+00	7 14E-03	1 43E-02	5 0000	4 433E+06
Kr-85	2 8214E-02	7,263 66	14,527 32	0 00E+00	2 05E+02	4 10E+02	7 0000	5 110E+05
Np-237	1 1218E-05	7,263 66	14,527 32	0 00E+00	8 15E-02	1 63E-01	11 0000	5 868E+04
Pa-231	1 3036E-09	7,263 66	14,527 32	0 00E+00	9 47E-06	1 89E-05		
Pb-210	8 5078E-11	7,263 66	14,527 32	0 00E+00	6 18E-07	1 24E-06		
Pm-147	3 6531E-04	7,263 66	14,527 32	0 00E+00	2 65E+00	5 31E+00		
Pu-238	7 4564E-02	7,263 66	14,527 32	0 00E+00	5 42E+02	1 08E+03		
Pu-239	1 1623E-02	7,263 66	14,527 32	0 00E+00	8 44E+01	1 69E+02		
Pu-240	1 5132E-02	7,263 66	14,527 32	0 00E+00	1 10E+02	2 20E+02		
Pu-241	9 0036E-01	7,263 66	14,527 32	0 00E+00	6 54E+03	1 31E+04		
Pu-242	6 4260E-05	7,263 66	14,527 32	0 00E+00	4 67E-01	9 34E-01		
Ra-226	2 2804E-10	7,263 66	14,527 32	0 00E+00	1 66E-06	3 31E-06		
Ra-228	5 2713E-12	7,263 66	14,527 32	0 00E+00	3 83E-08	7 66E-08		
Ru-106	6 1160E-10	7,263 66	14,527 32	0 00E+00	4 44E-06	8 88E-06		
Se-79	1 2377E-05	7,263 66	14,527 32	0 00E+00	8 99E-02	1 80E-01		
Sn-126	2 5210E-05	7,263 66	14,527 32	0 00E+00	1 83E-01	3 66E-01		
Sr-90	9 1667E-01	7,263 66	14,527 32	0 00E+00	6 66E+03	1 33E+04		
Tc-99	3 9357E-04	7,263 66	14,527 32	0 00E+00	2 86E+00	5 72E+00		
Th-229	1 2057E-10	7,263 66	14,527 32	0 00E+00	8 76E-07	1 75E-06		
Th-230	2 1043E-08	7,263 66	14,527 32	0 00E+00	1 53E-04	3 06E-04		
Th-232	5 2972E-12	7,263 66	14,527 32	0 00E+00	3 85E-08	7 70E-08		
Tl-208	1 7474E-07	7,263 66	14,527 32	0 00E+00	1 27E-03	2 54E-03		
U-232	4 7368E-07	7,263 66	14,527 32	0 00E+00	3 44E-03	6 88E-03		
U-233	2 5097E-08	7,263 66	14,527 32	0 00E+00	1 82E-04	3 65E-04		
U-234	5 0000E-05	7,263 66	14,527 32	0 00E+00	3 63E-01	7 26E-01		
U-235	-1 4489E-06	7,263 66	0 00	1 37E-02	3 20E-03	1 37E-02		
U-236	7 5824E-06	7,263 66	14,527 32	0 00E+00	5 51E-02	1 10E-01		
U-238	-2 6129E-07	7,263 66	0 00	5 23E-02	5 04E-02	5 23E-02		
Y-90	9 1699E-01	7,263 66	14,527 32	0 00E+00	6 66E+03	1 33E+04		
Other Radionuclides					9 75E+03	1 95E+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	U	U	
BOL Enrichment %	3 923	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		7,263 66	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding		14,527 32	

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: MISCELLANEOUS RSWF FUEL
 SNF ID #: 366
 Fuel Units & Descr: 1 - UNKNOWN
 Heavy Metal Mass: BOL = : EOL=4161 515kg
 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"
 2 00

Radionuclide	m		x _n		b		y _n		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	6 1822E-12	12,522.18	28,967.98	0 00E+00	7 74E-08	1 79E-07	Avg MeV			
Am-241	1 1066E-01	12,522.18	28,967.98	8 05E+03	9 43E+03	1 13E+04	0 0150	1 365E+15		
Am-242m	1 9247E-03	12,522.18	28,967.98	0 00E+00	2 41E+01	5 58E+01	0 0250	1 957E+14		
Am-243	1 0740E-04	12,522.18	28,967.98	0 00E+00	1 34E+00	3 11E+00	0 0375	2 196E+14		
C-14	2 6042E-05	12,522.18	28,967.98	0 00E+00	3 26E-01	7 54E-01	0 0575	3 254E+14		
Cl-36	3 4243E-10	12,522.18	28,967.98	0 00E+00	4 29E-06	9 92E-06	0 0850	1 050E+14		
Cm-243	4 0629E-04	12,522.18	28,967.98	0 00E+00	5 09E+00	1 18E+01	0 1250	7 411E+13		
Cm-244	1 6024E-03	12,522.18	28,967.98	0 00E+00	2 01E+01	4 64E+01	0 2250	8 464E+13		
Co-60	3 4275E-03	12,522.18	28,967.98	0 00E+00	4 29E+01	9 93E+01	0 3750	3 683E+13		
Cs-134	1 5566E-03	12,522.18	28,967.98	0 00E+00	1 95E+01	4 51E+01	0 5750	1 486E+15		
Cs-135	4 7693E-05	12,522.18	28,967.98	0 00E+00	5 97E-01	1 38E+00	0 8500	1 553E+13		
Cs-137	1 4007E+00	12,522.18	28,967.98	0 00E+00	1 75E+04	4 06E+04	1 2500	1 858E+13		
Eu-154	1 6184E-02	12,522.18	28,967.98	0 00E+00	2 03E+02	4 69E+02	1 7500	4 204E+11		
Eu-155	1 3774E-02	12,522.18	28,967.98	0 00E+00	1 72E+02	3 99E+02	2 2500	1 193E+08		
Fe-55	3 8028E-04	12,522.18	28,967.98	0 00E+00	4 76E+00	1 10E+01	2 7500	5 003E+08		
H-3	3 8454E-03	12,522.18	28,967.98	0 00E+00	4 82E+01	1 11E+02	3 5000	2 029E+07		
I-129	1 2891E-06	12,522.18	28,967.98	0 00E+00	1 61E-02	3 73E-02	5 0000	8 426E+06		
Kr-85	2 7848E-02	12,522.18	28,967.98	0 00E+00	3 49E+02	8 07E+02	7 0000	9 593E+05		
Np-237	3 7516E-06	12,522.18	28,967.98	0 00E+00	4 70E-02	1 09E-01	11 0000	1 096E+05		
Pa-231	1 2488E-11	12,522.18	28,967.98	0 00E+00	1 56E-07	3 62E-07				
Pb-210	2 4206E-12	12,522.18	28,967.98	0 00E+00	3 03E-08	7 01E-08				
Pm-147	1 5671E-02	12,522.18	28,967.98	0 00E+00	1 96E+02	4 54E+02				
Pu-238	1 4877E-02	12,522.18	28,967.98	0 00E+00	1 86E+02	4 31E+02				
Pu-239	-3 5520E-02	12,522.18	0 00	6 61E+04	6 56E+04	6 61E+04				
Pu-240	2 0690E-02	12,522.18	28,967.98	3 36E+04	3 38E+04	3 42E+04				
Pu-241	-1 4799E+00	12,522.18	0 00	1 51E+06	1 49E+06	1 51E+06				
Pu-242	1 1252E-05	12,522.18	28,967.98	8 95E+00	9 09E+00	9 28E+00				
Ra-226	7 8524E-12	12,522.18	28,967.98	0 00E+00	9 83E-08	2 27E-07				
Ra-228	2 4086E-16	12,522.18	28,967.98	0 00E+00	3 02E-12	6 98E-12				
Ru-106	1 5066E-05	12,522.18	28,967.98	0 00E+00	1 89E-01	4 36E-01				
Sa-79	1 0127E-05	12,522.18	28,967.98	0 00E+00	1 27E-01	2 93E-01				
Sn-126	4 3902E-05	12,522.18	28,967.98	0 00E+00	5 50E-01	1 27E+00				
Sr-90	5 0088E-01	12,522.18	28,967.98	0 00E+00	6 27E+03	1 45E+04				
Tc-99	3 9412E-04	12,522.18	28,967.98	0 00E+00	4 94E+00	1 14E+01				
Th-229	2 7219E-12	12,522.18	28,967.98	0 00E+00	3 41E-08	7 88E-08				
Th-230	1 0441E-09	12,522.18	28,967.98	0 00E+00	1 31E-05	3 02E-05				
Th-232	3 1689E-16	12,522.18	28,967.98	0 00E+00	3 97E-12	9 18E-12				
Tl-208	4 6636E-07	12,522.18	28,967.98	0 00E+00	5 84E-03	1 35E-02				
U-232	1 2638E-06	12,522.18	28,967.98	0 00E+00	1 58E-02	3 66E-02				
U-233	5 7451E-10	12,522.18	28,967.98	0 00E+00	7 19E-06	1 66E-05				
U-234	4 3044E-06	12,522.18	28,967.98	0 00E+00	5 39E-02	1 25E-01				
U-235	-7 7765E-09	12,522.18	0 00	1 36E-02	1 35E-02	1 36E-02				
U-236	1 8050E-07	12,522.18	28,967.98	0 00E+00	2 26E-03	5 23E-03				
U-238	-1 7914E-07	12,522.18	0 00	9 87E-01	9 85E-01	9 87E-01				
Y-90	5 0088E-01	12,522.18	28,967.98	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)
3.57E+03	3.84E+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	FAST	FAST	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown) and BOL heavy metal (it is mostly U with a little Pu)
BOL HM Constituents	SST	SST	
BOL Enrichment %	UNKNOWN	Pu and U	
		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
Bounding		12,522.18	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
		28 967 98	

Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Bounding	0.02		1 00
	0.05		

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 TREAT FUEL (MOX) ¹Fuel decay start date 1994
 SNF ID # 369 Estimates as of 2030
 Fuel Units & Descr 1 - UNKNOWN Template (Worst Case)
 Heavy Metal Mass BOL= ; EOL=0 12kg ²Template Burnup(MWd) 62.5
 ROD Storage Site INEEL Template BOL Heavy Metal Mass (MT) 0.00186865
 Template Decay Time 35 years

Estimated
 Canister usage*
 18"x10"
 0 01

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	114.14	114.14	0.00E+00	2.63E-04	2.63E-04	Avg MeV	
Am-241	8.4448E+00	114.14	114.14	0.00E+00	9.64E+02	9.64E+02	0.0150	1.399E+14
Am-242m	1.6848E-02	114.14	114.14	0.00E+00	1.92E+00	1.92E+00	0.0250	2.783E+13
Am-243	1.6320E-02	114.14	114.14	0.00E+00	1.86E+00	1.86E+00	0.0375	2.431E+13
C-14	1.2090E-01	114.14	114.14	0.00E+00	1.38E+01	1.38E+01	0.0575	3.826E+13
Cl-36	2.2849E-03	114.14	114.14	0.00E+00	2.61E-01	2.61E-01	0.0850	1.493E+13
Cm-243	8.6624E-04	114.14	114.14	0.00E+00	9.89E-02	9.89E-02	0.1250	1.170E+13
Cm-244	1.6848E-01	114.14	114.14	0.00E+00	1.92E+01	1.92E+01	0.2250	1.294E+13
Co-60	2.8086E+01	114.14	114.14	0.00E+00	3.21E+03	3.21E+03	0.3750	5.533E+12
Cs-134	3.4148E-04	114.14	114.14	0.00E+00	3.90E-02	3.90E-02	0.5750	8.997E+13
Cs-135	4.3976E-04	114.14	114.14	0.00E+00	5.02E-02	5.02E-02	0.8500	3.438E+12
Cs-137	2.1049E+01	114.14	114.14	0.00E+00	2.40E+03	2.40E+03	1.2500	2.403E+14
Eu-154	1.2500E+00	114.14	114.14	0.00E+00	1.43E+02	1.43E+02	1.7500	1.063E+11
Eu-155	6.8986E-02	114.14	114.14	0.00E+00	7.87E+00	7.87E+00	2.2500	1.260E+09
Fe-55	2.9308E-01	114.14	114.14	0.00E+00	3.35E+01	3.35E+01	2.7500	3.552E+08
H-3	2.4311E-01	114.14	114.14	0.00E+00	2.77E+01	2.77E+01	3.5000	2.842E+05
I-129	1.0618E-05	114.14	114.14	0.00E+00	1.21E-03	1.21E-03	5.0000	1.207E+05
Kr-85	5.9882E-01	114.14	114.14	0.00E+00	6.83E+01	6.83E+01	7.0000	1.382E+04
Np-237	1.5668E-04	114.14	114.14	0.00E+00	1.79E-02	1.79E-02	11.0000	1.582E+03
Pa-231	2.8656E-06	114.14	114.14	0.00E+00	3.27E-04	3.27E-04		
Pb-210	2.3918E-08	114.14	114.14	0.00E+00	2.73E-06	2.73E-06		
Pm-147	1.6900E-02	114.14	114.14	0.00E+00	1.93E+00	1.93E+00		
Pu-238	-8.6120E-01	114.14	0.00	3.09E+01	0.00E+00	3.09E+01		
Pu-239	-4.8440E-02	114.14	0.00	3.74E+00	0.00E+00	3.74E+00		
Pu-240	-3.0095E-01	114.14	0.00	4.77E+00	0.00E+00	4.77E+00		
Pu-241	-1.0411E+02	114.14	0.00	1.23E+03	0.00E+00	1.23E+03		
Pu-242	-1.1381E-04	114.14	0.00	2.06E-02	7.66E-03	2.06E-02		
Ra-226	6.4400E-08	114.14	114.14	0.00E+00	7.35E-06	7.35E-06		
Ra-228	5.9952E-07	114.14	114.14	0.00E+00	6.84E-05	6.84E-05		
Ru-106	8.5526E-07	114.14	114.14	0.00E+00	9.76E-05	9.76E-05		
Se-79	1.9181E-04	114.14	114.14	0.00E+00	2.19E-02	2.19E-02		
Sn-126	1.6671E-04	114.14	114.14	0.00E+00	1.90E-02	1.90E-02		
Sr-90	1.9799E+01	114.14	114.14	0.00E+00	2.26E+03	2.26E+03		
Tc-99	6.7678E-03	114.14	114.14	0.00E+00	7.72E-01	7.72E-01		
Th-229	1.7488E-06	114.14	114.14	0.00E+00	2.00E-04	2.00E-04		
Th-230	5.8704E-06	114.14	114.14	0.00E+00	6.70E-04	6.70E-04		
Th-232	6.0208E-07	114.14	114.14	0.00E+00	6.87E-05	6.87E-05		
Tl-208	8.7573E-05	114.14	114.14	0.00E+00	1.00E-02	1.00E-02		
U-232	2.3706E-04	114.14	114.14	0.00E+00	2.71E-02	2.71E-02		
U-233	3.6128E-04	114.14	114.14	0.00E+00	4.12E-02	4.12E-02		
U-234	1.2788E-02	114.14	114.14	0.00E+00	1.46E+00	1.46E+00		
U-235	5.7486E-04	114.14	114.14	1.03E-04	6.57E-02	6.57E-02		
U-236	2.3485E-04	114.14	114.14	0.00E+00	2.68E-02	2.68E-02		
U-238	1.1581E-04	114.14	114.14	1.29E-05	1.32E-02	1.32E-02		
Y-90	1.9804E+01	114.14	114.14	0.00E+00	2.26E+03	2.26E+03		
Other Radionuclides					7.04E+03	7.04E+03		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate
	From SFD	Estimated	
Nominal		114.14	Nominal burnup set equal to bounding burnup
Bounding		114.14	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: MISCELLANEOUS TREAT FUEL (U-METAL)
 SNF ID #: 905
 Fuel Units & Descr: 1 - UNKNOWN
 Heavy Metal Mass: BOL= , EOL=0.12kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1994
 Estimates as of: 2030
 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
 18"x10"
 0.01

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.2184E-10	126.70	126.70	0.00E+00	5.34E-08	5.34E-08	Avg. MeV	
Am-241	9.6379E-02	126.70	126.70	0.00E+00	1.22E+01	1.22E+01	0.0150	6.156E+12
Am-242m	5.8463E-05	126.70	126.70	0.00E+00	7.41E-03	7.41E-03	0.0250	1.258E+12
Am-243	4.6279E-05	126.70	126.70	0.00E+00	5.86E-03	5.86E-03	0.0375	1.164E+12
C-14	9.2026E-05	126.70	126.70	0.00E+00	1.17E-02	1.17E-02	0.0575	1.328E+12
Cl-36	0.0000E+00	126.70	126.70	0.00E+00	0.00E+00	0.00E+00	0.0850	6.986E+11
Cm-243	0.0000E+00	126.70	126.70	0.00E+00	0.00E+00	0.00E+00	0.1250	4.639E+11
Cm-244	4.5445E-04	126.70	126.70	0.00E+00	5.76E-02	5.76E-02	0.2250	5.993E+11
Co-60	6.3707E-05	126.70	126.70	0.00E+00	8.07E-03	8.07E-03	0.3750	2.594E+11
Cs-134	1.4042E-05	126.70	126.70	0.00E+00	1.78E-03	1.78E-03	0.5750	5.995E+12
Cs-135	1.0066E-05	126.70	126.70	0.00E+00	1.28E-03	1.28E-03	0.8500	5.684E+10
Cs-137	1.1945E+00	126.70	126.70	0.00E+00	1.51E+02	1.51E+02	1.2500	3.101E+10
Eu-154	6.6451E-03	126.70	126.70	0.00E+00	8.42E-01	8.42E-01	1.7500	1.572E+09
Eu-155	2.9052E-04	126.70	126.70	0.00E+00	3.68E-02	3.68E-02	2.2500	1.270E+05
Fe-55	2.8807E-06	126.70	126.70	0.00E+00	3.65E-04	3.65E-04	2.7500	2.965E+03
H-3	2.1063E-03	126.70	126.70	0.00E+00	2.67E-01	2.67E-01	3.5000	2.621E+03
I-129	8.6006E-07	126.70	126.70	0.00E+00	1.09E-04	1.09E-04	5.0000	1.106E+03
Kr-85	2.6739E-02	126.70	126.70	0.00E+00	3.39E+00	3.39E+00	7.0000	1.254E+02
Np-237	8.5589E-06	126.70	126.70	0.00E+00	1.08E-03	1.08E-03	11.0000	1.428E+01
Pa-231	1.2500E-09	126.70	126.70	0.00E+00	1.58E-07	1.58E-07		
Pb-210	2.3017E-11	126.70	126.70	0.00E+00	2.92E-09	2.92E-09		
Pm-147	5.9856E-04	126.70	126.70	0.00E+00	7.58E-02	7.58E-02		
Pu-238	2.0029E-02	126.70	126.70	0.00E+00	2.54E+00	2.54E+00		
Pu-239	2.8836E-02	126.70	126.70	0.00E+00	3.65E+00	3.65E+00		
Pu-240	2.2802E-02	126.70	126.70	0.00E+00	2.89E+00	2.89E+00		
Pu-241	6.1020E-01	126.70	126.70	0.00E+00	7.73E+01	7.73E+01		
Pu-242	1.4526E-05	126.70	126.70	0.00E+00	1.84E-03	1.84E-03		
Ra-226	9.7701E-11	126.70	126.70	0.00E+00	1.24E-08	1.24E-08		
Ra-228	1.1068E-14	126.70	126.70	0.00E+00	1.40E-12	1.40E-12		
Ru-106	5.9224E-10	126.70	126.70	0.00E+00	7.50E-08	7.50E-08		
Se-79	1.0899E-05	126.70	126.70	0.00E+00	1.38E-03	1.38E-03		
Sn-126	0.0000E+00	126.70	126.70	0.00E+00	0.00E+00	0.00E+00		
Sr-90	8.4899E-01	126.70	126.70	0.00E+00	1.08E+02	1.08E+02		
Tc-99	3.6494E-04	126.70	126.70	0.00E+00	4.62E-02	4.62E-02		
Th-229	1.2928E-12	126.70	126.70	0.00E+00	1.64E-10	1.64E-10		
Th-230	1.6293E-08	126.70	126.70	0.00E+00	2.06E-06	2.06E-06		
Th-232	1.6451E-14	126.70	126.70	0.00E+00	2.08E-12	2.08E-12		
Tl-208	3.4382E-15	126.70	126.70	0.00E+00	4.36E-13	4.36E-13		
U-232	0.0000E+00	126.70	126.70	0.00E+00	0.00E+00	0.00E+00		
U-233	9.9425E-10	126.70	126.70	0.00E+00	1.26E-07	1.26E-07		
U-234	6.5575E-05	126.70	126.70	0.00E+00	8.31E-03	8.31E-03		
U-235	-1.2944E-06	126.70	0.00	4.92E-06	0.00E+00	4.92E-06		
U-236	1.1951E-05	126.70	126.70	0.00E+00	1.51E-03	1.51E-03		
U-238	-3.0619E-07	126.70	0.00	7.99E-05	4.11E-05	7.99E-05		
Y-90	8.4928E-01	126.70	126.70	0.00E+00	1.08E+02	1.08E+02		
Other Radionuclides					1.45E+02	1.45E+02		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal		126.70	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding		126.70	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	87.91		1.83
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: MTR CANAL SCRAP	Fuel decay start date: 1979	Estimated Canister usage HIC 105.00
SNF ID #: 1062	Estimates as of: 2030	
Fuel Units & Descr: 105 - CANISTER OF SCRAP	Template: PWR (Light Water, Zirc, 0 to 5%, U)	
Heavy Metal Mass BOL: EOL=265 975kg	Template Burnup(MWd): 61.92	
ROD Storage Site: INEEL	Template BOL Heavy Metal Mass (MT): 0.00176911	
	Template Decay Time: 50 years	

Radionuclide	Ci/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	266.26	532.51	0.00E+00	2.86E-07	5.72E-07	Avg MeV	
Am-241	1.4751E-01	266.26	532.51	0.00E+00	3.93E+01	7.86E+01	0.0150	2.026E+13
Am-242m	2.6809E-04	266.26	532.51	0.00E+00	7.14E-02	1.43E-01	0.0250	4.061E+12
Am-243	6.2484E-04	266.26	532.51	0.00E+00	1.66E-01	3.33E-01	0.0375	3.826E+12
C-14	4.7820E-05	266.26	532.51	0.00E+00	1.27E-02	2.55E-02	0.0575	4.788E+12
Ct-36	8.0297E-07	266.26	532.51	0.00E+00	2.14E-04	4.28E-04	0.0850	2.237E+12
Cm-243	1.7426E-04	266.26	532.51	0.00E+00	4.64E-02	9.28E-02	0.1250	1.488E+12
Cm-244	2.7616E-02	266.26	532.51	0.00E+00	7.35E+00	1.47E+01	0.2250	1.910E+12
Co-60	3.5610E-04	266.26	532.51	0.00E+00	9.48E-02	1.90E-01	0.3750	8.249E+11
Cs-134	2.6260E-07	266.26	532.51	0.00E+00	6.99E-05	1.40E-04	0.5750	1.943E+13
Cs-135	1.4433E-05	266.26	532.51	0.00E+00	3.84E-03	7.69E-03	0.8500	1.897E+11
Cs-137	9.8870E-01	266.26	532.51	0.00E+00	2.63E+02	5.26E+02	1.2500	1.207E+11
Eu-154	6.0320E-03	266.26	532.51	0.00E+00	1.61E+00	3.21E+00	1.7500	5.307E+09
Eu-155	2.1770E-04	266.26	532.51	0.00E+00	5.80E-02	1.16E-01	2.2500	8.730E+05
Fe-55	7.9296E-07	266.26	532.51	0.00E+00	2.11E-04	4.22E-04	2.7500	3.075E+06
H-3	8.9486E-03	266.26	532.51	0.00E+00	2.38E+00	4.77E+00	3.5000	2.198E+05
I-129	9.8288E-07	266.26	532.51	0.00E+00	2.62E-04	5.23E-04	5.0000	9.393E+04
Kr-85	1.0707E-02	266.26	532.51	0.00E+00	2.85E+00	5.70E+00	7.0000	1.082E+04
Np-237	1.1927E-05	266.26	532.51	0.00E+00	3.18E-03	6.35E-03	11.0000	1.242E+03
Pa-231	1.4703E-09	266.26	532.51	0.00E+00	3.91E-07	7.83E-07		
Pb-210	1.6828E-10	266.26	532.51	0.00E+00	4.48E-08	8.96E-08		
Pm-147	6.9606E-06	266.26	532.51	0.00E+00	1.85E-03	3.71E-03		
Pu-238	6.6263E-02	266.26	532.51	0.00E+00	1.76E+01	3.53E+01		
Pu-239	1.1618E-02	266.26	532.51	0.00E+00	3.09E+00	6.19E+00		
Pu-240	1.5142E-02	266.26	532.51	0.00E+00	4.03E+00	8.06E+00		
Pu-241	4.3766E-01	266.26	532.51	0.00E+00	1.17E+02	2.33E+02		
Pu-242	6.4260E-05	266.26	532.51	0.00E+00	1.71E-02	3.42E-02		
Ra-226	3.8501E-10	266.26	532.51	0.00E+00	1.03E-07	2.05E-07		
Ra-228	5.2955E-12	266.26	532.51	0.00E+00	1.41E-09	2.82E-09		
Ru-106	2.0413E-14	266.26	532.51	0.00E+00	5.44E-12	1.09E-11		
Se-79	1.2376E-05	266.26	532.51	0.00E+00	3.30E-03	6.59E-03		
Sn-126	2.5210E-05	266.26	532.51	0.00E+00	6.71E-03	1.34E-02		
Sr-90	6.4163E-01	266.26	532.51	0.00E+00	1.71E+02	3.42E+02		
Tc-99	3.9357E-04	266.26	532.51	0.00E+00	1.05E-01	2.10E-01		
Th-229	1.5644E-10	266.26	532.51	0.00E+00	4.17E-08	8.33E-08		
Th-230	2.7972E-08	266.26	532.51	0.00E+00	7.45E-06	1.49E-05		
Th-232	5.3036E-12	266.26	532.51	0.00E+00	1.41E-09	2.82E-09		
Ti-208	1.5136E-07	266.26	532.51	0.00E+00	4.03E-05	8.06E-05		
U-232	4.1005E-07	266.26	532.51	0.00E+00	1.09E-04	2.18E-04		
U-233	2.5856E-08	266.26	532.51	0.00E+00	6.88E-06	1.38E-05		
U-234	5.2665E-05	266.26	532.51	0.00E+00	1.40E-02	2.80E-02		
U-235	-1.4487E-06	266.26	0.00	1.84E-02	1.80E-02	1.84E-02		
U-236	7.5888E-06	266.26	532.51	0.00E+00	2.02E-03	4.04E-03		
U-238	-2.6129E-07	266.26	0.00	8.66E-02	8.65E-02	8.65E-02	4.82E+00	9.63E+00
Y-90	6.4180E-01	266.26	532.51	0.00E+00	1.71E+02	3.42E+02	Total	Total
Other Radionuclides					2.54E+02	5.07E+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
Fuel Cladding	ZIRC	ZIRC	This fuel matches on all parameters except enrichment (unknown)
BOL HM Constituents	U	U	
BOL Enrichment %		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		266.26	Nominal burnup taken from SFD and converted to MWd using BOL=266.255kg
Bounding		532.51	Bounding burnup assumed to be twice nominal burnup

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

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: MURR (UALX) COLUMBIA
 SNF ID #: 142
 Fuel Units & Descr: 32 - 24 CURVED PLATES
 Heavy Metal Mass: BOL=25.12kg EOL=21 725kg
 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 33

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	2 0068E-09	4 521 60	9 043 20	0 00E+00	9 07E-06	1 81E-05		
Am-241	2 5251E-03	4 521 60	9 043 20	0 00E+00	1 14E+01	2 28E+01	0 0150	6 660E+14
Am-242m	3 9624E-07	4 521 60	9 043 20	0 00E+00	1 79E-03	3 58E-03	0 0250	1 383E+14
Am-243	1 4880E-06	4 521 60	9 043 20	0 00E+00	6 73E-03	1 35E-02	0 0375	1 202E+14
C-14	5 7053E-09	4 521 60	9 043 20	0 00E+00	2 58E-05	5 16E-05	0 0575	1 294E+14
Cf-252	1 3124E-32	4 521 60	9 043 20	0 00E+00	5 93E-29	1 19E-28	0 0850	7 796E+13
Cm-243	1 1419E-07	4 521 60	9 043 20	0 00E+00	5 16E-04	1 03E-03	0 1250	5 150E+13
Cm-244	1 6522E-05	4 521 60	9 043 20	0 00E+00	7 47E-02	1 49E-01	0 2250	6 731E+13
Co-60	7 4047E-07	4 521 60	9 043 20	0 00E+00	3 35E-03	6 70E-03	0 3750	2 928E+13
Cs-134	2 0455E-05	4 521 60	9 043 20	0 00E+00	9 25E-02	1 85E-01	0 5750	4 839E+14
Cs-135	3 4477E-06	4 521 60	9 043 20	0 00E+00	1 56E-02	3 12E-02	0 8500	5 911E+12
Cs-137	1 4365E+00	4 521 60	9 043 20	0 00E+00	6 50E+03	1 30E+04	1 2500	2 859E+12
Eu-154	7 3230E-03	4 521 60	9 043 20	0 00E+00	3 31E+01	6 62E+01	1 7500	1 609E+11
Eu-155	5 9259E-04	4 521 60	9 043 20	0 00E+00	2 68E+00	5 36E+00	2 2500	1 345E+07
Fe-55	2 2791E-06	4 521 60	9 043 20	0 00E+00	1 03E-02	2 06E-02	2 7500	1 284E+07
H-3	1 9698E-03	4 521 60	9 043 20	0 00E+00	8 91E+00	1 78E+01	3 5000	7 441E+03
I-129	7 5300E-07	4 521 60	9 043 20	0 00E+00	3 40E-03	6 81E-03	5 0000	3 041E+03
Kr-85	4 1176E-02	4 521 60	9 043 20	0 00E+00	1 86E+02	3 72E+02	7 0000	3 327E+02
Np-237	9 5752E-06	4 521 60	9 043 20	0 00E+00	4 33E-02	8 66E-02	11 0000	3 710E+01
Pa-231	3 9379E-09	4 521 60	9 043 20	0 00E+00	1 78E-05	3 56E-05		
Pb-210	3 3115E-10	4 521 60	9 043 20	0 00E+00	1 50E-06	2 99E-06		
Pm-147	9 2402E-04	4 521 60	9 043 20	0 00E+00	4 18E+00	8 36E+00		
Pu-238	1 6217E-02	4 521 60	9 043 20	0 00E+00	7 33E+01	1 47E+02		
Pu-239	4 2810E-04	4 521 60	9 043 20	0 00E+00	1 94E+00	3 87E+00		
Pu-240	2 4333E-04	4 521 60	9 043 20	0 00E+00	1 10E+00	2 20E+00		
Pu-241	1 6242E-02	4 521 60	9 043 20	0 00E+00	7 34E+01	1 47E+02		
Pu-242	3 6329E-07	4 521 60	9 043 20	0 00E+00	1 64E-03	3 29E-03		
Ra-226	9 0114E-10	4 521 60	9 043 20	0 00E+00	4 07E-06	8 15E-06		
Ra-228	3 1019E-14	4 521 60	9 043 20	0 00E+00	1 40E-10	2 81E-10		
Ru-106	2 1225E-10	4 521 60	9 043 20	0 00E+00	9 60E-07	1 92E-06		
Se-79	1 2930E-05	4 521 60	9 043 20	0 00E+00	5 85E-02	1 17E-01		
Sn-126	1 1571E-05	4 521 60	9 043 20	0 00E+00	5 23E-02	1 05E-01		
Sr-90	1 3472E+00	4 521 60	9 043 20	0 00E+00	6 09E+03	1 22E+04		
Tc-99	4 2239E-04	4 521 60	9 043 20	0 00E+00	1 91E+00	3 82E+00		
Th-229	1 2407E-11	4 521 60	9 043 20	0 00E+00	5 61E-08	1 12E-07		
Th-230	8 3497E-08	4 521 60	9 043 20	0 00E+00	3 78E-04	7 55E-04		
Th-232	3 8371E-14	4 521 60	9 043 20	0 00E+00	1 74E-10	3 47E-10		
Tl-208	4 0414E-08	4 521 60	9 043 20	0 00E+00	1 83E-04	3 65E-04		
U-232	1 0948E-07	4 521 60	9 043 20	0 00E+00	4 95E-04	9 90E-04		
U-233	3 6275E-09	4 521 60	9 043 20	0 00E+00	1 64E-05	3 28E-05		
U-234	1 8562E-04	4 521 60	9 043 20	0 00E+00	8 39E-01	1 68E+00		
U-235	-2 7235E-06	4 521 60	0 00	5 08E-02	3 84E-02	5 08E-02		
U-236	1 5493E-05	4 521 60	9 043 20	0 00E+00	7 01E-02	1 40E-01		
U-238	-4 2851E-09	4 521 60	0 00	5 49E-04	5 29E-04	5 49E-04		
Y-90	1 3475E+00	4 521 60	9 043 20	0 00E+00	6 09E+03	1 22E+04		
Other Radionuclides					6.19E+03	1 24E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93.5	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	4,521 60	3,215.32	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup assumed to be twice nominal burnup
Bounding		9 043.20	

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 (UALX) COLUMBIA
 SNF ID # 962
 Fuel Units & Descr. 24 - 24 CURVED PLATES
 Heavy Metal Mass BOL=18.84kg EOL=16.294kg
 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"
 1.00

Radionuclide	II. Estimates		Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventones(CI)	Bounding Fuel Inventones(CI)	Gamma Sources	
	m	x _n						Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	3,391.20	6,782.40	0.00E+00	6.81E-06	1.36E-05	Avg MeV		
Am-241	2.5251E-03	3,391.20	6,782.40	0.00E+00	8.56E+00	1.71E+01	0.0150	4.995E+14	
Am-242m	3.9624E-07	3,391.20	6,782.40	0.00E+00	1.34E-03	2.69E-03	0.0250	1.037E+14	
Am-243	1.4880E-06	3,391.20	6,782.40	0.00E+00	5.05E-03	1.01E-02	0.0375	9.016E+13	
C-14	5.7053E-09	3,391.20	6,782.40	0.00E+00	1.93E-05	3.87E-05	0.0675	9.705E+13	
Cl-36	1.3124E-32	3,391.20	6,782.40	0.00E+00	4.45E-29	8.90E-29	0.0850	5.847E+13	
Cm-243	1.1419E-07	3,391.20	6,782.40	0.00E+00	3.87E-04	7.74E-04	0.1250	3.862E+13	
Cm-244	1.6522E-05	3,391.20	6,782.40	0.00E+00	5.60E-02	1.12E-01	0.2250	5.048E+13	
Co-60	7.4047E-07	3,391.20	6,782.40	0.00E+00	2.51E-03	5.02E-03	0.3750	2.196E+13	
Cs-134	2.0455E-05	3,391.20	6,782.40	0.00E+00	6.94E-02	1.39E-01	0.5750	3.629E+14	
Cs-135	3.4477E-06	3,391.20	6,782.40	0.00E+00	1.17E-02	2.34E-02	0.8500	4.433E+12	
Cs-137	1.4365E+00	3,391.20	6,782.40	0.00E+00	4.87E+03	9.74E+03	1.2500	2.144E+12	
Eu-154	7.3230E-03	3,391.20	6,782.40	0.00E+00	2.48E+01	4.97E+01	1.7500	1.207E+11	
Eu-155	5.9259E-04	3,391.20	6,782.40	0.00E+00	2.01E+00	4.02E+00	2.2500	1.009E+07	
Fe-55	2.2791E-06	3,391.20	6,782.40	0.00E+00	7.73E-03	1.55E-02	2.7500	9.631E+06	
H-3	1.9698E-03	3,391.20	6,782.40	0.00E+00	6.68E+00	1.34E+01	3.5000	5.581E+03	
I-129	7.5300E-07	3,391.20	6,782.40	0.00E+00	2.55E-03	5.11E-03	5.0000	2.281E+03	
Kr-85	4.1178E-02	3,391.20	6,782.40	0.00E+00	1.40E+02	2.79E+02	7.0000	2.496E+02	
Np-237	9.5752E-06	3,391.20	6,782.40	0.00E+00	3.25E-02	6.49E-02	11.0000	2.783E+01	
Pa-231	3.9379E-09	3,391.20	6,782.40	0.00E+00	1.34E-05	2.67E-05			
Pb-210	3.3115E-10	3,391.20	6,782.40	0.00E+00	1.12E-06	2.25E-06			
Pm-147	9.2402E-04	3,391.20	6,782.40	0.00E+00	3.13E+00	6.27E+00			
Pu-238	1.6217E-02	3,391.20	6,782.40	0.00E+00	5.50E+01	1.10E+02			
Pu-239	4.2810E-04	3,391.20	6,782.40	0.00E+00	1.45E+00	2.90E+00			
Pu-240	2.4333E-04	3,391.20	6,782.40	0.00E+00	8.25E-01	1.65E+00			
Pu-241	1.6242E-02	3,391.20	6,782.40	0.00E+00	5.51E+01	1.10E+02			
Pu-242	3.6329E-07	3,391.20	6,782.40	0.00E+00	1.23E-03	2.46E-03			
Ra-226	9.0114E-10	3,391.20	6,782.40	0.00E+00	3.06E-06	6.11E-06			
Ra-228	3.1019E-14	3,391.20	6,782.40	0.00E+00	1.05E-10	2.10E-10			
Ru-106	2.1225E-10	3,391.20	6,782.40	0.00E+00	7.20E-07	1.44E-06			
Se-79	1.2930E-05	3,391.20	6,782.40	0.00E+00	4.38E-02	8.77E-02			
Sn-126	1.1571E-05	3,391.20	6,782.40	0.00E+00	3.92E-02	7.85E-02			
Sr-90	1.3472E+00	3,391.20	6,782.40	0.00E+00	4.57E+03	9.14E+03			
Tc-99	4.2239E-04	3,391.20	6,782.40	0.00E+00	1.43E+00	2.86E+00			
Th-229	1.2407E-11	3,391.20	6,782.40	0.00E+00	4.21E-08	8.42E-08			
Th-230	8.3497E-08	3,391.20	6,782.40	0.00E+00	2.83E-04	5.66E-04			
Th-232	3.8371E-14	3,391.20	6,782.40	0.00E+00	1.30E-10	2.60E-10			
Th-208	4.0414E-08	3,391.20	6,782.40	0.00E+00	1.37E-04	2.74E-04			
U-232	1.0948E-07	3,391.20	6,782.40	0.00E+00	3.71E-04	7.43E-04			
U-233	3.6275E-09	3,391.20	6,782.40	0.00E+00	1.23E-05	2.46E-05			
U-234	1.8562E-04	3,391.20	6,782.40	0.00E+00	6.29E-01	1.26E+00			
U-235	-2.7235E-06	3,391.20	0.00	3.81E-02	2.68E-02	3.81E-02			
U-236	1.5493E-05	3,391.20	6,782.40	0.00E+00	5.25E-02	1.05E-01			
U-238	-4.2851E-09	3,391.20	0.00	4.12E-04	3.97E-04	4.12E-04			
Y-90	1.3475E+00	3,391.20	6,782.40	0.00E+00	4.57E+03	9.14E+03			
Other Radionuclides					4.64E+03	9.28E+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	U	
BOL Enrichment %	93.5	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	3,391.20	2,411.49	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup assumed to be twice nominal burnup
Bounding		6,782.40	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
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: OCONEE
 SNF ID #: 156
 Fuel Units & Descr: 14 - ROD
 Heavy Metal Mass: BOL=39.2kg, EOL=31 983kg
 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" x 10"
 0 78

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg. MeV	
Ac-227	8.7758E-10	6,863 03	13,726 05	0 00E+00	6 02E-06	1.20E-05		
Am-241	1 4352E-01	6,863 03	13,726 05	0 00E+00	9 85E+02	1.97E+03	0 0150	7 385E+14
Am-242m	2 8698E-04	6,863 03	13,726 05	0 00E+00	1 97E+00	3 94E+00	0 0250	1 489E+14
Am-243	6.2565E-04	6,863 03	13,726 05	0 00E+00	4 29E+00	8.59E+00	0 0375	1 420E+14
C-14	4.7901E-05	6,863.03	13,726 05	0 00E+00	3 29E-01	6 57E-01	0 0575	1 641E+14
Cl-36	8 0297E-07	6,863.03	13,726 05	0 00E+00	5 51E-03	1.10E-02	0 0850	8.264E+13
Cm-243	2 5081E-04	6,863 03	13,726 05	0 00E+00	1 72E+00	3 44E+00	0 1250	5 734E+13
Cm-244	4 9015E-02	6,863 03	13,726 05	0 00E+00	3 36E+02	6 73E+02	0.2250	7 086E+13
Co-60	2 5581E-03	6,863 03	13,726 05	0 00E+00	1 76E+01	3 51E+01	0 3750	3 047E+13
Cs-134	4 0536E-05	6,863.03	13,726 05	0 00E+00	2 78E-01	5 56E-01	0 5750	7 087E+14
Cs-135	1 4433E-05	6,863 03	13,726 05	0 00E+00	9 91E-02	1 98E-01	0 8500	9.805E+12
Cs-137	1 3979E+00	6,863 03	13,726 05	0 00E+00	9 59E+03	1 92E+04	1 2500	9 631E+12
Eu-154	2 0203E-02	6,863 03	13,726 05	0 00E+00	1 39E+02	2.77E+02	1 7500	2.884E+11
Eu-155	1 7684E-03	6 863 03	13,726 05	0 00E+00	1 21E+01	2 43E+01	2.2500	4 644E+07
Fe-55	4 3136E-05	6 863 03	13,726 05	0 00E+00	2 96E-01	5 92E-01	2.7500	9 514E+07
H-3	2 0769E-02	6,863 03	13,726 05	0 00E+00	1 43E+02	2 85E+02	3 5000	9 796E+06
I-129	9 8288E-07	6,863 03	13,726 05	0 00E+00	6.75E-03	1 35E-02	5 0000	4 189E+06
Kr-85	2 8214E-02	6,863 03	13,726 05	0 00E+00	1 94E+02	3 87E+02	7 0000	4 828E+05
Np-237	1 1218E-05	6,863 03	13,726 05	0 00E+00	7.70E-02	1 54E-01	11 0000	5 545E+04
Pa-231	1 3036E-09	6,863 03	13,726 05	0 00E+00	8 95E-06	1 79E-05		
Pb-210	8 5078E-11	6,863 03	13,726 05	0 00E+00	5 84E-07	1 17E-06		
Pm-147	3 6531E-04	6,863 03	13,726 05	0 00E+00	2 51E+00	5 01E+00		
Pu-238	7 4564E-02	6,863 03	13,726 05	0 00E+00	5 12E+02	1 02E+03		
Pu-239	1 1623E-02	6,863 03	13,726 05	0 00E+00	7 98E+01	1 60E+02		
Pu-240	1 5132E-02	6,863 03	13,726 05	0 00E+00	1 04E+02	2 08E+02		
Pu-241	9 0036E-01	6,863 03	13,726 05	0 00E+00	6 18E+03	1 24E+04		
Pu-242	6 4260E-05	6,863 03	13,726 05	0 00E+00	4 41E-01	8 82E-01		
Ra-226	2 2804E-10	6,863 03	13,726 05	0 00E+00	1.57E-06	3 13E-06		
Ra-228	5 2713E-12	6,863 03	13,726 05	0 00E+00	3 62E-08	7 24E-08		
Ru-106	6 1160E-10	6,863 03	13,726 05	0 00E+00	4.20E-06	8 39E-06		
Se-79	1 2377E-05	6,863 03	13,726 05	0 00E+00	8 49E-02	1 70E-01		
Sn-126	2 5210E-05	6,863 03	13,726 05	0 00E+00	1.73E-01	3 46E-01		
Sr-90	9 1667E-01	6,863 03	13,726 05	0 00E+00	6.29E+03	1 26E+04		
Tc-99	3 9357E-04	6,863 03	13,726 05	0 00E+00	2 70E+00	5 40E+00		
Th-229	1 2057E-10	6,863 03	13,726 05	0 00E+00	8.28E-07	1 66E-06		
Th-230	2.1043E-08	6,863 03	13,726 05	0 00E+00	1.44E-04	2 89E-04		
Th-232	5 2972E-12	6,863 03	13,726 05	0 00E+00	3 64E-08	7.27E-08		
Ti-208	1 7474E-07	6,863 03	13,726 05	0 00E+00	1.20E-03	2 40E-03		
U-232	4 7368E-07	6,863 03	13,726 05	0 00E+00	3.25E-03	6.50E-03		
U-233	2 5097E-08	6,863 03	13,726 05	0 00E+00	1.72E-04	3 44E-04		
U-234	5 0000E-05	6,863 03	13,726 05	0 00E+00	3 43E-01	6 86E-01		
U-235	-1 4489E-06	6,863 03	0 00	1.75E-03	0 00E+00	1.75E-03		
U-236	7 5824E-06	6,863 03	13,726 05	0 00E+00	5.20E-02	1.04E-01		
U-238	-2 6129E-07	6,863 03	0 00	1.29E-02	1.11E-02	1.29E-02		
Y-90	9 1699E-01	6,863 03	13,726 05	0 00E+00	6.29E+03	1.26E+04		
Other Radionuclides					9.21E+03	1 84E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.58E+02	3 16E+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	U	
BOL Enrichment %	2 0625	0 to 5	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	1 326.33	6,863.03	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding	1,960 00	13,726.05	

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 ORR
 SNF ID #. 461
 Fuel Units & Descr: 17 - 19 CURVED PLATES
 Heavy Metal Mass BOL=4 981kg EOL=3.252kg
 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 47

Radionuclide	m		x _a		x _b		b		y _a		y _b		Gamma Sources	
	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)						
Ac-227	2 0068E-09	1,637.30	3,274.60	0 00E+00	3 29E-06	6.57E-06	Avg MeV							
Am-241	2 5251E-03	1,637.30	3,274.60	0 00E+00	4 13E+00	8 27E+00	0 0150	2 412E+14						
Am-242m	3 9624E-07	1,637.30	3,274.60	0 00E+00	6 49E-04	1.30E-03	0 0250	5 008E+13						
Am-243	1 4880E-06	1,637.30	3,274.60	0 00E+00	2 44E-03	4 87E-03	0 0375	4 353E+13						
C-14	5 7053E-09	1,637.30	3,274.60	0 00E+00	9 34E-06	1.87E-05	0 0575	4 685E+13						
Cl-36	1 3124E-32	1,637.30	3,274.60	0 00E+00	2 15E-29	4.30E-29	0 0850	2.823E+13						
Cm-243	1 1419E-07	1,637.30	3,274.60	0 00E+00	1 87E-04	3 74E-04	0 1250	1 865E+13						
Cm-244	1 6522E-05	1,637.30	3,274.60	0 00E+00	2 71E-02	5 41E-02	0 2250	2 437E+13						
Co-60	7 4047E-07	1,637.30	3,274.60	0 00E+00	1 21E-03	2 42E-03	0 3750	1 060E+13						
Cs-134	2 0455E-05	1,637.30	3,274.60	0 00E+00	3 35E-02	6 70E-02	0 5750	1 752E+14						
Cs-135	3 4477E-06	1,637.30	3,274.60	0 00E+00	5 64E-03	1 13E-02	0 8500	2 140E+12						
Cs-137	1 4365E+00	1,637.30	3,274.60	0 00E+00	2 35E+03	4 70E+03	1 2500	1 035E+12						
Eu-154	7 3230E-03	1,637.30	3,274.60	0 00E+00	1 20E+01	2 40E+01	1 7500	5 827E+10						
Eu-155	5 9259E-04	1,637.30	3,274.60	0 00E+00	9 70E-01	1 94E+00	2 2500	4 872E+06						
Fe-55	2 2791E-06	1,637.30	3,274.60	0 00E+00	3 73E-03	7 46E-03	2 7500	4 650E+06						
H-3	1 9698E-03	1,637.30	3,274.60	0 00E+00	3 23E+00	6 45E+00	3 5000	2 694E+03						
I-129	7 5300E-07	1,637.30	3,274.60	0 00E+00	1 23E-03	2 47E-03	5 0000	1 101E+03						
Kr-85	4 1176E-02	1,637.30	3,274.60	0 00E+00	6 74E+01	1.35E+02	7 0000	1 205E+02						
Np-237	9 5752E-06	1,637.30	3,274.60	0 00E+00	1 57E-02	3 14E-02	11 0000	1 343E+01						
Pa-231	3 9379E-09	1,637.30	3,274.60	0 00E+00	6 45E-06	1 29E-05								
Pb-210	3 3115E-10	1,637.30	3,274.60	0 00E+00	5 42E-07	1 08E-06								
Pm-147	9 2402E-04	1,637.30	3,274.60	0 00E+00	1 51E+00	3 03E+00								
Pu-238	1 6217E-02	1,637.30	3,274.60	0 00E+00	2 66E+01	5 31E+01								
Pu-239	4 2810E-04	1,637.30	3,274.60	0 00E+00	7 01E-01	1 40E+00								
Pu-240	2 4333E-04	1,637.30	3,274.60	0 00E+00	3 98E-01	7 97E-01								
Pu-241	1 6242E-02	1,637.30	3,274.60	0 00E+00	2 66E+01	5 32E+01								
Pu-242	3 6329E-07	1,637.30	3,274.60	0 00E+00	5 95E-04	1 19E-03								
Ra-226	9 0114E-10	1,637.30	3,274.60	0 00E+00	1 48E-06	2 95E-06								
Ra-228	3 1019E-14	1,637.30	3,274.60	0 00E+00	5 08E-11	1 02E-10								
Ru-106	2 1225E-10	1,637.30	3,274.60	0 00E+00	3 48E-07	6 95E-07								
Se-79	1 2930E-05	1,637.30	3,274.60	0 00E+00	2 12E-02	4 23E-02								
Sn-126	1 1571E-05	1,637.30	3,274.60	0 00E+00	1 89E-02	3 79E-02								
Sr-90	1 3472E+00	1,637.30	3,274.60	0 00E+00	2 21E+03	4 41E+03								
Tc-99	4 2239E-04	1,637.30	3,274.60	0 00E+00	6 92E-01	1 38E+00								
Th-229	1 2407E-11	1,637.30	3,274.60	0 00E+00	2 03E-08	4 06E-08								
Th-230	8 3497E-08	1,637.30	3,274.60	0 00E+00	1 37E-04	2 73E-04								
Th-232	3 8371E-14	1,637.30	3,274.60	0 00E+00	6 28E-11	1 26E-10								
Tl-208	4 0414E-08	1,637.30	3,274.60	0 00E+00	6 62E-05	1 32E-04								
U-232	1 0948E-07	1,637.30	3,274.60	0 00E+00	1 79E-04	3 58E-04								
U-233	3 6275E-09	1,637.30	3,274.60	0 00E+00	5 94E-06	1 19E-05								
U-234	1 8562E-04	1,637.30	3,274.60	0 00E+00	3 04E-01	6 08E-01								
U-235	-2 7235E-06	1,637.30	0 00	1 00E-02	5 57E-03	1 00E-02								
U-236	1 5493E-05	1,637.30	3,274.60	0 00E+00	2 54E-02	5 07E-02								
U-238	-4 2851E-09	1,637.30	0 00	1 14E-04	1 07E-04	1 14E-04								
Y-90	1 3475E+00	1,637.30	3,274.60	0 00E+00	2 21E+03	4 41E+03								
Other Radionuclides					2 24E+03	4 48E+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	U	
BOL Enrichment %	93 19412969	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	0 47	1,637.30	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding		3,274.60	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	1 04	3 460 10	1 03
Bounding	2 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: PATHFINDER (SUPERHEATER)
 SNF ID #: 166
 Fuel Units & Descr: 411 - ROD
 Heavy Metal Mass: BOL=54 54kg; EOL=52 608kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1967
 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"
 3 57

II. Estimates	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	1,824.78	3,649.55	0 00E+00	6 25E-05	1.25E-04		
Am-241	1 1458E-04	1,824.78	3,649.55	0 00E+00	2 09E-01	4 18E-01	0 0150	1 903E+14
Am-242m	7 9468E-09	1,824.78	3,649.55	0 00E+00	1 45E-05	2 90E-05	0 0250	3 955E+13
Am-243	9 8386E-10	1,824.78	3,649.55	0 00E+00	1 80E-06	3.59E-06	0 0375	3 429E+13
C-14	2 2978E-04	1,824.78	3,649.55	0 00E+00	4 19E-01	8.39E-01	0 0575	3 688E+13
Cf-252	1 2261E-06	1,824.78	3,649.55	0 00E+00	2 24E-03	4 47E-03	0 0850	2 228E+13
Cm-243	1 7271E-10	1,824.78	3,649.55	0 00E+00	3 15E-07	6.30E-07	0 1250	1 445E+13
Cm-244	1 3058E-09	1,824.78	3,649.55	0 00E+00	2 38E-06	4 77E-06	0 2250	1 920E+13
Co-60	9 8636E-03	1,824.78	3,649.55	0 00E+00	1 80E+01	3 60E+01	0 3750	8.374E+12
Cs-134	1 9617E-08	1,824.78	3,649.55	0 00E+00	3 58E-05	7.16E-05	0 5750	1 394E+14
Cs-135	3 0316E-05	1,824.78	3,649.55	0 00E+00	5 53E-02	1.11E-01	0 8500	1 377E+12
Cs-137	1 0263E+00	1,824.78	3,649.55	0 00E+00	1 87E+03	3.75E+03	1.2500	3 135E+12
Eu-154	2 0017E-04	1,824.78	3,649.55	0 00E+00	3 65E-01	7.31E-01	1 7500	3 544E+10
Eu-155	8 5957E-05	1,824.78	3,649.55	0 00E+00	1 57E-01	3 14E-01	2 2500	1 796E+07
Fe-55	2.2646E-05	1,824.78	3,649.55	0 00E+00	4 13E-02	8.26E-02	2.7500	2.447E+06
H-3	1 0835E-03	1,824.78	3,649.55	0 00E+00	1 98E+00	3 95E+00	3.5000	2 228E+02
I-129	7 3195E-07	1,824.78	3,649.55	0 00E+00	1 34E-03	2 67E-03	5.0000	9 206E+01
Kr-85	1 5661E-02	1,824.78	3,649.55	0 00E+00	2 86E+01	5.72E+01	7.0000	1 018E+01
Np-237	1 1494E-06	1,824.78	3,649.55	0 00E+00	2 10E-03	4 19E-03	11 0000	1 143E+00
Pa-231	5 8070E-08	1,824.78	3,649.55	0 00E+00	1 06E-04	2.12E-04		
Pb-210	1 2985E-12	1,824.78	3,649.55	0 00E+00	2 37E-09	4 74E-09		
Pm-147	2.2196E-05	1,824.78	3,649.55	0 00E+00	4 05E-02	8 10E-02		
Pu-238	2 6223E-04	1,824.78	3,649.55	0 00E+00	4 79E-01	9 57E-01		
Pu-239	6 6739E-04	1,824.78	3,649.55	0 00E+00	1 22E+00	2 44E+00		
Pu-240	8 6705E-05	1,824.78	3,649.55	0 00E+00	1 58E-01	3 16E-01		
Pu-241	3 4759E-04	1,824.78	3,649.55	0 00E+00	6 34E-01	1.27E+00		
Pu-242	1 9717E-09	1,824.78	3,649.55	0 00E+00	3 60E-06	7.20E-06		
Ra-226	3 0000E-12	1,824.78	3,649.55	0 00E+00	5 47E-09	1 09E-08		
Ra-228	8 3328E-12	1,824.78	3,649.55	0 00E+00	1 52E-08	3 04E-08		
Ru-106	6 1464E-15	1,824.78	3,649.55	0 00E+00	1 12E-11	2.24E-11		
Se-79	1 3221E-05	1,824.78	3,649.55	0 00E+00	2 41E-02	4 83E-02		
Sn-126	1 1491E-05	1,824.78	3,649.55	0 00E+00	2 10E-02	4 19E-02		
Sr-90	9 5541E-01	1,824.78	3,649.55	0 00E+00	1 74E+03	3.49E+03		
Tc-99	4 6656E-04	1,824.78	3,649.55	0 00E+00	8 51E-01	1.70E+00		
Th-229	1 9085E-11	1,824.78	3,649.55	0 00E+00	3 48E-08	6 97E-08		
Th-230	2 1913E-10	1,824.78	3,649.55	0 00E+00	4 00E-07	8 00E-07		
Th-232	8 3478E-12	1,824.78	3,649.55	0 00E+00	1 52E-08	3 05E-08		
Tl-208	1 8752E-08	1,824.78	3,649.55	0 00E+00	3 42E-05	6 84E-05		
U-232	5 0782E-08	1,824.78	3,649.55	0 00E+00	9 27E-05	1 85E-04		
U-233	3.2596E-09	1,824.78	3,649.55	0 00E+00	5 95E-06	1 19E-05		
U-234	3 9817E-07	1,824.78	3,649.55	0 00E+00	7 27E-04	1 45E-03		
U-235	-2.7761E-06	1,824.78	0 00	1 10E-01	1 05E-01	1 10E-01		
U-236	1 6190E-05	1,824.78	3,649.55	0 00E+00	2 95E-02	5 91E-02		
U-238	-2.8547E-09	1,824.78	0 00	1.26E-03	1 25E-03	1.26E-03		
Y-90	9 5557E-01	1,824.78	3,649.55	0 00E+00	1 74E+03	3 49E+03		
Other Radionuclides					2.22E+03	4 45E+03		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							2.13E+01	4.26E+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	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %	93 14242653	60 to 100	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		1 824 78	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding		3 649 55	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 72		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 PATHFINDER (SUPERHEATER)
 SNF ID #: 814
 Fuel Units & Descr: 6 - ROD
 Heavy Metal Mass BOL=0.796kg EOL=0.796kg
 ROD Storage Site INEEL

¹Fuel decay start date: 1967
 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"
 0.05

Radionuclide	m	x _n	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV		
Ac-227	3.4276E-08	15.04	30.09	0.00E+00	5.16E-07	1.03E-06	0.0150	1.569E+12
Am-241	1.1458E-04	15.04	30.09	0.00E+00	1.72E-03	3.45E-03	0.0250	3.260E+11
Am-242m	7.9468E-09	15.04	30.09	0.00E+00	1.20E-07	2.39E-07	0.0375	2.826E+11
Am-243	9.8386E-10	15.04	30.09	0.00E+00	1.48E-08	2.96E-08	0.0575	3.040E+11
C-14	2.2978E-04	15.04	30.09	0.00E+00	3.46E-03	6.91E-03	0.0850	1.836E+11
Cf-253	1.2261E-06	15.04	30.09	0.00E+00	1.84E-05	3.69E-05	0.1250	1.191E+11
Cm-243	1.7271E-10	15.04	30.09	0.00E+00	2.60E-09	5.20E-09	0.2250	1.583E+11
Cm-244	1.3058E-09	15.04	30.09	0.00E+00	1.96E-08	3.93E-08	0.3750	6.903E+10
Co-60	9.8636E-03	15.04	30.09	0.00E+00	1.48E-01	2.97E-01	0.5750	1.149E+12
Cs-134	1.9617E-08	15.04	30.09	0.00E+00	2.95E-07	5.90E-07	1.2500	2.584E+10
Cs-135	3.0316E-05	15.04	30.09	0.00E+00	4.56E-04	9.12E-04	1.8500	1.135E+10
Cs-137	1.0263E+00	15.04	30.09	0.00E+00	1.54E+01	3.09E+01	2.2500	2.584E+10
Eu-154	2.0017E-04	15.04	30.09	0.00E+00	3.01E-03	6.02E-03	1.7500	2.922E+08
Eu-155	8.5957E-05	15.04	30.09	0.00E+00	1.29E-03	2.59E-03	2.2500	1.481E+05
Fe-55	2.2646E-05	15.04	30.09	0.00E+00	3.41E-04	6.81E-04	2.7500	2.017E+04
H-3	1.0835E-03	15.04	30.09	0.00E+00	1.63E-02	3.26E-02	3.5000	1.903E+00
I-129	7.3195E-07	15.04	30.09	0.00E+00	1.10E-05	2.20E-05	5.0000	7.867E-01
Kr-85	1.5661E-02	15.04	30.09	0.00E+00	2.36E-01	4.71E-01	7.0000	8.703E-02
Np-237	1.1494E-06	15.04	30.09	0.00E+00	1.73E-05	3.46E-05	11.0000	9.777E-03
Pa-231	5.8070E-08	15.04	30.09	0.00E+00	8.74E-07	1.75E-06		
Pb-210	1.2985E-12	15.04	30.09	0.00E+00	1.95E-11	3.91E-11		
Pm-147	2.2196E-05	15.04	30.09	0.00E+00	3.34E-04	6.68E-04		
Pu-238	2.6223E-04	15.04	30.09	0.00E+00	3.94E-03	7.89E-03		
Pu-239	6.6739E-04	15.04	30.09	0.00E+00	1.00E-02	2.01E-02		
Pu-240	8.6705E-05	15.04	30.09	0.00E+00	1.30E-03	2.61E-03		
Pu-241	3.4759E-04	15.04	30.09	0.00E+00	5.23E-03	1.05E-02		
Pu-242	1.9717E-09	15.04	30.09	0.00E+00	2.97E-08	5.93E-08		
Ra-226	3.0000E-12	15.04	30.09	0.00E+00	4.51E-11	9.03E-11		
Ra-228	8.3328E-12	15.04	30.09	0.00E+00	1.25E-10	2.51E-10		
Ru-106	6.1464E-15	15.04	30.09	0.00E+00	9.25E-14	1.85E-13		
Se-79	1.3221E-05	15.04	30.09	0.00E+00	1.99E-04	3.98E-04		
Sn-126	1.1491E-05	15.04	30.09	0.00E+00	1.73E-04	3.46E-04		
Sr-90	9.5541E-01	15.04	30.09	0.00E+00	1.44E+01	2.87E+01		
Tc-99	4.6656E-04	15.04	30.09	0.00E+00	7.02E-03	1.40E-02		
Th-229	1.9085E-11	15.04	30.09	0.00E+00	2.87E-10	5.74E-10		
Th-230	2.1913E-10	15.04	30.09	0.00E+00	3.30E-09	6.59E-09		
Th-232	8.3478E-12	15.04	30.09	0.00E+00	1.26E-10	2.51E-10		
Tl-208	1.8752E-08	15.04	30.09	0.00E+00	2.82E-07	5.64E-07		
U-232	5.0782E-08	15.04	30.09	0.00E+00	7.64E-07	1.53E-06		
U-233	3.2596E-09	15.04	30.09	0.00E+00	4.90E-08	9.81E-08		
U-234	3.9817E-07	15.04	30.09	0.00E+00	5.99E-06	1.20E-05		
U-235	-2.7761E-06	15.04	0.00	1.60E-03	1.56E-03	1.60E-03		
U-236	1.6190E-05	15.04	30.09	0.00E+00	2.44E-04	4.87E-04		
U-238	-2.8547E-09	15.04	0.00	1.84E-05	1.83E-05	1.84E-05		
Y-90	9.5557E-01	15.04	30.09	0.00E+00	1.44E+01	2.87E+01		
Other Radionuclides					1.83E+01	3.67E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.76E-01	3.51E-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	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	93.14242815	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal		15.04	Nominal burnup assumed to be 2% of BOL heavy metal mass
Bounding		30.09	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		

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel
 *Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PBF DRIVER CORE
 SNF ID #: 167
 Fuel Units & Descr: 2425 - ROD
 Heavy Metal Mass: BOL=571.815kg, EOL=561.63kg
 ROD Storage Site INEEL

Fuel decay start date: 1985
 Estimates as of: 2030
 Template: Pathfinder (Light Water, SST 60 to 100%, U)
 Template Burnup (MWd): 6.01
 Template BOL Heavy Metal Mass (MT): 0.00012882
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x15"
 8.98

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	2.3344E-08	9,621.24	19,242.47	0.00E+00	2.25E-04	4.49E-04	Avg. MeV	
Am-241	1.1135E-04	9,621.24	19,242.47	0.00E+00	1.07E+00	2.14E+00	0.0150	1.436E+15
Am-242m	8.5075E-09	9,621.24	19,242.47	0.00E+00	8.19E-05	1.64E-04	0.0250	2.985E+14
Am-243	9.8519E-10	9,621.24	19,242.47	0.00E+00	9.48E-06	1.90E-05	0.0375	2.581E+14
C-14	2.3012E-04	9,621.24	19,242.47	0.00E+00	2.21E+00	4.43E+00	0.0575	2.783E+14
Cl-36	1.2281E-06	9,621.24	19,242.47	0.00E+00	1.18E-02	2.36E-02	0.0850	1.681E+14
Cm-243	2.4875E-10	9,621.24	19,242.47	0.00E+00	2.39E-06	4.79E-06	0.1250	1.092E+14
Cm-244	2.3178E-09	9,621.24	19,242.47	0.00E+00	2.23E-05	4.46E-05	0.2250	1.447E+14
Co-60	7.0849E-02	9,621.24	19,242.47	0.00E+00	6.82E+02	1.36E+03	0.3750	6.313E+13
Cs-134	3.0266E-06	9,621.24	19,242.47	0.00E+00	2.91E-02	5.82E-02	0.5750	1.040E+15
Cs-135	3.0316E-05	9,621.24	19,242.47	0.00E+00	2.92E-01	5.83E-01	0.8500	1.053E+13
Cs-137	1.4511E+00	9,621.24	19,242.47	0.00E+00	1.40E+04	2.79E+04	1.2500	1.046E+14
Eu-154	6.6955E-04	9,621.24	19,242.47	0.00E+00	6.44E+00	1.29E+01	1.7500	2.715E+11
Eu-155	6.9850E-04	9,621.24	19,242.47	0.00E+00	6.72E+00	1.34E+01	2.2500	5.637E+08
Fe-55	1.2318E-03	9,621.24	19,242.47	0.00E+00	1.19E+01	2.37E+01	2.7500	1.629E+07
H-3	2.5141E-03	9,621.24	19,242.47	0.00E+00	2.42E+01	4.84E+01	3.5000	1.984E+03
I-129	7.3195E-07	9,621.24	19,242.47	0.00E+00	7.04E-03	1.41E-02	5.0000	8.313E+02
Kr-85	4.1281E-02	9,621.24	19,242.47	0.00E+00	3.97E+02	7.94E+02	7.0000	9.348E+01
Np-237	1.1489E-06	9,621.24	19,242.47	0.00E+00	1.11E-02	2.21E-02	11.0000	1.060E+01
Pa-231	4.5241E-08	9,621.24	19,242.47	0.00E+00	4.35E-04	8.71E-04		
Pb-210	6.4476E-13	9,621.24	19,242.47	0.00E+00	6.20E-09	1.24E-08		
Pm-147	1.1651E-03	9,621.24	19,242.47	0.00E+00	1.12E+01	2.24E+01		
Pu-238	2.9517E-04	9,621.24	19,242.47	0.00E+00	2.84E+00	5.68E+00		
Pu-239	6.6772E-04	9,621.24	19,242.47	0.00E+00	6.42E+00	1.28E+01		
Pu-240	8.6839E-05	9,621.24	19,242.47	0.00E+00	8.35E-01	1.67E+00		
Pu-241	7.1514E-04	9,621.24	19,242.47	0.00E+00	6.88E+00	1.38E+01		
Pu-242	1.9717E-09	9,621.24	19,242.47	0.00E+00	1.90E-05	3.79E-05		
Ra-226	1.7654E-12	9,621.24	19,242.47	0.00E+00	1.70E-08	3.40E-08		
Ra-228	8.2928E-12	9,621.24	19,242.47	0.00E+00	7.98E-08	1.60E-07		
Ru-106	1.8419E-10	9,621.24	19,242.47	0.00E+00	1.77E-06	3.54E-06		
Sa-79	1.3223E-05	9,621.24	19,242.47	0.00E+00	1.27E-01	2.54E-01		
Sn-126	1.1493E-05	9,621.24	19,242.47	0.00E+00	1.11E-01	2.21E-01		
Sr-90	1.3649E+00	9,621.24	19,242.47	0.00E+00	1.31E+04	2.63E+04		
Tc-99	4.6656E-04	9,621.24	19,242.47	0.00E+00	4.49E+00	8.98E+00		
Th-229	1.4547E-11	9,621.24	19,242.47	0.00E+00	1.40E-07	2.80E-07		
Th-230	1.6617E-10	9,621.24	19,242.47	0.00E+00	1.60E-06	3.20E-06		
Th-232	8.3361E-12	9,621.24	19,242.47	0.00E+00	8.02E-08	1.60E-07		
Tl-208	2.1664E-08	9,621.24	19,242.47	0.00E+00	2.08E-04	4.17E-04		
U-232	5.8669E-08	9,621.24	19,242.47	0.00E+00	5.64E-04	1.13E-03		
U-233	3.1847E-09	9,621.24	19,242.47	0.00E+00	3.06E-05	6.13E-05		
U-234	3.8769E-07	9,621.24	19,242.47	0.00E+00	3.73E-03	7.46E-03		
U-235	-2.7761E-06	9,621.24	0.00	2.28E-01	2.02E-01	2.28E-01		
U-236	1.6190E-05	9,621.24	19,242.47	0.00E+00	1.56E-01	3.12E-01		
U-238	-2.8547E-09	9,621.24	0.00	1.57E-01	1.57E-01	1.57E-01		
Y-90	1.3652E+00	9,621.24	19,242.47	0.00E+00	1.31E+04	2.63E+04		
Other Radionuclides					1.59E+04	3.18E+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 Pathfinder Template on all but one parameter (enrichment) making Pathfinder a reasonable match.
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	18.49024597	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	297.34	9,621.24	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding	623.28	19,242.47	

Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.36	32.36	1.00
Bounding	0.72	30.87	

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 (ASSEMBLY)	¹ Fuel decay start date 1976
SNF ID # 385	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=288.335kg EOL=285.305kg	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"x15"
1.00

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-09	2,881.39	5,762.77	0.00E+00	3.09E-06	6.19E-06	Avg MeV	
Am-241	1.4751E-01	2,881.39	5,762.77	0.00E+00	4.25E+02	8.50E+02	0.0150	2.193E+14
Am-242m	2.6809E-04	2,881.39	5,762.77	0.00E+00	7.72E-01	1.54E+00	0.0250	4.394E+13
Am-243	6.2484E-04	2,881.39	5,762.77	0.00E+00	1.80E+00	3.60E+00	0.0375	4.141E+13
C-14	4.7820E-05	2,881.39	5,762.77	0.00E+00	1.38E-01	2.76E-01	0.0575	5.181E+13
Cl-36	8.0297E-07	2,881.39	5,762.77	0.00E+00	2.31E-03	4.63E-03	0.0850	2.421E+13
Cr-51	1.7426E-04	2,881.39	5,762.77	0.00E+00	5.02E-01	1.00E+00	0.1250	1.611E+13
Cr-243	2.7616E-02	2,881.39	5,762.77	0.00E+00	7.96E+01	1.59E+02	0.2250	2.067E+13
Co-60	3.5610E-04	2,881.39	5,762.77	0.00E+00	1.03E+00	2.05E+00	0.3750	8.927E+12
Cs-134	2.6260E-07	2,881.39	5,762.77	0.00E+00	7.57E-04	1.51E-03	0.5750	2.102E+13
Cs-135	1.4433E-05	2,881.39	5,762.77	0.00E+00	4.16E-02	8.32E-02	0.8500	2.053E+12
Cs-137	9.8870E-01	2,881.39	5,762.77	0.00E+00	2.85E+03	5.70E+03	1.2500	1.306E+12
Eu-154	6.0320E-03	2,881.39	5,762.77	0.00E+00	1.74E+01	3.48E+01	1.7500	5.743E+10
Eu-155	2.1770E-04	2,881.39	5,762.77	0.00E+00	6.27E-01	1.25E+00	2.2500	9.439E+06
Fe-55	7.9296E-07	2,881.39	5,762.77	0.00E+00	2.28E-03	4.57E-03	2.7500	3.327E+07
H-3	8.9486E-03	2,881.39	5,762.77	0.00E+00	2.58E+01	5.16E+01	3.5000	2.374E+06
I-129	9.8288E-07	2,881.39	5,762.77	0.00E+00	2.83E-03	5.66E-03	5.0000	1.015E+06
Kr-85	1.0707E-02	2,881.39	5,762.77	0.00E+00	3.09E+01	6.17E+01	7.0000	1.169E+05
Np-237	1.1927E-05	2,881.39	5,762.77	0.00E+00	3.44E-02	6.87E-02	11.0000	1.342E+04
Pa-231	1.4703E-09	2,881.39	5,762.77	0.00E+00	4.24E-06	8.47E-06		
Pb-210	1.6826E-10	2,881.39	5,762.77	0.00E+00	4.85E-07	9.70E-07		
Pm-147	6.9606E-06	2,881.39	5,762.77	0.00E+00	2.01E-02	4.01E-02		
Pu-238	6.6263E-02	2,881.39	5,762.77	0.00E+00	1.91E+02	3.82E+02		
Pu-239	1.1618E-02	2,881.39	5,762.77	0.00E+00	3.35E+01	6.70E+01		
Pu-240	1.5142E-02	2,881.39	5,762.77	0.00E+00	4.36E+01	8.73E+01		
Pu-241	4.3766E-01	2,881.39	5,762.77	0.00E+00	1.26E+03	2.52E+03		
Pu-242	6.4260E-05	2,881.39	5,762.77	0.00E+00	1.85E-01	3.70E-01		
Ra-226	3.8501E-10	2,881.39	5,762.77	0.00E+00	1.11E-06	2.22E-06		
Ra-228	5.2955E-12	2,881.39	5,762.77	0.00E+00	1.53E-08	3.05E-08		
Ru-106	2.0413E-14	2,881.39	5,762.77	0.00E+00	5.88E-11	1.18E-10		
Se-79	1.2376E-05	2,881.39	5,762.77	0.00E+00	3.57E-02	7.13E-02		
Sn-126	2.5210E-05	2,881.39	5,762.77	0.00E+00	7.26E-02	1.45E-01		
Sr-90	6.4163E-01	2,881.39	5,762.77	0.00E+00	1.85E+03	3.70E+03		
Tc-99	3.9357E-04	2,881.39	5,762.77	0.00E+00	1.13E+00	2.27E+00		
Th-229	1.5644E-10	2,881.39	5,762.77	0.00E+00	4.51E-07	9.02E-07		
Th-230	2.7972E-08	2,881.39	5,762.77	0.00E+00	8.06E-05	1.61E-04		
Th-232	5.3036E-12	2,881.39	5,762.77	0.00E+00	1.53E-08	3.06E-08		
Th-208	1.5136E-07	2,881.39	5,762.77	0.00E+00	4.36E-04	8.72E-04		
U-232	4.1005E-07	2,881.39	5,762.77	0.00E+00	1.18E-03	2.36E-03		
U-233	2.5856E-08	2,881.39	5,762.77	0.00E+00	7.45E-05	1.49E-04		
U-234	5.2665E-05	2,881.39	5,762.77	0.00E+00	1.52E-01	3.03E-01		
U-235	-1.4487E-06	2,881.39	0.00	1.51E-02	1.10E-02	1.51E-02		
U-236	7.5888E-06	2,881.39	5,762.77	0.00E+00	2.19E-02	4.37E-02		
U-238	-2.6129E-07	2,881.39	0.00	9.46E-02	9.38E-02	9.46E-02		
Y-90	6.4180E-01	2,881.39	5,762.77	0.00E+00	1.85E+03	3.70E+03		
Other Radionuclides					2.75E+03	5.49E+03		

Thermal Power
Nominal Heat Output (Watts) 5.21E+01
Bounding Heat Output (Watts) 1.04E+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	U	
BOL Enrichment %	2.429812544	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	2,476.80	2,881.39	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding	2,479.97	5,762.77	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.29	1.16	1.00
Bounding	0.57	2.32	

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel
²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information
 Fuel Name: PEACH BOTTOM RODS
 SNF ID #: 386
 Fuel Units & Descr: 20 - ROD
 Heavy Metal Mass: BOL=79kg; EOL=71 12kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1976
 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
 0.57

Radionuclide	m		x _n		x _b		b		y _a		y _b		Gamma Sources	
	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)						
Ac-227	1.0733E-09	7,493.51	14,987.01	0.00E+00	8.04E-06	1.61E-05	Avg. MeV							
Am-241	1.4751E-01	7,493.51	14,987.01	0.00E+00	1.11E+03	2.21E+03	0.0150	5.703E+14						
Am-242m	2.6809E-04	7,493.51	14,987.01	0.00E+00	2.01E+00	4.02E+00	0.0250	1.143E+14						
Am-243	6.2484E-04	7,493.51	14,987.01	0.00E+00	4.68E+00	9.36E+00	0.0375	1.077E+14						
C-14	4.7820E-05	7,493.51	14,987.01	0.00E+00	3.58E-01	7.17E-01	0.0575	1.348E+14						
Cl-36	8.0297E-07	7,493.51	14,987.01	0.00E+00	6.02E-03	1.20E-02	0.0850	6.296E+13						
Cm-243	1.7426E-04	7,493.51	14,987.01	0.00E+00	1.31E+00	2.61E+00	0.1250	4.189E+13						
Cm-244	2.7616E-02	7,493.51	14,987.01	0.00E+00	2.07E+02	4.14E+02	0.2250	5.375E+13						
Co-60	3.5610E-04	7,493.51	14,987.01	0.00E+00	2.67E+00	5.34E+00	0.3750	2.322E+13						
Cs-134	2.6260E-07	7,493.51	14,987.01	0.00E+00	1.97E-03	3.94E-03	0.5750	5.467E+14						
Cs-135	1.4433E-05	7,493.51	14,987.01	0.00E+00	1.08E-01	2.16E-01	0.8500	5.338E+12						
Cs-137	9.8870E-01	7,493.51	14,987.01	0.00E+00	7.41E+03	1.48E+04	1.2500	3.397E+12						
Eu-154	6.0320E-03	7,493.51	14,987.01	0.00E+00	4.52E+01	9.04E+01	1.7500	1.493E+11						
Eu-155	2.1770E-04	7,493.51	14,987.01	0.00E+00	1.63E+00	3.26E+00	2.2500	2.455E+07						
Fe-55	7.9296E-07	7,493.51	14,987.01	0.00E+00	5.94E-03	1.19E-02	2.7500	8.652E+07						
H-3	8.9488E-03	7,493.51	14,987.01	0.00E+00	6.71E+01	1.34E+02	3.5000	6.172E+06						
I-129	9.8288E-07	7,493.51	14,987.01	0.00E+00	7.37E-03	1.47E-02	5.0000	2.638E+06						
Kr-85	1.0707E-02	7,493.51	14,987.01	0.00E+00	8.02E+01	1.60E+02	7.0000	3.039E+05						
Np-237	1.1927E-05	7,493.51	14,987.01	0.00E+00	8.94E-02	1.79E-01	11.0000	3.489E+04						
Pa-231	1.4703E-09	7,493.51	14,987.01	0.00E+00	1.10E-05	2.20E-05								
Pb-210	1.6828E-10	7,493.51	14,987.01	0.00E+00	1.26E-06	2.52E-06								
Pm-147	6.9606E-06	7,493.51	14,987.01	0.00E+00	5.22E-02	1.04E-01								
Pu-238	6.6263E-02	7,493.51	14,987.01	0.00E+00	4.97E+02	9.93E+02								
Pu-239	1.1618E-02	7,493.51	14,987.01	0.00E+00	8.71E+01	1.74E+02								
Pu-240	1.5142E-02	7,493.51	14,987.01	0.00E+00	1.13E+02	2.27E+02								
Pu-241	4.3766E-01	7,493.51	14,987.01	0.00E+00	3.28E+03	6.56E+03								
Pu-242	6.4260E-05	7,493.51	14,987.01	0.00E+00	4.82E-01	9.63E-01								
Ra-226	3.8501E-10	7,493.51	14,987.01	0.00E+00	2.89E-06	5.77E-06								
Ra-228	5.2955E-12	7,493.51	14,987.01	0.00E+00	3.97E-08	7.94E-08								
Ru-106	2.0413E-14	7,493.51	14,987.01	0.00E+00	1.53E-10	3.06E-10								
Se-79	1.2376E-05	7,493.51	14,987.01	0.00E+00	9.27E-02	1.85E-01								
Sn-126	2.5210E-05	7,493.51	14,987.01	0.00E+00	1.89E-01	3.78E-01								
Sr-90	6.4163E-01	7,493.51	14,987.01	0.00E+00	4.81E+03	9.62E+03								
Tc-99	3.9357E-04	7,493.51	14,987.01	0.00E+00	2.95E+00	5.90E+00								
Th-229	1.5644E-10	7,493.51	14,987.01	0.00E+00	1.17E-06	2.34E-06								
Th-230	2.7972E-08	7,493.51	14,987.01	0.00E+00	2.10E-04	4.19E-04								
Th-232	5.3036E-12	7,493.51	14,987.01	0.00E+00	3.97E-08	7.95E-08								
Tl-208	1.5136E-07	7,493.51	14,987.01	0.00E+00	1.13E-03	2.27E-03								
U-232	4.1005E-07	7,493.51	14,987.01	0.00E+00	3.07E-03	6.15E-03								
U-233	2.5856E-08	7,493.51	14,987.01	0.00E+00	1.94E-04	3.88E-04								
U-234	5.2665E-05	7,493.51	14,987.01	0.00E+00	3.95E-01	7.89E-01								
U-235	-1.4487E-06	7,493.51	0.00	4.15E-03	0.00E+00	4.15E-03								
U-236	7.5888E-06	7,493.51	14,987.01	0.00E+00	5.69E-02	1.14E-01								
U-238	-2.6129E-07	7,493.51	0.00	2.59E-02	2.39E-02	2.59E-02								
Y-90	6.4180E-01	7,493.51	14,987.01	0.00E+00	4.81E+03	9.62E+03								
Other Radionuclides					7.14E+03	1.43E+04								

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.36E+02	2.71E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ZIRC	ZIRC	
BOL Enrichment %	U	U	
	2.43	0 to 5	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	809.75	7,493.51	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding	943.26	14,987.01	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	2.71	9.25	
Bounding	5.42	15.89	
			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: PEACH BOTTOM UNIT I CORE I
 SNF ID #: 169
 Fuel Units & Descr: 2 - SCRAP
 Heavy Metal Mass BOL=3 746kg EOL=3.56kg
 ROD Storage Site INEEL

¹Fuel decay start date 1969
 Estimates as of 2030
 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 50 years

Estimated
 Canister usage:
 18"x15"
 0 15

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	4.2062E-06	176.28	352.57	0.00E+00	7.41E-04	1.48E-03	0.0150	1.735E+13
Am-241	3.2229E-03	176.28	352.57	0.00E+00	5.68E-01	1.14E+00	0.0250	3.543E+12
Am-242m	2.2381E-06	176.28	352.57	0.00E+00	3.95E-04	7.89E-04	0.0375	3.075E+12
Am-243	4.6006E-05	176.28	352.57	0.00E+00	8.11E-03	1.62E-02	0.0575	3.322E+12
C-14	2.3082E-05	176.28	352.57	0.00E+00	4.07E-03	8.14E-03	0.1250	2.005E+12
Cl-36	1.0667E-06	176.28	352.57	0.00E+00	1.88E-04	3.76E-04	0.0850	1.319E+12
Cm-243	1.7602E-05	176.28	352.57	0.00E+00	3.10E-03	6.21E-03	0.2250	1.736E+12
Cm-244	3.6307E-03	176.28	352.57	0.00E+00	6.40E-01	1.28E+00	0.3750	7.518E+11
Co-60	6.2585E-05	176.28	352.57	0.00E+00	1.10E-02	2.21E-02	0.5750	1.234E+13
Cs-134	2.4585E-07	176.28	352.57	0.00E+00	4.33E-05	8.67E-05	0.8500	1.542E+11
Cs-135	2.4711E-05	176.28	352.57	0.00E+00	4.36E-03	8.71E-03	1.2500	7.446E+10
Cs-137	9.3838E-01	176.28	352.57	0.00E+00	1.65E+02	3.31E+02	1.7500	4.734E+09
Eu-154	4.6887E-03	176.28	352.57	0.00E+00	8.27E-01	1.65E+00	2.2500	3.939E+05
Eu-155	1.2793E-04	176.28	352.57	0.00E+00	2.26E-02	4.51E-02	2.7500	6.379E+09
Fe-55	8.1951E-10	176.28	352.57	0.00E+00	1.44E-07	2.89E-07	3.5000	2.104E+04
H-3	1.6839E-03	176.28	352.57	0.00E+00	2.97E-01	5.94E-01	5.0000	8.956E+03
I-129	1.0092E-06	176.28	352.57	0.00E+00	1.78E-04	3.56E-04	7.0000	1.027E+03
Kr-85	1.4981E-02	176.28	352.57	0.00E+00	2.64E+00	5.28E+00	11.0000	1.177E+02
Np-237	1.2556E-05	176.28	352.57	0.00E+00	2.21E-03	4.43E-03		
Pa-231	4.7360E-06	176.28	352.57	0.00E+00	8.35E-04	1.67E-03		
Pb-210	2.1901E-09	176.28	352.57	0.00E+00	3.86E-07	7.72E-07		
Pm-147	2.8781E-06	176.28	352.57	0.00E+00	5.07E-04	1.01E-03		
Pu-238	1.4430E-01	176.28	352.57	0.00E+00	2.54E+01	5.09E+01		
Pu-239	1.3572E-04	176.28	352.57	0.00E+00	2.39E-02	4.78E-02		
Pu-240	2.7537E-04	176.28	352.57	0.00E+00	4.85E-02	9.71E-02		
Pu-241	9.3995E-03	176.28	352.57	0.00E+00	1.66E+00	3.31E+00		
Pu-242	3.8866E-06	176.28	352.57	0.00E+00	6.85E-04	1.37E-03		
Ra-226	4.1243E-09	176.28	352.57	0.00E+00	7.27E-07	1.45E-06		
Ra-228	9.1949E-07	176.28	352.57	0.00E+00	1.62E-04	3.24E-04		
Ru-106	1.1667E-15	176.28	352.57	0.00E+00	2.06E-13	4.11E-13		
Se-79	2.1074E-05	176.28	352.57	0.00E+00	3.72E-03	7.43E-03		
Sn-126	2.2192E-05	176.28	352.57	0.00E+00	3.91E-03	7.82E-03		
Sr-90	8.8642E-01	176.28	352.57	0.00E+00	1.56E+02	3.13E+02		
Tc-99	3.3323E-04	176.28	352.57	0.00E+00	5.87E-02	1.17E-01		
Th-229	1.3517E-05	176.28	352.57	0.00E+00	2.38E-03	4.77E-03		
Th-230	2.2822E-07	176.28	352.57	0.00E+00	4.02E-05	8.05E-05		
Th-232	-6.9673E-08	176.28	0.00	3.71E-04	3.58E-04	3.71E-04		
Th-208	5.1524E-04	176.28	352.57	0.00E+00	9.08E-02	1.82E-01		
U-232	1.3950E-03	176.28	352.57	0.00E+00	2.46E-01	4.92E-01		
U-233	2.0602E-03	176.28	352.57	0.00E+00	3.63E-01	7.26E-01		
U-234	2.9513E-04	176.28	352.57	0.00E+00	5.20E-02	1.04E-01		
U-235	-1.7343E-06	176.28	0.00	7.41E-04	4.35E-04	7.41E-04		
U-236	8.6281E-06	176.28	352.57	0.00E+00	1.52E-03	3.04E-03		
U-238	-5.6065E-09	176.28	0.00	7.37E-06	6.39E-06	7.37E-06		
Y-90	8.8642E-01	176.28	352.57	0.00E+00	1.56E+02	3.13E+02		
Other Radionuclides					1.59E+02	3.19E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.82E+00	5.63E+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:	GRAPHITE	GRAPHITE	
BOL HM Constituents:	Th and U	Th and U	
BOL Enrichment %:	93.333	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		176.28	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding	115.37	352.57	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.47		1.00
Bounding	0.94	3.06	

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel
²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PEACH BOTTOM UNIT 1 CORE 1

SNF ID #: 170

Fuel Units & Descr: 814 - CONCENTRIC TUBES

Heavy Metal Mass: BOL=1707.365kg EOL=1660.153kg

ROD Storage Site: INEEL

¹Fuel decay start date: 1969

Estimates as of 2030

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 50 years

Estimated
Canister usage:
18"x15"
62 62

Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4 2062E-06	44,649 60	52,578.31	0 00E+00	1 88E-01	2 21E-01	Avg. MeV	
Am-241	3 2229E-03	44,649 60	52,578.31	0 00E+00	1 44E+02	1 69E+02	0 0150	2.588E+15
Am-242m	2 2381E-06	44,649 60	52,578 31	0 00E+00	9 99E-02	1 18E-01	0 0250	5.283E+14
Am-243	4 6006E-05	44,649 60	52,578 31	0 00E+00	2 05E+00	2 42E+00	0 0375	4.586E+14
C-14	2 3082E-05	44,649 60	52,578 31	0 00E+00	1 03E+00	1 21E+00	0 0575	4.954E+14
Ct-36	1 0667E-06	44,649 60	52,578 31	0 00E+00	4 76E-02	5 61E-02	0 0850	2.989E+14
Cm-243	1 7602E-05	44,649 60	52,578 31	0 00E+00	7 86E-01	9 26E-01	0 1250	1 967E+14
Cm-244	3 6307E-03	44,649 60	52,578 31	0 00E+00	1 62E+02	1 91E+02	0 2250	2.589E+14
Co-60	6 2585E-05	44,649 60	52,578 31	0 00E+00	2 79E+00	3 29E+00	0 3750	1 121E+14
Cs-134	2 4585E-07	44,649 60	52,578 31	0 00E+00	1 10E-02	1 29E-02	0 5750	1 840E+13
Cs-135	2 4711E-05	44,649 60	52,578 31	0 00E+00	1 10E+00	1 30E+00	0 8500	2.300E+13
Cs-137	9 3838E-01	44,649 60	52,578 31	0 00E+00	4 19E+04	4 93E+04	1 2500	1 110E+13
Eu-154	4 6887E-03	44,649 60	52,578 31	0 00E+00	2 09E+02	2 47E+02	1 7500	7 060E+11
Eu-155	1 2793E-04	44,649 60	52,578 31	0 00E+00	5 71E+00	6 73E+00	2 2500	5.874E+07
Fe-55	8 1951E-10	44,649 60	52,578 31	0 00E+00	3 66E-05	4 31E-05	2 7500	9.512E+11
H-3	1 6839E-03	44,649 60	52,578 31	0 00E+00	7 52E+01	8 85E+01	3 5000	3 137E+06
I-129	1 0092E-06	44,649 60	52,578 31	0 00E+00	4 51E-02	5 31E-02	5 0000	1 336E+06
Kr-85	1 4981E-02	44,649 60	52,578 31	0 00E+00	6 69E+02	7 88E+02	7 0000	1 532E+05
Np-237	1 2556E-05	44,649 60	52,578 31	0 00E+00	5 61E-01	6 60E-01	11 0000	1 755E+04
Pa-231	4 7360E-06	44,649 60	52,578.31	0 00E+00	2 11E-01	2 49E-01		
Pb-210	2 1901E-09	44,649 60	52,578 31	0 00E+00	9 78E-05	1 15E-04		
Pm-147	2 8781E-06	44,649 60	52,578 31	0 00E+00	1 29E-01	1 51E-01		
Pu-238	1 4430E-01	44,649 60	52,578.31	0 00E+00	6 44E+03	7 59E+03		
Pu-239	1 3572E-04	44,649 60	52,578.31	0 00E+00	6 06E+00	7 14E+00		
Pu-240	2 7537E-04	44,649 60	52,578.31	0 00E+00	1 23E+01	1 45E+01		
Pu-241	9 3995E-03	44,649 60	52,578.31	0 00E+00	4 20E+02	4 94E+02		
Pu-242	3 8866E-06	44,649 60	52,578.31	0 00E+00	1 74E-01	2 04E-01		
Ra-226	4 1243E-09	44,649 60	52,578 31	0 00E+00	1 84E-04	2 17E-04		
Ra-228	9 1949E-07	44,649 60	52,578 31	0 00E+00	4 11E-02	4 83E-02		
Ru-106	1 1667E-15	44,649 60	52,578 31	0 00E+00	5 21E-11	6 13E-11		
Se-79	2 1074E-05	44,649 60	52,578 31	0 00E+00	9 41E-01	1 11E+00		
Sn-126	2 2192E-05	44,649 60	52,578 31	0 00E+00	9 91E-01	1 17E+00		
Sr-90	8 8642E-01	44,649 60	52,578 31	0 00E+00	3 96E+04	4 66E+04		
Tc-99	3 3323E-04	44,649 60	52,578 31	0 00E+00	1 49E+01	1 75E+01		
Th-229	1 3517E-05	44,649 60	52,578 31	0 00E+00	6 04E-01	7 11E-01		
Th-230	2 2822E-07	44,649 60	52,578 31	0 00E+00	1 02E-02	1 20E-02		
Th-232	-6 9673E-08	44,649 60	0 00	1 69E-01	1 66E-01	1 69E-01		
Tl-208	5 1524E-04	44,649 60	52,578 31	0 00E+00	2 30E+01	2 71E+01		
U-232	1 3950E-03	44,649 60	52,578 31	0 00E+00	6 23E+01	7 33E+01		
U-233	2 0602E-03	44,649 60	52,578 31	0 00E+00	9 20E+01	1 08E+02		
U-234	2 9513E-04	44,649 60	52,578 31	0 00E+00	1 32E+01	1 55E+01		
U-235	-1 7343E-06	44,649 60	0 00	3 38E-01	2 60E-01	3 38E-01		
U-236	8 6281E-06	44,649 60	52,578 31	0 00E+00	3 85E-01	4 54E-01		
U-238	-5 6065E-09	44,649 60	0 00	3 36E-03	3 11E-03	3 36E-03		
Y-90	8 8642E-01	44,649 60	52,578.31	0 00E+00	3 96E+04	4 66E+04		
Other Radionuclides					4 03E+04	4 75E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
	From SFD	Used	
Reactor Moderator:	GRAPHITE	GRAPHITE	
Fuel Cladding	GRAPHITE	GRAPHITE	
BOL HM Constituents	Th and U	Th and U	
BOL Enrichment %	93.1525882	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		44,649 60	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup taken directly from SFD (converted to MWd)
Bounding	52,578.31	89,299.20	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.26		1 00
Bounding	0.31	1 70	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name PEACH BOTTOM UNIT I CORE II
 SNF ID # 171
 Fuel Units & Descr 787 - CONCENTRIC TUBES
 Heavy Metal Mass BOL=1389 055kg EOL=1289 657kg
 ROD Storage Site INEEL

¹Fuel decay start date 1973
 Estimates as of 2030
 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 50 years

Estimated
 Canister usage
 18"x15"
 60 54

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	4.2062E-06	94,003.34	101,007.91	0.00E+00	3.95E-01	4.25E-01	Avg MeV	
Am-241	3.2229E-03	94,003.34	101,007.91	0.00E+00	3.03E+02	3.26E+02	0.0150	4.972E+15
Am-242m	2.2381E-06	94,003.34	101,007.91	0.00E+00	2.10E-01	2.26E-01	0.0250	1.015E+15
Am-243	4.6006E-05	94,003.34	101,007.91	0.00E+00	4.32E+00	4.65E+00	0.0375	8.811E+14
C-14	2.3082E-05	94,003.34	101,007.91	0.00E+00	2.17E+00	2.33E+00	0.0575	9.518E+14
Cl-36	1.0667E-06	94,003.34	101,007.91	0.00E+00	1.00E-01	1.08E-01	0.0850	5.743E+14
Cm-243	1.7602E-05	94,003.34	101,007.91	0.00E+00	1.65E+00	1.78E+00	0.1250	3.778E+14
Cm-244	3.6307E-03	94,003.34	101,007.91	0.00E+00	3.41E+02	3.67E+02	0.2250	4.973E+14
Co-60	6.2585E-05	94,003.34	101,007.91	0.00E+00	5.88E+00	6.32E+00	0.3750	2.154E+14
Cs-134	2.4585E-07	94,003.34	101,007.91	0.00E+00	2.31E-02	2.48E-02	0.5750	3.535E+15
Cs-135	2.4711E-05	94,003.34	101,007.91	0.00E+00	2.32E+00	2.50E+00	0.8500	4.419E+13
Cs-137	9.3838E-01	94,003.34	101,007.91	0.00E+00	8.82E+04	9.48E+04	1.2500	2.133E+13
Eu-154	4.6887E-03	94,003.34	101,007.91	0.00E+00	4.41E+02	4.74E+02	1.7500	1.356E+12
Eu-155	1.2793E-04	94,003.34	101,007.91	0.00E+00	1.20E+01	1.29E+01	2.2500	1.128E+08
Fe-55	8.1951E-10	94,003.34	101,007.91	0.00E+00	7.70E-05	8.28E-05	2.7500	1.827E+12
H-3	1.6839E-03	94,003.34	101,007.91	0.00E+00	1.58E+02	1.70E+02	3.5000	6.027E+06
I-129	1.0092E-06	94,003.34	101,007.91	0.00E+00	9.49E-02	1.02E-01	5.0000	2.566E+06
Kr-85	1.4981E-02	94,003.34	101,007.91	0.00E+00	1.41E+03	1.51E+03	7.0000	2.943E+05
Np-237	1.2556E-05	94,003.34	101,007.91	0.00E+00	1.18E+00	1.27E+00	11.0000	3.372E+04
Pa-231	4.7360E-06	94,003.34	101,007.91	0.00E+00	4.45E-01	4.78E-01		
Pb-210	2.1901E-09	94,003.34	101,007.91	0.00E+00	2.06E-04	2.21E-04		
Pm-147	2.8781E-06	94,003.34	101,007.91	0.00E+00	2.71E-01	2.91E-01		
Pu-238	1.4430E-01	94,003.34	101,007.91	0.00E+00	1.36E+04	1.46E+04		
Pu-239	1.3572E-04	94,003.34	101,007.91	0.00E+00	1.28E+01	1.37E+01		
Pu-240	2.7537E-04	94,003.34	101,007.91	0.00E+00	2.59E+01	2.78E+01		
Pu-241	9.3995E-03	94,003.34	101,007.91	0.00E+00	8.84E+02	9.49E+02		
Pu-242	3.8866E-06	94,003.34	101,007.91	0.00E+00	3.65E-01	3.93E-01		
Ra-226	4.1243E-09	94,003.34	101,007.91	0.00E+00	3.88E-04	4.17E-04		
Ra-228	9.1949E-07	94,003.34	101,007.91	0.00E+00	8.64E-02	9.29E-02		
Ru-106	1.1667E-15	94,003.34	101,007.91	0.00E+00	1.10E-10	1.18E-10		
Se-79	2.1074E-05	94,003.34	101,007.91	0.00E+00	1.98E+00	2.13E+00		
Sn-126	2.2192E-05	94,003.34	101,007.91	0.00E+00	2.09E+00	2.24E+00		
Sr-90	8.8642E-01	94,003.34	101,007.91	0.00E+00	8.33E+04	8.95E+04		
Tc-99	3.3323E-04	94,003.34	101,007.91	0.00E+00	3.13E+01	3.37E+01		
Th-229	1.3517E-05	94,003.34	101,007.91	0.00E+00	1.27E+00	1.37E+00		
Th-230	2.2822E-07	94,003.34	101,007.91	0.00E+00	2.15E-02	2.31E-02		
Th-232	-6.9673E-08	94,003.34	0.00	1.37E-01	1.31E-01	1.37E-01		
Ti-208	5.1524E-04	94,003.34	101,007.91	0.00E+00	4.84E+01	5.20E+01		
U-232	1.3950E-03	94,003.34	101,007.91	0.00E+00	1.31E+02	1.41E+02		
U-233	2.0602E-03	94,003.34	101,007.91	0.00E+00	1.94E+02	2.08E+02		
U-234	2.9513E-04	94,003.34	101,007.91	0.00E+00	2.77E+01	2.98E+01		
U-235	-1.7343E-06	94,003.34	0.00	2.75E-01	1.12E-01	2.75E-01		
U-236	8.6281E-06	94,003.34	101,007.91	0.00E+00	8.11E-01	8.72E-01		
U-238	-5.6065E-09	94,003.34	0.00	2.73E-03	2.21E-03	2.73E-03		
Y-90	8.8642E-01	94,003.34	101,007.91	0.00E+00	8.33E+04	8.95E+04	Total	Total
Other Radionuclides					8.49E+04	9.13E+04		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		94.003.34	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup taken directly from SFD (converted to MWd)
Bounding	101,007.91	188.006.68	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.68		1.00
Bounding	0.73	1.88	

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: PEACH BOTTOM UNIT I CORE II (INTACT)
 SNF ID #: 206
 Fuel Units & Descr: 9 - CONCENTRIC TUBES
 Heavy Metal Mass: BOL=11 925kg, EOL=11 977kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1974
 Estimates as of: 2030
 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: 50 years

Estimated
 Canister usage:
 18"x15"
 0 69

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 2062E-06	674 97	867 05	0 00E+00	2.84E-03	3 65E-03	Avg MeV	
Am-241	3.2229E-03	674 97	867.05	0 00E+00	2 18E+00	2.79E+00	0 0150	4.268E+13
Am-242m	2.2381E-06	674 97	867 05	0 00E+00	1 51E-03	1 94E-03	0 0250	8 712E+12
Am-243	4 6006E-05	674 97	867.05	0 00E+00	3.11E-02	3 99E-02	0 0375	7.563E+12
C-14	2.3082E-05	674 97	867 05	0 00E+00	1.56E-02	2 00E-02	0 0575	8 170E+12
Cl-36	1 0667E-06	674 97	867 05	0 00E+00	7.20E-04	9 25E-04	0 0850	4 930E+12
Cm-243	1 7602E-05	674 97	867 05	0 00E+00	1 19E-02	1 53E-02	0 1250	3.243E+12
Cm-244	3.6307E-03	674 97	867.05	0 00E+00	2 45E+00	3 15E+00	0.2250	4.269E+12
Co-60	6.2585E-05	674 97	867 05	0 00E+00	4.22E-02	5 43E-02	0 3750	1.849E+12
Cs-134	2 4585E-07	674 97	867 05	0 00E+00	1 66E-04	2 13E-04	0.5750	3 034E+13
Cs-135	2 4711E-05	674 97	867 05	0 00E+00	1 67E-02	2 14E-02	0 8500	3 793E+11
Cs-137	9.3838E-01	674 97	867 05	0 00E+00	6 33E+02	8 14E+02	1.2500	1.831E+11
Eu-154	4 6887E-03	674 97	867.05	0 00E+00	3 16E+00	4 07E+00	1 7500	1 164E+10
Eu-155	1 2793E-04	674 97	867.05	0 00E+00	8 63E-02	1 11E-01	2.2500	9 686E+05
Fe-55	8 1951E-10	674 97	867.05	0 00E+00	5 53E-07	7 11E-07	2.7500	1 569E+10
H-3	1 6839E-03	674 97	867 05	0 00E+00	1 14E+00	1 46E+00	3.5000	5 174E+04
I-129	1 0092E-06	674 97	867.05	0 00E+00	6.81E-04	8 75E-04	5 0000	2.202E+04
Kr-85	1 4981E-02	674 97	867.05	0 00E+00	1 01E+01	1 30E+01	7 0000	2.527E+03
Np-237	1.2556E-05	674 97	867.05	0 00E+00	8 48E-03	1 09E-02	11 0000	2.894E+02
Pa-231	4 7360E-06	674 97	867.05	0 00E+00	3.20E-03	4 11E-03		
Pb-210	2 1901E-09	674 97	867.05	0 00E+00	1 48E-06	1 90E-06		
Pm-147	2.8781E-06	674 97	867.05	0 00E+00	1 94E-03	2 50E-03		
Pu-238	1 4430E-01	674 97	867.05	0 00E+00	9 74E+01	1 25E+02		
Pu-239	1.3572E-04	674 97	867.05	0 00E+00	9 16E-02	1 18E-01		
Pu-240	2.7537E-04	674 97	867.05	0 00E+00	1 86E-01	2 39E-01		
Pu-241	9.3995E-03	674 97	867.05	0 00E+00	6 34E+00	8 15E+00		
Pu-242	3.8866E-06	674 97	867.05	0 00E+00	2 62E-03	3 37E-03		
Ra-226	4.1243E-09	674 97	867.05	0 00E+00	2 78E-06	3 58E-06		
Ra-228	9 1949E-07	674 97	867.05	0 00E+00	6.21E-04	7 97E-04		
Ru-106	1 1667E-15	674 97	867.05	0 00E+00	7 87E-13	1 01E-12		
Se-79	2.1074E-05	674 97	867 05	0 00E+00	1 42E-02	1 83E-02		
Sn-126	2.2192E-05	674 97	867 05	0 00E+00	1 50E-02	1 92E-02		
Sr-90	8 8642E-01	674 97	867 05	0 00E+00	5 98E+02	7 69E+02		
Tc-99	3.3323E-04	674 97	867 05	0 00E+00	2.25E-01	2 89E-01		
Th-229	1.3517E-05	674 97	867 05	0 00E+00	9 12E-03	1 17E-02		
Th-230	2.2822E-07	674 97	867 05	0 00E+00	1 54E-04	1 98E-04		
Th-232	-6 9673E-08	674 97	0 00	1 18E-03	1 13E-03	1 18E-03		
Tl-208	5.1524E-04	674 97	867 05	0 00E+00	3 48E-01	4 47E-01		
U-232	1.3950E-03	674 97	867 05	0 00E+00	9 42E-01	1 21E+00		
U-233	2 0602E-03	674 97	867 05	0 00E+00	1 39E+00	1 79E+00		
U-234	2 9513E-04	674 97	867 05	0 00E+00	1 99E-01	2 56E-01		
U-235	-1 7343E-06	674 97	0 00	2 36E-03	1 19E-03	2 36E-03		
U-236	8 6281E-06	674 97	867 05	0 00E+00	5 82E-03	7 48E-03		
U-238	-5 6065E-09	674 97	0 00	2 35E-05	1 97E-05	2 35E-05		
Y-90	8 8642E-01	674 97	867 05	0 00E+00	5 98E+02	7 69E+02		
Other Radionuclides					6 10E+02	7 84E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	GRAPHITE	GRAPHITE	
Fuel Cladding	GRAPHITE	GRAPHITE	
BOL HM Constituents	Th and U	Th and U	
BOL Enrichment %	93 152	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	674 97	-49 37	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup taken directly from SFD (converted to MWd)
Bounding	867 05	-98.73	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 57	-0 07	0 94
Bounding	0 73	-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 PNL MIXED MATERIAL EXP DCC-1
 SNF ID # 430
 Fuel Units & Descr 1 - EXPERIMENT CAPSULE
 Heavy Metal Mass BOL= , EOL=23 628kg
 ROD Storage Site INEEL

Fuel decay start date 1983
 Estimates as of 2030
 Template Pathfinder (Light Water, SST, 60 to 100%, U)
 Template Burnup(MWd): 6 01
 Template BOL Heavy Metal Mass (MT) 0 00012882
 Template Decay Time 35 years

Estimated
 Canister usage
 18"x15"
 0 07

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	22,320 13	22,320 13	0 00E+00	5 21E-04	5 21E-04	Avg MeV	
Am-241	1 1135E-04	22,320 13	22,320 13	0 00E+00	2 49E+00	2 49E+00	0 0150	1 666E+15
Am-242m	8 5075E-09	22,320 13	22,320 13	0 00E+00	1 90E-04	1 90E-04	0 0250	3 462E+14
Am-243	9 8519E-10	22,320 13	22,320 13	0 00E+00	2 20E-05	2 20E-05	0 0375	2 994E+14
C-14	2 3012E-04	22,320 13	22,320 13	0 00E+00	5 14E+00	5 14E+00	0 0575	3 228E+14
Cl-36	1 2261E-06	22,320 13	22,320 13	0 00E+00	2 74E-02	2 74E-02	0 0850	1 950E+14
Cm-243	2 4875E-10	22,320 13	22,320 13	0 00E+00	5 55E-06	5 55E-06	0 1250	1 266E+14
Cm-244	2 3178E-09	22,320 13	22,320 13	0 00E+00	5 17E-05	5 17E-05	0 2250	1 679E+14
Co-60	7 0849E-02	22,320 13	22,320 13	0 00E+00	1 58E+03	1 58E+03	0 3750	7 322E+13
Cs-134	3 0266E-06	22,320 13	22,320 13	0 00E+00	6 76E-02	6 76E-02	0 5750	1 206E+15
Cs-135	3 0316E-05	22,320 13	22,320 13	0 00E+00	6 77E-01	6 77E-01	0 8500	1 221E+13
Cs-137	1 4511E+00	22,320 13	22,320 13	0 00E+00	3 24E+04	3 24E+04	1 2500	1 213E+14
Eu-154	6 6955E-04	22,320 13	22,320 13	0 00E+00	1 49E+01	1 49E+01	1 7500	3 149E+11
Eu-155	6 9850E-04	22,320 13	22,320 13	0 00E+00	1 56E+01	1 56E+01	2 2500	6 538E+08
Fe-55	1 2318E-03	22,320 13	22,320 13	0 00E+00	2 75E+01	2 75E+01	2 7500	1 890E+07
H-3	2 5141E-03	22,320 13	22,320 13	0 00E+00	5 61E+01	5 61E+01	3 5000	1 333E+03
I-129	7 3195E-07	22,320 13	22,320 13	0 00E+00	1 63E-02	1 63E-02	5 0000	5 481E+02
Kr-85	4 1281E-02	22,320 13	22,320 13	0 00E+00	9 21E+02	9 21E+02	7 0000	6 052E+01
Np-237	1 1489E-06	22,320 13	22,320 13	0 00E+00	2 56E-02	2 56E-02	11 0000	6 791E+00
Pa-231	4 5241E-08	22,320 13	22,320 13	0 00E+00	1 01E-03	1 01E-03		
Pb-210	6 4476E-13	22,320 13	22,320 13	0 00E+00	1 44E-08	1 44E-08		
Pm-147	1 1651E-03	22,320 13	22,320 13	0 00E+00	2 60E+01	2 60E+01		
Pu-238	2 9517E-04	22,320 13	22,320 13	0 00E+00	6 59E+00	6 59E+00		
Pu-239	6 6772E-04	22,320 13	22,320 13	0 00E+00	1 49E+01	1 49E+01		
Pu-240	8 6839E-05	22,320 13	22,320 13	0 00E+00	1 94E+00	1 94E+00		
Pu-241	7 1514E-04	22,320 13	22,320 13	0 00E+00	1 60E+01	1 60E+01		
Pu-242	1 9717E-09	22,320 13	22,320 13	0 00E+00	4 40E-05	4 40E-05		
Ra-226	1 7654E-12	22,320 13	22,320 13	0 00E+00	3 94E-08	3 94E-08		
Ra-228	8 2928E-12	22,320 13	22,320 13	0 00E+00	1 85E-07	1 85E-07		
Ru-106	1 8419E-10	22,320 13	22,320 13	0 00E+00	4 11E-06	4 11E-06		
Se-79	1 3223E-05	22,320 13	22,320 13	0 00E+00	2 95E-01	2 95E-01		
Sn-126	1 1493E-05	22,320 13	22,320 13	0 00E+00	2 57E-01	2 57E-01		
Sr-90	1 3649E+00	22,320 13	22,320 13	0 00E+00	3 05E+04	3 05E+04		
Tc-99	4 6656E-04	22,320 13	22,320 13	0 00E+00	1 04E+01	1 04E+01		
Th-229	1 4547E-11	22,320 13	22,320 13	0 00E+00	3 25E-07	3 25E-07		
Th-230	1 6617E-10	22,320 13	22,320 13	0 00E+00	3 71E-06	3 71E-06		
Th-232	8 3361E-12	22,320 13	22,320 13	0 00E+00	1 86E-07	1 86E-07		
Th-208	2 1664E-08	22,320 13	22,320 13	0 00E+00	4 84E-04	4 84E-04		
U-232	5 8669E-08	22,320 13	22,320 13	0 00E+00	1 31E-03	1 31E-03		
U-233	3 1847E-09	22,320 13	22,320 13	0 00E+00	7 11E-05	7 11E-05		
U-234	3 8769E-07	22,320 13	22,320 13	0 00E+00	8 65E-03	8 65E-03		
U-235	-2 7761E-06	22,320 13	0 00	9 54E-02	3 35E-02	9 54E-02		
U-236	1 6190E-05	22,320 13	22,320 13	0 00E+00	3 61E-01	3 61E-01		
U-238	-2 8547E-09	22,320 13	0 00	1 03E-03	9 68E-04	1 03E-03		
Y-90	1 3652E+00	22,320 13	22,320 13	0 00E+00	3 05E+04	3 05E+04		
Other Radionuclides					3 68E+04	3 68E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3 90E+02	3 90E+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:
Fuel Cladding	NONE	SST	This fuel matches on all parameters except cladding (SST is conservative) and enrichment (unknown)
BOL HM Constituents	U	U	
BOL Enrichment %		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		22,320 13	Nominal burnup set equal to bounding burnup
Bounding		22,320 13	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		

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel
²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PNL MIXED MATERIAL EXP.DCC-2
 SNF ID #: 431
 Fuel Units & Descr: 1 - EXPERIMENT CAPSULE
 Heavy Metal Mass: BOL= , EOL=20 631kg
 ROD Storage Site: INEEL

Fuel decay start date: 1984
 Estimates as of: 2030
 Template: Pathfinder (Light Water, SST, 60 to 100%, U)
 Template Burnup (MWd): 6 01
 Template BOL Heavy Metal Mass (MT): 0 00012882
 Template Decay Time: 35 years

Estimated
 Canister usage.
 18"x15"
 0 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)		
Ac-227	2 3344E-08	19,489 03	19,489 03	0 00E+00	4 55E-04	4 55E-04	Avg. MeV	
Am-241	1 1135E-04	19,489 03	19,489 03	0 00E+00	2 17E+00	2 17E+00	0 0150	1 455E+15
Am-242m	8 5075E-09	19,489 03	19,489 03	0 00E+00	1 66E-04	1 66E-04	0 0250	3 023E+14
Am-243	9 8519E-10	19,489 03	19,489 03	0 00E+00	1 92E-05	1 92E-05	0 0375	2 615E+14
C-14	2 3012E-04	19,489 03	19,489 03	0 00E+00	4 48E+00	4 48E+00	0 0575	2 818E+14
Cl-36	1 2261E-06	19,489 03	19,489 03	0 00E+00	2 39E-02	2 39E-02	0 0850	1 703E+14
Cm-243	2 4875E-10	19,489 03	19,489 03	0 00E+00	4 85E-06	4 85E-06	0 1250	1 106E+14
Cm-244	2 3178E-09	19,489 03	19,489 03	0 00E+00	4 52E-05	4 52E-05	0 2250	1 466E+14
Co-60	7 0849E-02	19,489 03	19,489 03	0 00E+00	1.38E+03	1.38E+03	0 3750	6 393E+13
Cs-134	3 0266E-06	19,489 03	19,489 03	0 00E+00	5 90E-02	5 90E-02	0 5750	1 053E+15
Cs-135	3 0316E-05	19,489 03	19,489 03	0 00E+00	5 91E-01	5 91E-01	0 8500	1 066E+13
Cs-137	1 4511E+00	19,489 03	19,489 03	0 00E+00	2 83E+04	2 83E+04	1 2500	1 060E+14
Eu-154	6 6955E-04	19,489 03	19,489 03	0 00E+00	1 30E+01	1 30E+01	1 7500	2 750E+11
Eu-155	6 9850E-04	19,489 03	19,489 03	0 00E+00	1 36E+01	1 36E+01	2 2500	5 709E+08
Fe-55	1.2318E-03	19,489 03	19,489 03	0 00E+00	2 40E+01	2 40E+01	2 7500	1 650E+07
H-3	2 5141E-03	19,489 03	19,489 03	0 00E+00	4 90E+01	4 90E+01	3 5000	1 164E+03
I-129	7.3195E-07	19,489 03	19,489 03	0 00E+00	1 43E-02	1 43E-02	5 0000	4 786E+02
Kr-85	4 1281E-02	19,489 03	19,489 03	0 00E+00	8 05E+02	8 05E+02	7 0000	5 284E+01
Np-237	1 1489E-06	19,489 03	19,489 03	0 00E+00	2.24E-02	2.24E-02	11 0000	5 929E+00
Pa-231	4 5241E-08	19,489 03	19,489 03	0 00E+00	8 82E-04	8 82E-04		
Pb-210	6 4476E-13	19,489 03	19,489 03	0 00E+00	1 26E-08	1.26E-08		
Pm-147	1 1651E-03	19,489 03	19,489 03	0 00E+00	2 27E+01	2 27E+01		
Pu-238	2.9517E-04	19,489 03	19,489 03	0 00E+00	5 75E+00	5 75E+00		
Pu-239	6.6772E-04	19,489 03	19,489 03	0 00E+00	1 30E+01	1 30E+01		
Pu-240	8.6839E-05	19,489 03	19,489 03	0 00E+00	1 69E+00	1 69E+00		
Pu-241	7 1514E-04	19,489 03	19,489 03	0 00E+00	1 39E+01	1 39E+01		
Pu-242	1 9717E-09	19,489 03	19,489 03	0 00E+00	3 84E-05	3 84E-05		
Ra-226	1 7654E-12	19,489 03	19,489 03	0 00E+00	3 44E-08	3 44E-08		
Ra-228	8.2928E-12	19,489 03	19,489 03	0 00E+00	1 62E-07	1 62E-07		
Ru-106	1 8419E-10	19,489 03	19,489 03	0 00E+00	3 59E-06	3 59E-06		
Se-79	1 3223E-05	19,489 03	19,489 03	0 00E+00	2 58E-01	2 58E-01		
Sn-126	1 1493E-05	19,489 03	19,489 03	0 00E+00	2 24E-01	2 24E-01		
Sr-90	1 3649E+00	19,489 03	19,489 03	0 00E+00	2 66E+04	2 66E+04		
Tc-99	4 6656E-04	19,489 03	19,489 03	0 00E+00	9.09E+00	9 09E+00		
Th-229	1 4547E-11	19,489 03	19,489 03	0 00E+00	2 84E-07	2 84E-07		
Th-230	1 6617E-10	19,489 03	19,489 03	0 00E+00	3.24E-06	3.24E-06		
Th-232	8 3361E-12	19,489 03	19,489 03	0 00E+00	1 62E-07	1 62E-07		
Tl-208	2 1664E-08	19,489 03	19,489 03	0 00E+00	4.22E-04	4.22E-04		
U-232	5 8669E-08	19,489 03	19,489 03	0 00E+00	1.14E-03	1.14E-03		
U-233	3 1847E-09	19,489 03	19,489 03	0 00E+00	6.21E-05	6.21E-05		
U-234	3 8769E-07	19,489 03	19,489 03	0 00E+00	7 56E-03	7 56E-03		
U-235	-2 7761E-06	19,489 03	0 00	8 33E-02	2 92E-02	8.33E-02		
U-236	1 6190E-05	19,489 03	19,489 03	0 00E+00	3 16E-01	3 16E-01		
U-238	-2 8547E-09	19,489 03	0 00	9 01E-04	8 45E-04	9 01E-04		
Y-90	1.3652E+00	19,489 03	19,489 03	0 00E+00	2 66E+04	2 66E+04		
Other Radionuclides					3 22E+04	3 22E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3 40E+02	3 40E+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	NONE	SST
BOL HM Constituents	U	U
BOL Enrichment %		60 to 100

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)

Burnup Summary (MWd) ²		
	From SFD	Estimated
Nominal		19 489 03
Bounding		19 489 03

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.

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 MIXED MATERIAL EXP DCC-3
 SNF ID #: 432
 Fuel Units & Descr: 1 - FUEL MELTED IN EXP
 Heavy Metal Mass: BOL=, EOL=20 365kg
 ROD Storage Site: INEEL

Fuel decay start date: 1985
 Estimates as of: 2030
 Template: Pathfinder (Light Water, SST, 60 to 100% U)
 Template Burnup (MWd): 6.01
 Template BOL Heavy Metal Mass (MT): 0 00012882
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x15"
 0 07

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	2.3344E-08	19,237.75	19,237.75	0.00E+00	4.49E-04	4.49E-04	Avg MeV	
Am-241	1.1135E-04	19,237.75	19,237.75	0.00E+00	2.14E+00	2.14E+00	0.0150	1.436E+15
Am-242m	8.5075E-09	19,237.75	19,237.75	0.00E+00	1.64E-04	1.64E-04	0.0250	2.984E+14
Am-243	9.8519E-10	19,237.75	19,237.75	0.00E+00	1.90E-05	1.90E-05	0.0375	2.581E+14
C-14	2.3012E-04	19,237.75	19,237.75	0.00E+00	4.43E+00	4.43E+00	0.0575	2.782E+14
Cl-36	1.2261E-06	19,237.75	19,237.75	0.00E+00	2.36E-02	2.36E-02	0.0850	1.681E+14
Cm-243	2.4875E-10	19,237.75	19,237.75	0.00E+00	4.79E-06	4.79E-06	0.1250	1.091E+14
Cm-244	2.3178E-09	19,237.75	19,237.75	0.00E+00	4.46E-05	4.46E-05	0.2250	1.447E+14
Co-60	7.0849E-02	19,237.75	19,237.75	0.00E+00	1.36E+03	1.36E+03	0.3750	6.311E+13
Cs-134	3.0266E-06	19,237.75	19,237.75	0.00E+00	5.82E-02	5.82E-02	0.5750	1.040E+15
Cs-135	3.0316E-05	19,237.75	19,237.75	0.00E+00	5.83E-01	5.83E-01	0.8500	1.052E+13
Cs-137	1.4511E+00	19,237.75	19,237.75	0.00E+00	2.79E+04	2.79E+04	1.2500	1.046E+14
Eu-154	6.6955E-04	19,237.75	19,237.75	0.00E+00	1.29E+01	1.29E+01	1.7500	2.714E+11
Eu-155	6.9850E-04	19,237.75	19,237.75	0.00E+00	1.34E+01	1.34E+01	2.2500	5.635E+08
Fe-55	1.2318E-03	19,237.75	19,237.75	0.00E+00	2.37E+01	2.37E+01	2.7500	1.629E+07
H-3	2.5141E-03	19,237.75	19,237.75	0.00E+00	4.84E+01	4.84E+01	3.5000	1.149E+03
I-129	7.3195E-07	19,237.75	19,237.75	0.00E+00	1.41E-02	1.41E-02	5.0000	4.724E+02
Kr-85	4.1281E-02	19,237.75	19,237.75	0.00E+00	7.94E+02	7.94E+02	7.0000	5.216E+01
Np-237	1.1489E-06	19,237.75	19,237.75	0.00E+00	2.21E-02	2.21E-02	11.0000	5.853E+00
Pa-231	4.5241E-08	19,237.75	19,237.75	0.00E+00	8.70E-04	8.70E-04		
Pb-210	6.4476E-13	19,237.75	19,237.75	0.00E+00	1.24E-08	1.24E-08		
Pm-147	1.1651E-03	19,237.75	19,237.75	0.00E+00	2.24E+01	2.24E+01		
Pu-238	2.9517E-04	19,237.75	19,237.75	0.00E+00	5.68E+00	5.68E+00		
Pu-239	6.6772E-04	19,237.75	19,237.75	0.00E+00	1.28E+01	1.28E+01		
Pu-240	8.6839E-05	19,237.75	19,237.75	0.00E+00	1.67E+00	1.67E+00		
Pu-241	7.1514E-04	19,237.75	19,237.75	0.00E+00	1.38E+01	1.38E+01		
Pu-242	1.9717E-09	19,237.75	19,237.75	0.00E+00	3.79E-05	3.79E-05		
Ra-226	1.7654E-12	19,237.75	19,237.75	0.00E+00	3.40E-08	3.40E-08		
Ra-228	8.2928E-12	19,237.75	19,237.75	0.00E+00	1.60E-07	1.60E-07		
Ru-106	1.8419E-10	19,237.75	19,237.75	0.00E+00	3.54E-06	3.54E-06		
Se-79	1.3223E-05	19,237.75	19,237.75	0.00E+00	2.54E-01	2.54E-01		
Sn-126	1.1493E-05	19,237.75	19,237.75	0.00E+00	2.21E-01	2.21E-01		
Sr-90	1.3649E+00	19,237.75	19,237.75	0.00E+00	2.63E+04	2.63E+04		
Tc-99	4.6656E-04	19,237.75	19,237.75	0.00E+00	8.98E+00	8.98E+00		
Th-229	1.4547E-11	19,237.75	19,237.75	0.00E+00	2.80E-07	2.80E-07		
Th-230	1.6617E-10	19,237.75	19,237.75	0.00E+00	3.20E-06	3.20E-06		
Th-232	8.3361E-12	19,237.75	19,237.75	0.00E+00	1.60E-07	1.60E-07		
Ti-208	2.1664E-08	19,237.75	19,237.75	0.00E+00	4.17E-04	4.17E-04		
U-232	5.8669E-08	19,237.75	19,237.75	0.00E+00	1.13E-03	1.13E-03		
U-233	3.1847E-09	19,237.75	19,237.75	0.00E+00	6.13E-05	6.13E-05		
U-234	3.8769E-07	19,237.75	19,237.75	0.00E+00	7.46E-03	7.46E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2.7761E-06	19,237.75	0.00	8.23E-02	2.89E-02	8.23E-02	3.36E+02	3.36E+02
U-236	1.6190E-05	19,237.75	19,237.75	0.00E+00	3.11E-01	3.11E-01	Total	Total
U-238	-2.8547E-09	19,237.75	0.00	8.89E-04	8.35E-04	8.89E-04		
Y-90	1.3652E+00	19,237.75	19,237.75	0.00E+00	2.63E+04	2.63E+04		

Other Radionuclides

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)
Reactor Moderator	From SFD: LIGHT WATER	Used: LIGHT WATER	
Fuel Cladding	NONE	SST	
BOL HM Constituents	U	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.
Nominal	From SFD	Estimated	
Bounding		19,237.75	
Checks			Estimated EOL HM/Given EOL HM 1.02
Nominal	Burnup Multiplier	Estimated Burnup/Given Burnup	
Bounding	10.12	10.12	

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel
²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PNL MOX FUEL
 SNF ID #: 414
 Fuel Units & Descr: 5 - SCRAP
 Heavy Metal Mass: BOL= , EOL=0.23kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1988
 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"x15"
 0.36

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	218.58	218.58	0.00E+00	5.04E-04	5.04E-04	Avg MeV	
Am-241	8.4448E+00	218.58	218.58	0.00E+00	1.85E+03	1.85E+03	0.0150	2.679E+14
Am-242m	1.6848E-02	218.58	218.58	0.00E+00	3.68E+00	3.68E+00	0.0250	5.330E+13
Am-243	1.6320E-02	218.58	218.58	0.00E+00	3.57E+00	3.57E+00	0.0375	4.656E+13
C-14	1.2090E-01	218.58	218.58	0.00E+00	2.64E+01	2.64E+01	0.0675	7.327E+13
Cl-36	2.2849E-03	218.58	218.58	0.00E+00	4.99E-01	4.99E-01	0.0850	2.859E+13
Cm-243	8.6624E-04	218.58	218.58	0.00E+00	1.89E-01	1.89E-01	0.1250	2.241E+13
Cm-244	1.6848E-01	218.58	218.58	0.00E+00	3.68E+01	3.68E+01	0.2250	2.477E+13
Co-60	2.8086E+01	218.58	218.58	0.00E+00	6.14E+03	6.14E+03	0.3750	1.060E+13
Cs-134	3.4148E-04	218.58	218.58	0.00E+00	7.46E-02	7.46E-02	0.5750	1.723E+14
Cs-135	4.3976E-04	218.58	218.58	0.00E+00	9.61E-02	9.61E-02	0.8500	6.584E+12
Cs-137	2.1049E+01	218.58	218.58	0.00E+00	4.60E+03	4.60E+03	1.2500	4.603E+14
Eu-154	1.2500E+00	218.58	218.58	0.00E+00	2.73E+02	2.73E+02	1.7500	2.036E+11
Eu-155	6.8986E-02	218.58	218.58	0.00E+00	1.51E+01	1.51E+01	2.2500	2.414E+09
Fe-55	2.9308E-01	218.58	218.58	0.00E+00	6.41E+01	6.41E+01	2.7500	6.802E+08
H-3	2.4311E-01	218.58	218.58	0.00E+00	5.31E+01	5.31E+01	3.5000	5.443E+05
I-129	1.0618E-05	218.58	218.58	0.00E+00	2.32E-03	2.32E-03	5.0000	2.312E+05
Kr-85	5.9882E-01	218.58	218.58	0.00E+00	1.31E+02	1.31E+02	7.0000	2.647E+04
Np-237	1.5668E-04	218.58	218.58	0.00E+00	3.42E-02	3.42E-02	11.0000	3.029E+03
Pa-231	2.8656E-06	218.58	218.58	0.00E+00	6.26E-04	6.26E-04		
Pb-210	2.3918E-08	218.58	218.58	0.00E+00	5.23E-06	5.23E-06		
Pm-147	1.6900E-02	218.58	218.58	0.00E+00	3.69E+00	3.69E+00		
Pu-238	-8.6120E-01	218.58	0.00	5.91E+01	0.00E+00	5.91E+01		
Pu-239	-4.8440E-02	218.58	0.00	7.15E+00	0.00E+00	7.15E+00		
Pu-240	-3.0095E-01	218.58	0.00	9.13E+00	0.00E+00	9.13E+00		
Pu-241	-1.0411E+02	218.58	0.00	2.35E+03	0.00E+00	2.35E+03		
Pu-242	-1.1381E-04	218.58	0.00	3.95E-02	1.47E-02	3.95E-02		
Ra-226	6.4400E-08	218.58	218.58	0.00E+00	1.41E-05	1.41E-05		
Ra-228	5.9952E-07	218.58	218.58	0.00E+00	1.31E-04	1.31E-04		
Ru-106	8.5526E-07	218.58	218.58	0.00E+00	1.87E-04	1.87E-04		
Se-79	1.9181E-04	218.58	218.58	0.00E+00	4.19E-02	4.19E-02		
Sn-126	1.6671E-04	218.58	218.58	0.00E+00	3.64E-02	3.64E-02		
Sr-90	1.9799E+01	218.58	218.58	0.00E+00	4.33E+03	4.33E+03		
Tc-99	6.7678E-03	218.58	218.58	0.00E+00	1.48E+00	1.48E+00		
Th-229	1.7488E-06	218.58	218.58	0.00E+00	3.82E-04	3.82E-04		
Th-230	5.8704E-06	218.58	218.58	0.00E+00	1.28E-03	1.28E-03		
Th-232	6.0208E-07	218.58	218.58	0.00E+00	1.32E-04	1.32E-04		
Th-208	8.7573E-05	218.58	218.58	0.00E+00	1.91E-02	1.91E-02		
U-232	2.3706E-04	218.58	218.58	0.00E+00	5.18E-02	5.18E-02		
U-233	3.6128E-04	218.58	218.58	0.00E+00	7.90E-02	7.90E-02		
U-234	1.2788E-02	218.58	218.58	0.00E+00	2.80E+00	2.80E+00		
U-235	5.7486E-04	218.58	218.58	1.98E-04	1.26E-01	1.26E-01		
U-236	2.3485E-04	218.58	218.58	0.00E+00	5.13E-02	5.13E-02		
U-238	1.1581E-04	218.58	218.58	2.46E-05	2.53E-02	2.53E-02		
Y-90	1.9804E+01	218.58	218.58	0.00E+00	4.33E+03	4.33E+03		
Other Radionuclides					1.35E+04	1.35E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.15E+02	2.18E+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)	
BOL HM Constituents	SST	SST/Inconel	
BOL Enrichment %	Pu and U	U, Th, & Pu	
		0 to 100	This fuel didn't closely match any existing templates, therefore the worst case template was used

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
Bounding		218.58	
		218.58	Nominal burnup set equal to bounding burnup. 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 PNL MOX FUEL ¹Fuel decay start date 1988
 SNF ID # 415 Estimates as of 2030
 Fuel Units & Descr. 7 - FUEL MELTED IN EXP Template (Worst Case)
 Heavy Metal Mass BOL= , EOL=0.01kg ²Template Burnup(MWd) 62.5
 ROD Storage Site INEEL Template BOL Heavy Metal Mass (MT) 0.00186865
 Template Decay Time 35 years

Estimated
 Canister usage
 18"x15"
 0.51

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	2.3072E-06	9.31	9.31	9.31	0.00E+00	2.15E-05	2.15E-05	Avg MeV	
Am-241	8.4448E+00	9.31	9.31	9.31	0.00E+00	7.87E+01	7.87E+01	0.0150	1.141E+13
Am-242m	1.6848E-02	9.31	9.31	9.31	0.00E+00	1.57E-01	1.57E-01	0.0250	2.271E+12
Am-243	1.6320E-02	9.31	9.31	9.31	0.00E+00	1.52E-01	1.52E-01	0.0375	1.884E+12
C-14	1.2090E-01	9.31	9.31	9.31	0.00E+00	1.13E+00	1.13E+00	0.0575	3.122E+12
Cl-36	2.2849E-03	9.31	9.31	9.31	0.00E+00	2.13E-02	2.13E-02	0.0850	1.218E+12
Cm-243	8.6624E-04	9.31	9.31	9.31	0.00E+00	8.07E-03	8.07E-03	0.1250	9.549E+11
Cm-244	1.6848E-01	9.31	9.31	9.31	0.00E+00	1.57E+00	1.57E+00	0.2250	1.056E+12
Co-60	2.8086E+01	9.31	9.31	9.31	0.00E+00	2.62E+02	2.62E+02	0.3750	4.515E+11
Cs-134	3.4148E-04	9.31	9.31	9.31	0.00E+00	3.18E-03	3.18E-03	0.5750	7.341E+12
Cs-135	4.3976E-04	9.31	9.31	9.31	0.00E+00	4.10E-03	4.10E-03	0.8500	2.806E+11
Cs-137	2.1049E+01	9.31	9.31	9.31	0.00E+00	1.96E+02	1.96E+02	1.2500	1.961E+13
Eu-154	1.2500E+00	9.31	9.31	9.31	0.00E+00	1.16E+01	1.16E+01	1.7500	8.675E+09
Eu-155	6.8986E-02	9.31	9.31	9.31	0.00E+00	6.42E-01	6.42E-01	2.2500	1.028E+08
Fe-55	2.9308E-01	9.31	9.31	9.31	0.00E+00	2.73E+00	2.73E+00	2.7500	2.898E+07
H-3	2.4311E-01	9.31	9.31	9.31	0.00E+00	2.26E+00	2.26E+00	3.5000	2.319E+04
I-129	1.0618E-05	9.31	9.31	9.31	0.00E+00	9.89E-05	9.89E-05	5.0000	9.850E+03
Kr-85	5.9882E-01	9.31	9.31	9.31	0.00E+00	5.58E+00	5.58E+00	7.0000	1.128E+03
Np-237	1.5668E-04	9.31	9.31	9.31	0.00E+00	1.46E-03	1.46E-03	11.0000	1.291E+02
Pa-231	2.8656E-06	9.31	9.31	9.31	0.00E+00	2.67E-05	2.67E-05		
Pb-210	2.3918E-08	9.31	9.31	9.31	0.00E+00	2.23E-07	2.23E-07		
Pm-147	1.6900E-02	9.31	9.31	9.31	0.00E+00	1.57E-01	1.57E-01		
Pu-238	-8.6120E-01	9.31	0.00	0.00	2.52E+00	0.00E+00	2.52E+00		
Pu-239	-4.8440E-02	9.31	0.00	0.00	3.05E-01	0.00E+00	3.05E-01		
Pu-240	-3.0095E-01	9.31	0.00	0.00	3.89E-01	0.00E+00	3.89E-01		
Pu-241	-1.0411E+02	9.31	0.00	0.00	1.00E+02	0.00E+00	1.00E+02		
Pu-242	-1.1381E-04	9.31	0.00	0.00	1.68E-03	6.25E-04	1.68E-03		
Ra-226	6.4400E-08	9.31	9.31	9.31	0.00E+00	6.00E-07	6.00E-07		
Ra-228	5.9952E-07	9.31	9.31	9.31	0.00E+00	5.58E-06	5.58E-06		
Ru-106	8.5526E-07	9.31	9.31	9.31	0.00E+00	7.97E-06	7.97E-06		
Se-79	1.9181E-04	9.31	9.31	9.31	0.00E+00	1.79E-03	1.79E-03		
Sn-126	1.6671E-04	9.31	9.31	9.31	0.00E+00	1.55E-03	1.55E-03		
Sr-90	1.9799E+01	9.31	9.31	9.31	0.00E+00	1.84E+02	1.84E+02		
Tc-99	6.7678E-03	9.31	9.31	9.31	0.00E+00	6.30E-02	6.30E-02		
Th-229	1.7488E-06	9.31	9.31	9.31	0.00E+00	1.63E-05	1.63E-05		
Th-230	5.8704E-06	9.31	9.31	9.31	0.00E+00	5.47E-05	5.47E-05		
Th-232	6.0208E-07	9.31	9.31	9.31	0.00E+00	5.61E-06	5.61E-06		
Th-208	8.7573E-05	9.31	9.31	9.31	0.00E+00	8.16E-04	8.16E-04		
U-232	2.3706E-04	9.31	9.31	9.31	0.00E+00	2.21E-03	2.21E-03		
U-233	3.6128E-04	9.31	9.31	9.31	0.00E+00	3.36E-03	3.36E-03		
U-234	1.2788E-02	9.31	9.31	9.31	0.00E+00	1.19E-01	1.19E-01		
U-235	5.7486E-04	9.31	9.31	9.31	8.43E-06	5.36E-03	5.36E-03		
U-236	2.3485E-04	9.31	9.31	9.31	0.00E+00	2.19E-03	2.19E-03		
U-238	1.1581E-04	9.31	9.31	9.31	1.05E-06	1.08E-03	1.08E-03		
Y-90	1.9804E+01	9.31	9.31	9.31	0.00E+00	1.84E+02	1.84E+02		
Other Radionuclides						5.74E+02	5.74E+02		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal		9.31	Nominal burnup set equal to bounding burnup
Bounding		9.31	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		

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel
²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information
 Fuel Name: PNL MOX FUEL 7055
 SNF ID #: 416
 Fuel Units & Descr: 12 - SCRAP
 Heavy Metal Mass: BOL = , EOL=0.058kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1988
 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"x15"
 0.68

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	2.3072E-06	54.74	54.74	0.00E+00	1.26E-04	1.26E-04		
Am-241	8.4448E+00	54.74	54.74	0.00E+00	4.62E+02	4.62E+02	0.0150	6.708E+13
Am-242m	1.6848E-02	54.74	54.74	0.00E+00	9.22E-01	9.22E-01	0.0250	1.335E+13
Am-243	1.6320E-02	54.74	54.74	0.00E+00	8.93E-01	8.93E-01	0.0375	1.166E+13
C-14	1.2090E-01	54.74	54.74	0.00E+00	6.62E+00	6.62E+00	0.0575	1.835E+13
Cl-36	2.2849E-03	54.74	54.74	0.00E+00	1.25E-01	1.25E-01	0.0850	7.161E+12
Cm-243	8.6624E-04	54.74	54.74	0.00E+00	4.74E-02	4.74E-02	0.1250	5.613E+12
Cm-244	1.6848E-01	54.74	54.74	0.00E+00	9.22E+00	9.22E+00	0.2250	6.204E+12
Co-60	2.8086E+01	54.74	54.74	0.00E+00	1.54E+03	1.54E+03	0.3750	2.653E+12
Cs-134	3.4148E-04	54.74	54.74	0.00E+00	1.87E-02	1.87E-02	0.5750	4.315E+13
Cs-135	4.3976E-04	54.74	54.74	0.00E+00	2.41E-02	2.41E-02	0.8500	1.649E+12
Cs-137	2.1049E+01	54.74	54.74	0.00E+00	1.15E+03	1.15E+03	1.2500	1.153E+14
Eu-154	1.2500E+00	54.74	54.74	0.00E+00	6.84E+01	6.84E+01	1.7500	5.099E+10
Eu-155	6.8986E-02	54.74	54.74	0.00E+00	3.78E+00	3.78E+00	2.2500	6.044E+08
Fe-55	2.9308E-01	54.74	54.74	0.00E+00	1.60E+01	1.60E+01	2.7500	1.703E+08
H-3	2.4311E-01	54.74	54.74	0.00E+00	1.33E+01	1.33E+01	3.5000	1.363E+05
I-129	1.0618E-05	54.74	54.74	0.00E+00	5.81E-04	5.81E-04	5.0000	5.789E+04
Kr-85	5.9882E-01	54.74	54.74	0.00E+00	3.28E+01	3.28E+01	7.0000	6.630E+03
Np-237	1.5668E-04	54.74	54.74	0.00E+00	8.58E-03	8.58E-03	11.0000	7.586E+02
Pa-231	2.8656E-06	54.74	54.74	0.00E+00	1.57E-04	1.57E-04		
Pb-210	2.3918E-08	54.74	54.74	0.00E+00	1.31E-06	1.31E-06		
Pm-147	1.6900E-02	54.74	54.74	0.00E+00	9.25E-01	9.25E-01		
Pu-238	-8.6120E-01	54.74	0.00	1.48E+01	0.00E+00	1.48E+01		
Pu-239	-4.8440E-02	54.74	0.00	1.79E+00	0.00E+00	1.79E+00		
Pu-240	-3.0095E-01	54.74	0.00	2.29E+00	0.00E+00	2.29E+00		
Pu-241	-1.0411E+02	54.74	0.00	5.89E+02	0.00E+00	5.89E+02		
Pu-242	-1.1381E-04	54.74	0.00	9.90E-03	3.67E-03	9.90E-03		
Ra-226	6.4400E-08	54.74	54.74	0.00E+00	3.53E-06	3.53E-06		
Ra-228	5.9952E-07	54.74	54.74	0.00E+00	3.28E-05	3.28E-05		
Ru-106	8.5526E-07	54.74	54.74	0.00E+00	4.68E-05	4.68E-05		
Se-79	1.9181E-04	54.74	54.74	0.00E+00	1.05E-02	1.05E-02		
Sn-126	1.6671E-04	54.74	54.74	0.00E+00	9.13E-03	9.13E-03		
Sr-90	1.9799E+01	54.74	54.74	0.00E+00	1.08E+03	1.08E+03		
Tc-99	6.7678E-03	54.74	54.74	0.00E+00	3.70E-01	3.70E-01		
Th-229	1.7488E-06	54.74	54.74	0.00E+00	9.57E-05	9.57E-05		
Th-230	5.8704E-06	54.74	54.74	0.00E+00	3.21E-04	3.21E-04		
Th-232	6.0208E-07	54.74	54.74	0.00E+00	3.30E-05	3.30E-05		
Tl-208	8.7573E-05	54.74	54.74	0.00E+00	4.79E-03	4.79E-03		
U-232	2.3706E-04	54.74	54.74	0.00E+00	1.30E-02	1.30E-02		
U-233	3.6128E-04	54.74	54.74	0.00E+00	1.98E-02	1.98E-02		
U-234	1.2788E-02	54.74	54.74	0.00E+00	7.00E-01	7.00E-01		
U-235	5.7486E-04	54.74	54.74	4.96E-05	3.15E-02	3.15E-02		
U-236	2.3485E-04	54.74	54.74	0.00E+00	1.29E-02	1.29E-02		
U-238	1.1581E-04	54.74	54.74	6.17E-06	6.35E-03	6.35E-03		
Y-90	1.9804E+01	54.74	54.74	0.00E+00	1.08E+03	1.08E+03		
Other Radionuclides					3.38E+03	3.38E+03		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
Bounding		54.74	Nominal burnup set equal to bounding burnup
		54.74	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: 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: 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"x15"
 0.29

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	2,318.86	2,318.86	0.00E+00	5.35E-03	5.35E-03	Avg MeV	
Am-241	8.4448E+00	2,318.86	2,318.86	0.00E+00	1.96E+04	1.96E+04	0.0150	2.842E+15
Am-242m	1.6848E-02	2,318.86	2,318.86	0.00E+00	3.91E+01	3.91E+01	0.0250	5.655E+14
Am-243	1.6320E-02	2,318.86	2,318.86	0.00E+00	3.78E+01	3.78E+01	0.0375	4.939E+14
C-14	1.2090E-01	2,318.86	2,318.86	0.00E+00	2.80E+02	2.80E+02	0.0575	7.772E+14
Cl-36	2.2849E-03	2,318.86	2,318.86	0.00E+00	5.30E+00	5.30E+00	0.0850	3.034E+14
Cm-243	8.6624E-04	2,318.86	2,318.86	0.00E+00	2.01E+00	2.01E+00	0.1250	2.378E+14
Cm-244	1.6848E-01	2,318.86	2,318.86	0.00E+00	3.91E+02	3.91E+02	0.2250	2.628E+14
Co-60	2.8086E+01	2,318.86	2,318.86	0.00E+00	6.51E+04	6.51E+04	0.3750	1.124E+14
Cs-134	3.4148E-04	2,318.86	2,318.86	0.00E+00	7.92E-01	7.92E-01	0.5750	1.828E+15
Cs-135	4.3976E-04	2,318.86	2,318.86	0.00E+00	1.02E+00	1.02E+00	0.8500	6.985E+13
Cs-137	2.1049E+01	2,318.86	2,318.86	0.00E+00	4.88E+04	4.88E+04	1.2500	4.883E+15
Eu-154	1.2500E+00	2,318.86	2,318.86	0.00E+00	2.90E+03	2.90E+03	1.7500	2.160E+12
Eu-155	6.8986E-02	2,318.86	2,318.86	0.00E+00	1.60E+02	1.60E+02	2.2500	2.561E+10
Fe-55	2.9308E-01	2,318.86	2,318.86	0.00E+00	6.80E+02	6.80E+02	2.7500	7.216E+09
H-3	2.4311E-01	2,318.86	2,318.86	0.00E+00	5.64E+02	5.64E+02	3.5000	5.775E+06
I-129	1.0618E-05	2,318.86	2,318.86	0.00E+00	2.46E-02	2.46E-02	5.0000	2.452E+06
Kr-85	5.9882E-01	2,318.86	2,318.86	0.00E+00	1.39E+03	1.39E+03	7.0000	2.808E+05
Np-237	1.5668E-04	2,318.86	2,318.86	0.00E+00	3.63E-01	3.63E-01	11.0000	3.214E+04
Pa-231	2.8656E-06	2,318.86	2,318.86	0.00E+00	6.64E-03	6.64E-03		
Pb-210	2.3918E-08	2,318.86	2,318.86	0.00E+00	5.55E-05	5.55E-05		
Pm-147	1.6900E-02	2,318.86	2,318.86	0.00E+00	3.92E+01	3.92E+01		
Pu-238	-8.6120E-01	2,318.86	0.00	6.27E+02	0.00E+00	6.27E+02		
Pu-239	-4.8440E-02	2,318.86	0.00	7.59E+01	0.00E+00	7.59E+01		
Pu-240	-3.0095E-01	2,318.86	0.00	9.69E+01	0.00E+00	9.69E+01		
Pu-241	-1.0411E+02	2,318.86	0.00	2.49E+04	0.00E+00	2.49E+04		
Pu-242	-1.1381E-04	2,318.86	0.00	4.19E-01	1.56E-01	4.19E-01		
Ra-226	6.4400E-08	2,318.86	2,318.86	0.00E+00	1.49E-04	1.49E-04		
Ra-228	5.9952E-07	2,318.86	2,318.86	0.00E+00	1.39E-03	1.39E-03		
Ru-106	8.5526E-07	2,318.86	2,318.86	0.00E+00	1.98E-03	1.98E-03		
Sr-90	1.9181E-04	2,318.86	2,318.86	0.00E+00	4.45E-01	4.45E-01		
Sn-126	1.6671E-04	2,318.86	2,318.86	0.00E+00	3.87E-01	3.87E-01		
Sr-90	1.9799E+01	2,318.86	2,318.86	0.00E+00	4.59E+04	4.59E+04		
Tc-99	6.7678E-03	2,318.86	2,318.86	0.00E+00	1.57E+01	1.57E+01		
Th-229	1.7488E-06	2,318.86	2,318.86	0.00E+00	4.06E-03	4.06E-03		
Th-230	5.8704E-06	2,318.86	2,318.86	0.00E+00	1.36E-02	1.36E-02		
Th-232	6.0208E-07	2,318.86	2,318.86	0.00E+00	1.40E-03	1.40E-03		
Th-208	8.7573E-05	2,318.86	2,318.86	0.00E+00	2.03E-01	2.03E-01		
U-232	2.3706E-04	2,318.86	2,318.86	0.00E+00	5.50E-01	5.50E-01		
U-233	3.6128E-04	2,318.86	2,318.86	0.00E+00	8.38E-01	8.38E-01		
U-234	1.2788E-02	2,318.86	2,318.86	0.00E+00	2.97E+01	2.97E+01		
U-235	5.7486E-04	2,318.86	2,318.86	2.10E-03	1.34E+00	1.34E+00		
U-236	2.3485E-04	2,318.86	2,318.86	0.00E+00	5.45E-01	5.45E-01		
U-238	1.1581E-04	2,318.86	2,318.86	2.61E-04	2.69E-01	2.69E-01		
Y-90	1.9804E+01	2,318.86	2,318.86	0.00E+00	4.59E+04	4.59E+04		
Other Radionuclides					1.43E+05	1.43E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.29E+03	2.31E+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	(Worst Case)	This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding	UNKNOWN	SST/Inconel	
BOL HM Constituents	Pu and U	U, Th, & Pu	
BOL Enrichment %		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		2,318.86	Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding		2,318.86	

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 PELLETS 7057
 SNF ID #: 418
 Fuel Units & Descr: 1 - SCRAP
 Heavy Metal Mass: BOL= , EOL=0.647kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1988
 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"x15"
 0.07

II. Estimates	m	x _a	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 Actvty (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	2.3072E-06	614.88	614.88	0.00E+00	1.42E-03	1.42E-03	Avg MeV	
Am-241	8.4448E+00	614.88	614.88	0.00E+00	5.19E+03	5.19E+03	0.0150	7.535E+14
Am-242m	1.6848E-02	614.88	614.88	0.00E+00	1.04E+01	1.04E+01	0.0250	1.499E+14
Am-243	1.6320E-02	614.88	614.88	0.00E+00	1.00E+01	1.00E+01	0.0375	1.310E+14
C-14	1.2090E-01	614.88	614.88	0.00E+00	7.43E+01	7.43E+01	0.0575	2.061E+14
Cf-254	2.2849E-03	614.88	614.88	0.00E+00	1.40E+00	1.40E+00	0.0850	8.044E+13
Cm-243	8.6624E-04	614.88	614.88	0.00E+00	5.33E-01	5.33E-01	0.1250	6.305E+13
Cm-244	1.6848E-01	614.88	614.88	0.00E+00	1.04E+02	1.04E+02	0.2250	6.969E+13
Co-60	2.8086E+01	614.88	614.88	0.00E+00	1.73E+04	1.73E+04	0.3750	2.981E+13
Cs-134	3.4148E-04	614.88	614.88	0.00E+00	2.10E-01	2.10E-01	0.5750	4.847E+14
Cs-135	4.3976E-04	614.88	614.88	0.00E+00	2.70E-01	2.70E-01	0.8500	1.852E+13
Cs-137	2.1049E+01	614.88	614.88	0.00E+00	1.29E+04	1.29E+04	1.2500	1.295E+15
Eu-154	1.2500E+00	614.88	614.88	0.00E+00	7.69E+02	7.69E+02	1.7500	5.727E+11
Eu-155	6.8986E-02	614.88	614.88	0.00E+00	4.24E+01	4.24E+01	2.2500	6.790E+09
Fe-55	2.9308E-01	614.88	614.88	0.00E+00	1.80E+02	1.80E+02	2.7500	1.913E+09
H-3	2.4311E-01	614.88	614.88	0.00E+00	1.49E+02	1.49E+02	3.5000	1.531E+06
I-129	1.0618E-05	614.88	614.88	0.00E+00	6.53E-03	6.53E-03	5.0000	6.503E+05
Kr-85	5.9882E-01	614.88	614.88	0.00E+00	3.68E+02	3.68E+02	7.0000	7.447E+04
Np-237	1.5668E-04	614.88	614.88	0.00E+00	9.63E-02	9.63E-02	11.0000	8.521E+03
Pa-231	2.8656E-06	614.88	614.88	0.00E+00	1.76E-03	1.76E-03		
Pb-210	2.3918E-08	614.88	614.88	0.00E+00	1.47E-05	1.47E-05		
Pm-147	1.6900E-02	614.88	614.88	0.00E+00	1.04E+01	1.04E+01		
Pu-238	-8.6120E-01	614.88	0.00	1.66E+02	0.00E+00	1.66E+02		
Pu-239	-4.8440E-02	614.88	0.00	2.01E+01	0.00E+00	2.01E+01		
Pu-240	-3.0095E-01	614.88	0.00	2.57E+01	0.00E+00	2.57E+01		
Pu-241	-1.0411E+02	614.88	0.00	6.61E+03	0.00E+00	6.61E+03		
Pu-242	-1.1381E-04	614.88	0.00	1.11E-01	4.12E-02	1.11E-01		
Ra-226	6.4400E-08	614.88	614.88	0.00E+00	3.96E-05	3.96E-05		
Ra-228	5.9952E-07	614.88	614.88	0.00E+00	3.69E-04	3.69E-04		
Ru-106	8.5526E-07	614.88	614.88	0.00E+00	5.26E-04	5.26E-04		
Se-79	1.9181E-04	614.88	614.88	0.00E+00	1.18E-01	1.18E-01		
Sn-126	1.6671E-04	614.88	614.88	0.00E+00	1.03E-01	1.03E-01		
Sr-90	1.9799E+01	614.88	614.88	0.00E+00	1.22E+04	1.22E+04		
Tc-99	6.7678E-03	614.88	614.88	0.00E+00	4.16E+00	4.16E+00		
Th-229	1.7488E-06	614.88	614.88	0.00E+00	1.08E-03	1.08E-03		
Th-230	5.8704E-06	614.88	614.88	0.00E+00	3.61E-03	3.61E-03		
Th-232	6.0208E-07	614.88	614.88	0.00E+00	3.70E-04	3.70E-04		
Tl-208	8.7573E-05	614.88	614.88	0.00E+00	5.38E-02	5.38E-02		
U-232	2.3706E-04	614.88	614.88	0.00E+00	1.46E-01	1.46E-01		
U-233	3.6128E-04	614.88	614.88	0.00E+00	2.22E-01	2.22E-01		
U-234	1.2788E-02	614.88	614.88	0.00E+00	7.86E+00	7.86E+00		
U-235	5.7486E-04	614.88	614.88	5.57E-04	3.54E-01	3.54E-01		
U-236	2.3485E-04	614.88	614.88	0.00E+00	1.44E-01	1.44E-01		
U-238	1.1581E-04	614.88	614.88	6.93E-05	7.13E-02	7.13E-02		
Y-90	1.9804E+01	614.88	614.88	0.00E+00	1.22E+04	1.22E+04		
Other Radionuclides					3.79E+04	3.79E+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	(Worst Case)	This fuel didn't closely match any existing templates, therefore the worst case template was used.
BOL HM Constituents	UNKNOWN	SST/Inconel	
BOL Enrichment %	Pu and U	U, Th, & Pu	
		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		614.88	Nominal burnup set equal to bounding burnup
Bounding		614.88	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		

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=0.005kg
 ROD Storage Site INEEL

¹Fuel decay start date 1988
 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"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	2.3072E-06	4.75	4.75	0.00E+00	1.10E-05	1.10E-05		
Am-241	8.4448E+00	4.75	4.75	0.00E+00	4.01E+01	4.01E+01	0.0150	5.823E+12
Am-242m	1.6848E-02	4.75	4.75	0.00E+00	8.01E-02	8.01E-02	0.0250	1.159E+12
Am-243	1.6320E-02	4.75	4.75	0.00E+00	7.75E-02	7.75E-02	0.0375	1.012E+12
C-14	1.2090E-01	4.75	4.75	0.00E+00	5.74E-01	5.74E-01	0.0575	1.593E+12
Cl-36	2.2849E-03	4.75	4.75	0.00E+00	1.09E-02	1.09E-02	0.0850	6.216E+11
Cm-243	8.6624E-04	4.75	4.75	0.00E+00	4.12E-03	4.12E-03	0.1250	4.872E+11
Cm-244	1.6848E-01	4.75	4.75	0.00E+00	8.01E-01	8.01E-01	0.2250	5.385E+11
Co-60	2.8086E+01	4.75	4.75	0.00E+00	1.33E+02	1.33E+02	0.3750	2.303E+11
Cs-134	3.4148E-04	4.75	4.75	0.00E+00	1.62E-03	1.62E-03	0.5750	3.746E+12
Cs-135	4.3976E-04	4.75	4.75	0.00E+00	2.09E-03	2.09E-03	0.8500	1.431E+11
Cs-137	2.1049E+01	4.75	4.75	0.00E+00	1.00E+02	1.00E+02	1.2500	1.001E+13
Eu-154	1.2500E+00	4.75	4.75	0.00E+00	5.94E+00	5.94E+00	1.7500	4.426E+09
Eu-155	6.8986E-02	4.75	4.75	0.00E+00	3.28E-01	3.28E-01	2.2500	5.247E+07
Fe-55	2.9308E-01	4.75	4.75	0.00E+00	1.39E+00	1.39E+00	2.7500	1.479E+07
H-3	2.4311E-01	4.75	4.75	0.00E+00	1.16E+00	1.16E+00	3.5000	1.183E+04
I-129	1.0618E-05	4.75	4.75	0.00E+00	5.05E-05	5.05E-05	5.0000	5.026E+03
Kr-85	5.9882E-01	4.75	4.75	0.00E+00	2.85E+00	2.85E+00	7.0000	5.755E+02
Np-237	1.5668E-04	4.75	4.75	0.00E+00	7.45E-04	7.45E-04	11.0000	6.585E+01
Pa-231	2.8656E-06	4.75	4.75	0.00E+00	1.36E-05	1.36E-05		
Pb-210	2.3918E-08	4.75	4.75	0.00E+00	1.14E-07	1.14E-07		
Pm-147	1.6900E-02	4.75	4.75	0.00E+00	8.03E-02	8.03E-02		
Pu-238	-8.6120E-01	4.75	0.00	1.29E+00	0.00E+00	1.29E+00		
Pu-239	-4.8440E-02	4.75	0.00	1.55E-01	0.00E+00	1.55E-01		
Pu-240	-3.0095E-01	4.75	0.00	1.99E-01	0.00E+00	1.99E-01		
Pu-241	-1.0411E+02	4.75	0.00	5.11E+01	0.00E+00	5.11E+01		
Pu-242	-1.1381E-04	4.75	0.00	8.60E-04	3.19E-04	8.60E-04		
Ra-226	6.4400E-08	4.75	4.75	0.00E+00	3.06E-07	3.06E-07		
Ra-228	5.9952E-07	4.75	4.75	0.00E+00	2.85E-06	2.85E-06		
Ru-106	8.5526E-07	4.75	4.75	0.00E+00	4.06E-06	4.06E-06		
Se-79	1.9181E-04	4.75	4.75	0.00E+00	9.11E-04	9.11E-04		
Sn-126	1.6671E-04	4.75	4.75	0.00E+00	7.92E-04	7.92E-04		
Sr-90	1.9799E+01	4.75	4.75	0.00E+00	9.41E+01	9.41E+01		
Tc-99	6.7678E-03	4.75	4.75	0.00E+00	3.22E-02	3.22E-02		
Th-229	1.7488E-06	4.75	4.75	0.00E+00	8.31E-06	8.31E-06		
Th-230	5.8704E-06	4.75	4.75	0.00E+00	2.79E-05	2.79E-05		
Th-232	6.0208E-07	4.75	4.75	0.00E+00	2.86E-06	2.86E-06		
Ti-208	8.7573E-05	4.75	4.75	0.00E+00	4.16E-04	4.16E-04		
U-232	2.3706E-04	4.75	4.75	0.00E+00	1.13E-03	1.13E-03		
U-233	3.6128E-04	4.75	4.75	0.00E+00	1.72E-03	1.72E-03		
U-234	1.2788E-02	4.75	4.75	0.00E+00	6.08E-02	6.08E-02		
U-235	5.7486E-04	4.75	4.75	4.30E-06	2.74E-03	2.74E-03		
U-236	2.3485E-04	4.75	4.75	0.00E+00	1.12E-03	1.12E-03		
U-238	1.1581E-04	4.75	4.75	5.35E-07	5.51E-04	5.51E-04		
Y-90	1.9804E+01	4.75	4.75	0.00E+00	9.41E+01	9.41E+01		
Other Radionuclides					2.93E+02	2.93E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.68E+00	4.74E+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	(Worst Case)	This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding	UNKNOWN	SST/Inconel	
BOL HM Constituents	Pu and U	U, Th, & Pu	
BOL Enrichment %		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		4.75	Nominal burnup set equal to bounding burnup
Bounding		4.75	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=0.055kg
 ROD Storage Site* INEEL

*Fuel decay start date: 1984
 Estimates as of: 2030
 Template: (Worst Case)
 **Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x15"
 0.07

II. Estimates							Gamma Sources	
Radionuclide	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventones(Ci)	Bounding Fuel Inventones(Ci)	Avg MeV		
Ac-227	2.3072E-06	52.27	52.27	0.00E+00	1.21E-04	1.21E-04		
Am-241	8.4448E+00	52.27	52.27	0.00E+00	4.41E+02	4.41E+02	0.0150	6.405E+13
Am-242m	1.6848E-02	52.27	52.27	0.00E+00	8.81E-01	8.81E-01	0.0250	1.275E+13
Am-243	1.6320E-02	52.27	52.27	0.00E+00	8.53E-01	8.53E-01	0.0375	1.113E+13
C-14	1.2090E-01	52.27	52.27	0.00E+00	6.32E+00	6.32E+00	0.0575	1.752E+13
Cl-36	2.2849E-03	52.27	52.27	0.00E+00	1.19E-01	1.19E-01	0.0850	6.838E+12
Cm-243	8.6624E-04	52.27	52.27	0.00E+00	4.53E-02	4.53E-02	0.1250	5.359E+12
Cm-244	1.6848E-01	52.27	52.27	0.00E+00	8.81E+00	8.81E+00	0.2250	5.924E+12
Co-60	2.8086E+01	52.27	52.27	0.00E+00	1.47E+03	1.47E+03	0.3750	2.534E+12
Cs-134	3.4148E-04	52.27	52.27	0.00E+00	1.78E-02	1.78E-02	0.5750	4.120E+13
Cs-135	4.3976E-04	52.27	52.27	0.00E+00	2.30E-02	2.30E-02	0.8500	1.575E+12
Cs-137	2.1049E+01	52.27	52.27	0.00E+00	1.10E+03	1.10E+03	1.2500	1.101E+14
Eu-154	1.2500E+00	52.27	52.27	0.00E+00	6.53E+01	6.53E+01	1.7500	4.869E+10
Eu-155	6.8986E-02	52.27	52.27	0.00E+00	3.61E+00	3.61E+00	2.2500	5.772E+08
Fe-55	2.9308E-01	52.27	52.27	0.00E+00	1.53E+01	1.53E+01	2.7500	1.627E+08
H-3	2.4311E-01	52.27	52.27	0.00E+00	1.27E+01	1.27E+01	3.5000	1.302E+05
I-129	1.0618E-05	52.27	52.27	0.00E+00	5.55E-04	5.55E-04	5.0000	5.528E+04
Kr-85	5.9882E-01	52.27	52.27	0.00E+00	3.13E+01	3.13E+01	7.0000	8.331E+03
Np-237	1.5668E-04	52.27	52.27	0.00E+00	8.19E-03	8.19E-03	11.0000	7.244E+02
Pa-231	2.8656E-06	52.27	52.27	0.00E+00	1.50E-04	1.50E-04		
Pb-210	2.3918E-08	52.27	52.27	0.00E+00	1.25E-06	1.25E-06		
Pm-147	1.6900E-02	52.27	52.27	0.00E+00	8.83E-01	8.83E-01		
Pu-238	-8.6120E-01	52.27	0.00	1.41E+01	0.00E+00	1.41E+01		
Pu-239	-4.8440E-02	52.27	0.00	1.71E+00	0.00E+00	1.71E+00		
Pu-240	-3.0095E-01	52.27	0.00	2.18E+00	0.00E+00	2.18E+00		
Pu-241	-1.0411E+02	52.27	0.00	5.62E+02	0.00E+00	5.62E+02		
Pu-242	-1.1381E-04	52.27	0.00	9.45E-03	3.51E-03	9.45E-03		
Ra-226	6.4400E-08	52.27	52.27	0.00E+00	3.37E-06	3.37E-06		
Ra-228	5.9952E-07	52.27	52.27	0.00E+00	3.13E-05	3.13E-05		
Ru-106	8.5526E-07	52.27	52.27	0.00E+00	4.47E-05	4.47E-05		
Se-79	1.9181E-04	52.27	52.27	0.00E+00	1.00E-02	1.00E-02		
Sn-126	1.6671E-04	52.27	52.27	0.00E+00	8.71E-03	8.71E-03		
Sr-90	1.9799E+01	52.27	52.27	0.00E+00	1.03E+03	1.03E+03		
Tc-99	6.7678E-03	52.27	52.27	0.00E+00	3.54E-01	3.54E-01		
Th-229	1.7488E-06	52.27	52.27	0.00E+00	9.14E-05	9.14E-05		
Th-230	5.8704E-06	52.27	52.27	0.00E+00	3.07E-04	3.07E-04		
Th-232	6.0208E-07	52.27	52.27	0.00E+00	3.15E-05	3.15E-05		
Tl-208	8.7573E-05	52.27	52.27	0.00E+00	4.58E-03	4.58E-03		
U-232	2.3706E-04	52.27	52.27	0.00E+00	1.24E-02	1.24E-02		
U-233	3.6128E-04	52.27	52.27	0.00E+00	1.89E-02	1.89E-02		
U-234	1.2788E-02	52.27	52.27	0.00E+00	6.68E-01	6.68E-01		
U-235	5.7486E-04	52.27	52.27	4.73E-05	3.01E-02	3.01E-02		
U-236	2.3485E-04	52.27	52.27	0.00E+00	1.23E-02	1.23E-02		
U-238	1.1581E-04	52.27	52.27	5.89E-06	6.06E-03	6.06E-03		
Y-90	1.9804E+01	52.27	52.27	0.00E+00	1.04E+03	1.04E+03		
Other Radionuclides					3.22E+03	3.22E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
Fuel Cladding <td>LIGHT WATER</td> <td>(Worst Case)</td> <td rowspan="4">This fuel didn't closely match any existing templates, therefore the worst case template was used</td>	LIGHT WATER	(Worst Case)	This fuel didn't closely match any existing templates, therefore the worst case template was used
BOL HM Constituents <td>SST</td> <td>SST/Inconel</td>	SST	SST/Inconel	
BOL Enrichment % <td>Pu and U</td> <td>U, Th, & Pu</td>	Pu and U	U, Th, & Pu	
		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		52.27	Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL
Bounding		52.27	

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 4
 SNF ID #: 434
 Fuel Units & Descr: 1 - SCRAP
 Heavy Metal Mass BOL= , EOL=0.06kg
 ROD Storage Site INEEL

¹Fuel decay start date 1984
 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"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	2.3072E-06	57.02	57.02	0.00E+00	1.32E-04	1.32E-04	Avg MeV	
Am-241	8.4448E+00	57.02	57.02	0.00E+00	4.82E+02	4.82E+02	0.0150	6.987E+13
Am-242m	1.6848E-02	57.02	57.02	0.00E+00	9.61E-01	9.61E-01	0.0250	1.390E+13
Am-243	1.6320E-02	57.02	57.02	0.00E+00	9.31E-01	9.31E-01	0.0375	1.215E+13
C-14	1.2090E-01	57.02	57.02	0.00E+00	6.89E+00	6.89E+00	0.0575	1.911E+13
Cf-252	2.2849E-03	57.02	57.02	0.00E+00	1.30E-01	1.30E-01	0.0850	7.460E+12
Cm-243	8.6624E-04	57.02	57.02	0.00E+00	4.94E-02	4.94E-02	0.1250	5.847E+12
Cm-244	1.6848E-01	57.02	57.02	0.00E+00	9.61E+00	9.61E+00	0.2250	6.462E+12
Co-60	2.8086E+01	57.02	57.02	0.00E+00	1.60E+03	1.60E+03	0.3750	2.764E+12
Cs-134	3.4148E-04	57.02	57.02	0.00E+00	1.95E-02	1.95E-02	0.5750	4.495E+13
Cs-135	4.3976E-04	57.02	57.02	0.00E+00	2.51E-02	2.51E-02	0.8500	1.718E+12
Cs-137	2.1049E+01	57.02	57.02	0.00E+00	1.20E+03	1.20E+03	1.2500	1.201E+14
Eu-154	1.2500E+00	57.02	57.02	0.00E+00	7.13E+01	7.13E+01	1.7500	5.311E+10
Eu-155	6.8986E-02	57.02	57.02	0.00E+00	3.93E+00	3.93E+00	2.2500	6.296E+08
Fe-55	2.9308E-01	57.02	57.02	0.00E+00	1.67E+01	1.67E+01	2.7500	1.774E+08
H-3	2.4311E-01	57.02	57.02	0.00E+00	1.39E+01	1.39E+01	3.5000	1.420E+05
I-129	1.0618E-05	57.02	57.02	0.00E+00	6.05E-04	6.05E-04	5.0000	6.031E+04
Kr-85	5.9882E-01	57.02	57.02	0.00E+00	3.41E+01	3.41E+01	7.0000	6.906E+03
Np-237	1.5668E-04	57.02	57.02	0.00E+00	8.93E-03	8.93E-03	11.0000	7.902E+02
Pa-231	2.8656E-06	57.02	57.02	0.00E+00	1.63E-04	1.63E-04		
Pb-210	2.3918E-08	57.02	57.02	0.00E+00	1.36E-06	1.36E-06		
Pm-147	1.6900E-02	57.02	57.02	0.00E+00	9.64E-01	9.64E-01		
Pu-238	-8.6120E-01	57.02	0.00	1.54E+01	0.00E+00	1.54E+01		
Pu-239	-4.8440E-02	57.02	0.00	1.87E+00	0.00E+00	1.87E+00		
Pu-240	-3.0095E-01	57.02	0.00	2.38E+00	0.00E+00	2.38E+00		
Pu-241	-1.0411E+02	57.02	0.00	6.13E+02	0.00E+00	6.13E+02		
Pu-242	-1.1381E-04	57.02	0.00	1.03E-02	3.82E-03	1.03E-02		
Ra-226	6.4400E-08	57.02	57.02	0.00E+00	3.67E-06	3.67E-06		
Ra-228	5.9952E-07	57.02	57.02	0.00E+00	3.42E-05	3.42E-05		
Ru-106	8.5526E-07	57.02	57.02	0.00E+00	4.88E-05	4.88E-05		
Se-79	1.9181E-04	57.02	57.02	0.00E+00	1.09E-02	1.09E-02		
Sn-126	1.6671E-04	57.02	57.02	0.00E+00	9.51E-03	9.51E-03		
Sr-90	1.9799E+01	57.02	57.02	0.00E+00	1.13E+03	1.13E+03		
Tc-99	6.7678E-03	57.02	57.02	0.00E+00	3.86E-01	3.86E-01		
Th-229	1.7488E-06	57.02	57.02	0.00E+00	9.97E-05	9.97E-05		
Th-230	5.8704E-06	57.02	57.02	0.00E+00	3.35E-04	3.35E-04		
Th-232	6.0208E-07	57.02	57.02	0.00E+00	3.43E-05	3.43E-05		
Th-208	-8.7573E-05	57.02	57.02	0.00E+00	4.99E-03	4.99E-03		
U-232	2.3706E-04	57.02	57.02	0.00E+00	1.35E-02	1.35E-02		
U-233	3.6128E-04	57.02	57.02	0.00E+00	2.06E-02	2.06E-02		
U-234	1.2788E-02	57.02	57.02	0.00E+00	7.29E-01	7.29E-01	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	5.7486E-04	57.02	57.02	5.16E-05	3.28E-02	3.28E-02	5.62E+01	5.69E+01
U-236	2.3485E-04	57.02	57.02	0.00E+00	1.34E-02	1.34E-02		
U-238	1.1581E-04	57.02	57.02	6.42E-06	6.61E-03	6.61E-03	Total	Total
Y-90	1.9804E+01	57.02	57.02	0.00E+00	1.13E+03	1.13E+03		
Other Radionuclides					3.52E+03	3.52E+03		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		57.02	Nominal burnup set equal to bounding burnup
Bounding:		57.02	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 5
 SNF ID #: 435
 Fuel Units & Descr: 1 - SCRAP
 Heavy Metal Mass: BOL= , EOL=0 139kg
 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"x15"
 0 07

Radionuclide	m		x _a		x _b		b		y _a		y _b		Gamma Sources	
	CvMw/d From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)						
Ac-227	2 3072E-06	132 10	132 10	0 00E+00	3 05E-04	3 05E-04	Avg. MeV							
Am-241	8 4448E+00	132 10	132 10	0 00E+00	1 12E+03	1 12E+03	0 0150	1 619E+14						
Am-242m	1 6848E-02	132 10	132 10	0 00E+00	2 23E+00	2 23E+00	0 0250	3 221E+13						
Am-243	1 6320E-02	132 10	132 10	0 00E+00	2 16E+00	2 16E+00	0 0375	2 814E+13						
C-14	1 2090E-01	132 10	132 10	0 00E+00	1 60E+01	1 60E+01	0 0575	4 428E+13						
Cl-36	2 2849E-03	132 10	132 10	0 00E+00	3 02E-01	3 02E-01	0 0850	1 728E+13						
Cm-243	8 6624E-04	132 10	132 10	0 00E+00	1 14E-01	1 14E-01	0 1250	1 354E+13						
Cm-244	1 6848E-01	132 10	132 10	0 00E+00	2 23E+01	2 23E+01	0 2250	1 497E+13						
Co-60	2 8086E+01	132 10	132 10	0 00E+00	3 71E+03	3 71E+03	0 3750	6 403E+12						
Cs-134	3 4148E-04	132 10	132 10	0 00E+00	4 51E-02	4 51E-02	0 5750	1 041E+14						
Cs-135	4 3976E-04	132 10	132 10	0 00E+00	5 81E-02	5 81E-02	0 8500	3 979E+12						
Cs-137	2 1049E+01	132 10	132 10	0 00E+00	2 78E+03	2 78E+03	1 2500	2 782E+14						
Eu-154	1 2500E+00	132 10	132 10	0 00E+00	1 65E+02	1 65E+02	1 7500	1 230E+11						
Eu-155	6 8986E-02	132 10	132 10	0 00E+00	9 11E+00	9 11E+00	2 2500	1 459E+09						
Fe-55	2 9308E-01	132 10	132 10	0 00E+00	3 87E+01	3 87E+01	2 7500	4 111E+08						
H-3	2 4311E-01	132 10	132 10	0 00E+00	3 21E+01	3 21E+01	3 5000	3 290E+05						
I-129	1 0618E-05	132 10	132 10	0 00E+00	1 40E-03	1 40E-03	5 0000	1 397E+05						
Kr-85	5 9882E-01	132 10	132 10	0 00E+00	7 91E+01	7 91E+01	7 0000	1 600E+04						
Np-237	1 5668E-04	132 10	132 10	0 00E+00	2 07E-02	2 07E-02	11 0000	1 831E+03						
Pa-231	2 8656E-06	132 10	132 10	0 00E+00	3 79E-04	3 79E-04								
Pb-210	2 3918E-08	132 10	132 10	0 00E+00	3 16E-06	3 16E-06								
Pm-147	1 6900E-02	132 10	132 10	0 00E+00	2 23E+00	2 23E+00								
Pu-238	-8 6120E-01	132 10	0 00	3 57E+01	0 00E+00	3 57E+01								
Pu-239	-4 8440E-02	132 10	0 00	4 32E+00	0 00E+00	4 32E+00								
Pu-240	-3 0095E-01	132 10	0 00	5 52E+00	0 00E+00	5 52E+00								
Pu-241	-1 0411E+02	132 10	0 00	1 42E+03	0 00E+00	1 42E+03								
Pu-242	-1 1381E-04	132 10	0 00	2 39E-02	8 86E-03	2 39E-02								
Ra-226	6 4400E-08	132 10	132 10	0 00E+00	8 51E-06	8 51E-06								
Ra-228	5 9952E-07	132 10	132 10	0 00E+00	7 92E-05	7 92E-05								
Ru-106	8 5526E-07	132 10	132 10	0 00E+00	1 13E-04	1 13E-04								
Se-79	1 9181E-04	132 10	132 10	0 00E+00	2 53E-02	2 53E-02								
Sn-126	1 6671E-04	132 10	132 10	0 00E+00	2 20E-02	2 20E-02								
Sr-90	1 9799E+01	132 10	132 10	0 00E+00	2 62E+03	2 62E+03								
Tc-99	6 7678E-03	132 10	132 10	0 00E+00	8 94E-01	8 94E-01								
Th-229	1 7488E-06	132 10	132 10	0 00E+00	2 31E-04	2 31E-04								
Th-230	5 8704E-06	132 10	132 10	0 00E+00	7 75E-04	7 75E-04								
Th-232	6 0208E-07	132 10	132 10	0 00E+00	7 95E-05	7 95E-05								
Th-208	8 7573E-05	132 10	132 10	0 00E+00	1 16E-02	1 16E-02								
U-232	2 3706E-04	132 10	132 10	0 00E+00	3 13E-02	3 13E-02								
U-233	3 6128E-04	132 10	132 10	0 00E+00	4 77E-02	4 77E-02								
U-234	1 2788E-02	132 10	132 10	0 00E+00	1 69E+00	1 69E+00								
U-235	5 7486E-04	132 10	132 10	1 20E-04	7 61E-02	7 61E-02								
U-236	2 3485E-04	132 10	132 10	0 00E+00	3 10E-02	3 10E-02								
U-238	1 1581E-04	132 10	132 10	1 49E-05	1 53E-02	1 53E-02								
Y-90	1 9804E+01	132 10	132 10	0 00E+00	2 62E+03	2 62E+03								
Other Radionuclides					8 15E+03	8 15E+03								

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		132.10	Nominal burnup set equal to bounding burnup
Bounding		132.10	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=0.069kg
 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"x15"
 0.07

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	65.57	65.57	0.00E+00	1.51E-04	1.51E-04	Avg MeV	
Am-241	8.4448E+00	65.57	65.57	0.00E+00	5.54E+02	5.54E+02	0.0150	8.036E+13
Am-242m	1.6848E-02	65.57	65.57	0.00E+00	1.10E+00	1.10E+00	0.0250	1.599E+13
Am-243	1.6320E-02	65.57	65.57	0.00E+00	1.07E+00	1.07E+00	0.0375	1.397E+13
C-14	1.2090E-01	65.57	65.57	0.00E+00	7.93E+00	7.93E+00	0.0575	2.198E+13
Cl-36	2.2849E-03	65.57	65.57	0.00E+00	1.50E-01	1.50E-01	0.0850	8.578E+12
Cm-243	8.6624E-04	65.57	65.57	0.00E+00	5.68E-02	5.68E-02	0.1250	6.724E+12
Cm-244	1.6848E-01	65.57	65.57	0.00E+00	1.10E+01	1.10E+01	0.2250	7.432E+12
Co-60	2.8086E+01	65.57	65.57	0.00E+00	1.84E+03	1.84E+03	0.3750	3.179E+12
Cs-134	3.4148E-04	65.57	65.57	0.00E+00	2.24E-02	2.24E-02	0.5750	5.169E+13
Cs-135	4.3976E-04	65.57	65.57	0.00E+00	2.88E-02	2.88E-02	0.8500	1.975E+14
Cs-137	2.1049E+01	65.57	65.57	0.00E+00	1.38E+03	1.38E+03	1.2500	1.381E+12
Eu-154	1.2500E+00	65.57	65.57	0.00E+00	8.20E+01	8.20E+01	1.7500	6.108E+10
Eu-155	6.8986E-02	65.57	65.57	0.00E+00	4.52E+00	4.52E+00	2.2500	7.241E+08
Fe-55	2.9308E-01	65.57	65.57	0.00E+00	1.92E+01	1.92E+01	2.7500	2.041E+08
H-3	2.4311E-01	65.57	65.57	0.00E+00	1.59E+01	1.59E+01	3.5000	1.633E+05
I-129	1.0618E-05	65.57	65.57	0.00E+00	6.96E-04	6.96E-04	5.0000	6.935E+04
Kr-85	5.9882E-01	65.57	65.57	0.00E+00	3.93E+01	3.93E+01	7.0000	7.942E+03
Np-237	1.5668E-04	65.57	65.57	0.00E+00	1.03E-02	1.03E-02	11.0000	9.087E+02
Pa-231	2.8656E-06	65.57	65.57	0.00E+00	1.88E-04	1.88E-04		
Pb-210	2.3918E-08	65.57	65.57	0.00E+00	1.57E-06	1.57E-06		
Pm-147	1.6900E-02	65.57	65.57	0.00E+00	1.11E+00	1.11E+00		
Pu-238	-8.6120E-01	65.57	0.00	1.77E+01	0.00E+00	1.77E+01		
Pu-239	-4.8440E-02	65.57	0.00	2.15E+00	0.00E+00	2.15E+00		
Pu-240	-3.0095E-01	65.57	0.00	7.05E+02	0.00E+00	7.05E+02		
Pu-241	-1.0411E+02	65.57	0.00	1.19E-02	4.40E-03	1.19E-02		
Pu-242	-1.1381E-04	65.57	65.57	0.00E+00	4.22E-06	4.22E-06		
Ra-226	6.4400E-08	65.57	65.57	0.00E+00	3.93E-05	3.93E-05		
Ra-228	5.9952E-07	65.57	65.57	0.00E+00	5.61E-05	5.61E-05		
Ru-106	8.5526E-07	65.57	65.57	0.00E+00	1.26E-02	1.26E-02		
Se-79	1.9181E-04	65.57	65.57	0.00E+00	1.09E-02	1.09E-02		
Sn-126	1.6671E-04	65.57	65.57	0.00E+00	1.30E+03	1.30E+03		
Sr-90	1.9799E+01	65.57	65.57	0.00E+00	4.44E-01	4.44E-01		
Tc-99	6.7678E-03	65.57	65.57	0.00E+00	1.15E-04	1.15E-04		
Th-229	1.7488E-06	65.57	65.57	0.00E+00	3.85E-04	3.85E-04		
Th-230	5.8704E-06	65.57	65.57	0.00E+00	3.95E-05	3.95E-05		
Th-232	6.0208E-07	65.57	65.57	0.00E+00	5.74E-03	5.74E-03		
Th-208	8.7573E-05	65.57	65.57	0.00E+00	1.55E-02	1.55E-02		
U-232	2.3706E-04	65.57	65.57	0.00E+00	2.37E-02	2.37E-02		
U-233	3.6128E-04	65.57	65.57	0.00E+00	8.39E-01	8.39E-01		
U-234	1.2788E-02	65.57	65.57	5.94E-05	3.78E-02	3.78E-02		
U-235	5.7486E-04	65.57	65.57	0.00E+00	1.54E-02	1.54E-02		
U-236	2.3485E-04	65.57	65.57	7.39E-06	7.60E-03	7.60E-03		
U-238	1.1581E-04	65.57	65.57	0.00E+00	1.30E+03	1.30E+03		
Y-90	1.9804E+01	65.57	65.57	0.00E+00	4.04E+03	4.04E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.46E+01	6.54E+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 (Worst Case)	
Fuel Cladding	SST	SST/Inconel	This fuel didn't closely match any existing templates, therefore the worst case template was used
BOL HM Constituents	Pu and U	U, Th & Pu	
BOL Enrichment %		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		65.57	Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding		65.57	

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 7
 SNF ID #: 422
 Fuel Units & Descr.: 1 - SCRAP
 Heavy Metal Mass: BOL = ; EOL = 0.348kg
 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"x15"
 0.07

II. Estimates

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	2.3072E-06	330.72	330.72	0.00E+00	7.63E-04	7.63E-04		
Am-241	8.4448E+00	330.72	330.72	0.00E+00	2.79E+03	2.79E+03	0.0150	4.053E+14
Am-242m	1.6848E-02	330.72	330.72	0.00E+00	5.57E+00	5.57E+00	0.0250	8.065E+13
Am-243	1.6320E-02	330.72	330.72	0.00E+00	5.40E+00	5.40E+00	0.0375	7.045E+13
C-14	1.2090E-01	330.72	330.72	0.00E+00	4.00E+01	4.00E+01	0.0575	1.105E+14
Cf-252	2.2849E-03	330.72	330.72	0.00E+00	7.56E-01	7.56E-01	0.0850	4.327E+13
Cm-243	8.6624E-04	330.72	330.72	0.00E+00	2.86E-01	2.86E-01	0.1250	3.391E+13
Cm-244	1.6848E-01	330.72	330.72	0.00E+00	5.57E+01	5.57E+01	0.2250	3.748E+13
Co-60	2.8086E+01	330.72	330.72	0.00E+00	9.29E+03	9.29E+03	0.3750	1.603E+13
Cs-134	3.4148E-04	330.72	330.72	0.00E+00	1.13E-01	1.13E-01	0.5750	2.607E+14
Cs-135	4.3976E-04	330.72	330.72	0.00E+00	1.45E-01	1.45E-01	0.8500	9.962E+12
Cs-137	2.1049E+01	330.72	330.72	0.00E+00	6.96E+03	6.96E+03	1.2500	6.964E+14
Eu-154	1.2500E+00	330.72	330.72	0.00E+00	4.13E+02	4.13E+02	1.7500	3.080E+11
Eu-155	6.8986E-02	330.72	330.72	0.00E+00	2.28E+01	2.28E+01	2.2500	3.652E+09
Fe-55	2.9308E-01	330.72	330.72	0.00E+00	9.69E+01	9.69E+01	2.7500	1.029E+09
H-3	2.4311E-01	330.72	330.72	0.00E+00	8.04E+01	8.04E+01	3.5000	8.236E+05
I-129	1.0618E-05	330.72	330.72	0.00E+00	3.51E-03	3.51E-03	5.0000	3.498E+05
Kr-85	5.9882E-01	330.72	330.72	0.00E+00	1.98E+02	1.98E+02	7.0000	4.006E+04
Np-237	1.5668E-04	330.72	330.72	0.00E+00	5.18E-02	5.18E-02	11.0000	4.583E+03
Pa-231	2.8656E-06	330.72	330.72	0.00E+00	9.48E-04	9.48E-04		
Pb-210	2.3918E-08	330.72	330.72	0.00E+00	7.91E-06	7.91E-06		
Pm-147	1.6900E-02	330.72	330.72	0.00E+00	5.59E+00	5.59E+00		
Pu-238	-8.6120E-01	330.72	0.00	8.94E+01	0.00E+00	8.94E+01		
Pu-239	-4.8440E-02	330.72	0.00	1.08E+01	0.00E+00	1.08E+01		
Pu-240	-3.0095E-01	330.72	0.00	1.38E+01	0.00E+00	1.38E+01		
Pu-241	-1.0411E+02	330.72	0.00	3.56E+03	0.00E+00	3.56E+03		
Pu-242	-1.1381E-04	330.72	0.00	5.98E-02	2.22E-02	5.98E-02		
Ra-226	6.4400E-08	330.72	330.72	0.00E+00	2.13E-05	2.13E-05		
Ra-228	5.9952E-07	330.72	330.72	0.00E+00	1.98E-04	1.98E-04		
Ru-106	8.5526E-07	330.72	330.72	0.00E+00	2.83E-04	2.83E-04		
Se-79	1.9181E-04	330.72	330.72	0.00E+00	6.34E-02	6.34E-02		
Sn-126	1.6671E-04	330.72	330.72	0.00E+00	5.51E-02	5.51E-02		
Sr-90	1.9799E+01	330.72	330.72	0.00E+00	6.55E+03	6.55E+03		
Tc-99	6.7678E-03	330.72	330.72	0.00E+00	2.24E+00	2.24E+00		
Th-229	1.7488E-06	330.72	330.72	0.00E+00	5.78E-04	5.78E-04		
Th-230	5.8704E-06	330.72	330.72	0.00E+00	1.94E-03	1.94E-03		
Th-232	6.0208E-07	330.72	330.72	0.00E+00	1.99E-04	1.99E-04		
Tl-208	8.7573E-05	330.72	330.72	0.00E+00	2.90E-02	2.90E-02		
U-232	2.3706E-04	330.72	330.72	0.00E+00	7.84E-02	7.84E-02		
U-233	3.6128E-04	330.72	330.72	0.00E+00	1.19E-01	1.19E-01		
U-234	1.2788E-02	330.72	330.72	0.00E+00	4.23E+00	4.23E+00		
U-235	5.7486E-04	330.72	330.72	2.99E-04	1.90E-01	1.90E-01		
U-236	2.3485E-04	330.72	330.72	0.00E+00	7.77E-02	7.77E-02		
U-238	1.1581E-04	330.72	330.72	3.73E-05	3.83E-02	3.83E-02		
Y-90	1.9804E+01	330.72	330.72	0.00E+00	6.55E+03	6.55E+03		
Other Radionuclides					2.04E+04	2.04E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.26E+02	3.30E+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 fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	SST	SST/Inconel	
BOL HM Constituents:	Pu and U	U, Th, & Pu	
BOL Enrichment %:		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		330.72	Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding		330.72	

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 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 PNL-3
 SNF ID #: 420
 Fuel Units & Descr: 6 - ROD
 Heavy Metal Mass: BOL= ; EOL=0.064kg
 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
 18"x15"
 0.44

Radionuclide	m		x _n		x _b		b		y _n		y _b		Gamma Sources	
	C/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	2.5200E-06	61.01	61.01	61.01	0.00E+00	1.54E-04	1.54E-04							
Am-241	8.6432E+00	61.01	61.01	61.01	0.00E+00	5.27E+02	5.27E+02		0.0150				5.172E+13	
Am-242m	1.5728E-02	61.01	61.01	61.01	0.00E+00	9.60E-01	9.60E-01		0.0250				1.021E+13	
Am-243	1.6288E-02	61.01	61.01	61.01	0.00E+00	9.94E-01	9.94E-01		0.0375				8.635E+12	
C-14	1.2068E-01	61.01	61.01	61.01	0.00E+00	7.36E+00	7.36E+00		0.0575				1.631E+13	
Cl-36	2.2849E-03	61.01	61.01	61.01	0.00E+00	1.39E-01	1.39E-01		0.0850				5.467E+12	
Cm-243	6.0144E-04	61.01	61.01	61.01	0.00E+00	3.67E-02	3.67E-02		0.1250				3.868E+12	
Cm-244	9.4880E-02	61.01	61.01	61.01	0.00E+00	5.79E+00	5.79E+00		0.2250				4.732E+12	
Co-60	3.9052E+00	61.01	61.01	61.01	0.00E+00	2.38E+02	2.38E+02		0.3750				2.048E+12	
Cs-134	2.2139E-06	61.01	61.01	61.01	0.00E+00	1.35E-04	1.35E-04		0.5750				3.389E+13	
Cs-135	4.3976E-04	61.01	61.01	61.01	0.00E+00	2.68E-02	2.68E-02		0.8500				7.423E+11	
Cs-137	1.4887E+01	61.01	61.01	61.01	0.00E+00	9.08E+02	9.08E+02		1.2500				1.819E+13	
Eu-154	3.7342E-01	61.01	61.01	61.01	0.00E+00	2.28E+01	2.28E+01		1.7500				2.187E+10	
Eu-155	8.4893E-03	61.01	61.01	61.01	0.00E+00	5.18E-01	5.18E-01		2.2500				9.455E+07	
Fe-55	5.3750E-03	61.01	61.01	61.01	0.00E+00	3.28E-01	3.28E-01		2.7500				1.628E+08	
H-3	1.0472E-01	61.01	61.01	61.01	0.00E+00	6.39E+00	6.39E+00		3.5000				8.862E+04	
I-129	1.0618E-05	61.01	61.01	61.01	0.00E+00	6.48E-04	6.48E-04		5.0000				3.745E+04	
Kr-85	2.2717E-01	61.01	61.01	61.01	0.00E+00	1.39E+01	1.39E+01		7.0000				4.265E+03	
Np-237	1.6400E-04	61.01	61.01	61.01	0.00E+00	1.00E-02	1.00E-02		11.0000				4.865E+02	
Pa-231	2.8688E-06	61.01	61.01	61.01	0.00E+00	1.75E-04	1.75E-04							
Pb-210	4.7312E-08	61.01	61.01	61.01	0.00E+00	2.89E-06	2.89E-06							
Pm-147	3.2198E-04	61.01	61.01	61.01	0.00E+00	1.96E-02	1.96E-02							
Pu-238	-1.1924E+00	61.01	0.00	0.00	1.65E+01	0.00E+00	1.65E+01							
Pu-239	-4.8600E-02	61.01	0.00	0.00	2.00E+00	0.00E+00	2.00E+00							
Pu-240	-3.0127E-01	61.01	0.00	0.00	2.55E+00	0.00E+00	2.55E+00							
Pu-241	-1.2917E+02	61.01	0.00	0.00	6.56E+02	0.00E+00	6.56E+02							
Pu-242	-1.1381E-04	61.01	0.00	0.00	1.10E-02	4.09E-03	1.10E-02							
Ra-226	1.0760E-07	61.01	61.01	61.01	0.00E+00	6.56E-06	6.56E-06							
Ra-228	6.0160E-07	61.01	61.01	61.01	0.00E+00	3.67E-05	3.67E-05							
Ru-106	1.3388E-13	61.01	61.01	61.01	0.00E+00	8.17E-12	8.17E-12							
Se-79	1.9179E-04	61.01	61.01	61.01	0.00E+00	1.17E-02	1.17E-02							
Sn-126	1.6669E-04	61.01	61.01	61.01	0.00E+00	1.02E-02	1.02E-02							
Sr-90	1.3859E+01	61.01	61.01	61.01	0.00E+00	8.46E+02	8.46E+02							
Tc-99	6.7678E-03	61.01	61.01	61.01	0.00E+00	4.13E-01	4.13E-01							
Th-229	2.2592E-06	61.01	61.01	61.01	0.00E+00	1.38E-04	1.38E-04							
Th-230	7.5955E-06	61.01	61.01	61.01	0.00E+00	4.63E-04	4.63E-04							
Th-232	6.0208E-07	61.01	61.01	61.01	0.00E+00	3.67E-05	3.67E-05							
Tl-208	7.5795E-05	61.01	61.01	61.01	0.00E+00	4.62E-03	4.62E-03							
U-232	2.0521E-04	61.01	61.01	61.01	0.00E+00	1.25E-02	1.25E-02							
U-233	3.6128E-04	61.01	61.01	61.01	0.00E+00	2.20E-02	2.20E-02							
U-234	1.2788E-02	61.01	61.01	61.01	0.00E+00	7.80E-01	7.80E-01							
U-235	5.7486E-04	61.01	61.01	61.01	5.52E-05	3.51E-02	3.51E-02							
U-236	2.3485E-04	61.01	61.01	61.01	0.00E+00	1.43E-02	1.43E-02		3.27E+01				3.34E+01	
U-238	1.1581E-04	61.01	61.01	61.01	6.87E-06	7.07E-03	7.07E-03		Total				Total	
Y-90	1.3861E+01	61.01	61.01	61.01	0.00E+00	8.46E+02	8.46E+02							
Other Radionuclides						3.14E+03	3.14E+03							

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		61.01	Nominal burnup set equal to bounding burnup
Bounding		61.01	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	14.21		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: PULSTAR - BUFFALO (6%RODS)
 SNF ID #: 174
 Fuel Units & Descr: 24 - CANISTER OF RODS
 Heavy Metal Mass: BOL=254 671kg; EOL=252.202kg
 ROD Storage Site INEEL

Fuel decay start date: 1978
 Estimates as of: 2030
 Template: PWR (Light Water, Zirc, 0 to 5%, U)
 Template Burnup(MWd): 61 92
 Template BOL Heavy Metal Mass (MT): 0 00176911
 Template Decay Time: 50 years

Estimated
 Canister usage
 18"x10"
 2 00

Radionuclide	m		x _a		x _b		b		y _a		y _b		Gamma Sources	
	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)						
Ac-227	1 0733E-09	2,348 47	2,546 71	0 00E+00	2 52E-06	2 73E-06	Avg MeV							
Am-241	1 4751E-01	2,348 47	2,546 71	0 00E+00	3 46E+02	3 76E+02	0 0150	9 691E+13						
Am-242m	2 6809E-04	2,348 47	2,546 71	0 00E+00	6 30E-01	6 83E-01	0 0250	1 942E+13						
Am-243	6 2484E-04	2,348 47	2,546 71	0 00E+00	1 47E+00	1 59E+00	0 0375	1 830E+13						
C-14	4 7820E-05	2,348 47	2,546 71	0 00E+00	1 12E-01	1 22E-01	0 0575	2 290E+13						
Cl-36	8 0297E-07	2,348 47	2,546 71	0 00E+00	1 89E-03	2 04E-03	0 0850	1 070E+13						
Cm-243	1 7426E-04	2,348 47	2,546 71	0 00E+00	4 09E-01	4 44E-01	0 1250	7 118E+12						
Cm-244	2 7616E-02	2,348 47	2,546 71	0 00E+00	6 49E+01	7 03E+01	0 2250	9 135E+12						
Co-60	3 5610E-04	2,348 47	2,546 71	0 00E+00	8 36E-01	9 07E-01	0 3750	3 945E+12						
Cs-134	2 6260E-07	2,348 47	2,546 71	0 00E+00	6 17E-04	6 69E-04	0 5750	9 290E+13						
Cs-135	1 4433E-05	2,348 47	2,546 71	0 00E+00	3 39E-02	3 68E-02	0 8500	9 071E+11						
Cs-137	9 8870E-01	2,348 47	2,546 71	0 00E+00	2 32E+03	2 52E+03	1 2500	5 772E+11						
Eu-154	6 0320E-03	2,348 47	2,546 71	0 00E+00	1 42E+01	1 54E+01	1 7500	2 538E+10						
Eu-155	2 1770E-04	2,348 47	2,546 71	0 00E+00	5 11E-01	5 54E-01	2 2500	4 172E+06						
Fe-55	7 9296E-07	2,348 47	2,546 71	0 00E+00	1 86E-03	2 02E-03	2 7500	1 470E+07						
H-3	8 9486E-03	2,348 47	2,546 71	0 00E+00	2 10E+01	2 28E+01	3 5000	1 049E+06						
I-129	9 8288E-07	2,348 47	2,546 71	0 00E+00	2 31E-03	2 50E-03	5 0000	4 484E+05						
Kr-85	1 0707E-02	2,348 47	2,546 71	0 00E+00	2 51E+01	2 73E+01	7 0000	5 166E+04						
Np-237	1 1927E-05	2,348 47	2,546 71	0 00E+00	2 80E-02	3 04E-02	11 0000	5 932E+03						
Pa-231	1 4703E-09	2,348 47	2,546 71	0 00E+00	3 45E-06	3 74E-06								
Pb-210	1 6828E-10	2,348 47	2,546 71	0 00E+00	3 95E-07	4 29E-07								
Pm-147	6 9606E-06	2,348 47	2,546 71	0 00E+00	1 63E-02	1 77E-02								
Pu-238	6 6263E-02	2,348 47	2,546 71	0 00E+00	1 56E+02	1 69E+02								
Pu-239	1 1618E-02	2,348 47	2,546 71	0 00E+00	2 73E+01	2 96E+01								
Pu-240	1 5142E-02	2,348 47	2,546 71	0 00E+00	3 56E+01	3 86E+01								
Pu-241	4 3766E-01	2,348 47	2,546 71	0 00E+00	1 03E+03	1 11E+03								
Pu-242	6 4260E-05	2,348 47	2,546 71	0 00E+00	1 51E-01	1 64E-01								
Ra-226	3 8501E-10	2,348 47	2,546 71	0 00E+00	9 04E-07	9 81E-07								
Ra-228	5 2955E-12	2,348 47	2,546 71	0 00E+00	1 24E-08	1 35E-08								
Ru-106	2 0413E-14	2,348 47	2,546 71	0 00E+00	4 79E-11	5 20E-11								
Se-79	1 2376E-05	2,348 47	2,546 71	0 00E+00	2 91E-02	3 15E-02								
Sn-126	2 5210E-05	2,348 47	2,546 71	0 00E+00	5 92E-02	6 42E-02								
Sr-90	6 4163E-01	2,348 47	2,546 71	0 00E+00	1 51E+03	1 63E+03								
Tc-99	3 9357E-04	2,348 47	2,546 71	0 00E+00	9 24E-01	1 00E+00								
Th-229	1 5644E-10	2,348 47	2,546 71	0 00E+00	3 67E-07	3 98E-07								
Th-230	2 7972E-08	2,348 47	2,546 71	0 00E+00	6 57E-05	7 12E-05								
Th-232	5 3036E-12	2,348 47	2,546 71	0 00E+00	1 25E-08	1 35E-08								
Tl-208	1 5136E-07	2,348 47	2,546 71	0 00E+00	3 55E-04	3 85E-04								
U-232	4 1005E-07	2,348 47	2,546 71	0 00E+00	9 63E-04	1 04E-03								
U-233	2 5856E-08	2,348 47	2,546 71	0 00E+00	6 07E-05	6 58E-05								
U-234	5 2665E-05	2,348 47	2,546 71	0 00E+00	1 24E-01	1 34E-01								
U-235	-1 4487E-06	2,348 47	0 00	3 30E-02	2 96E-02	3 30E-02								
U-236	7 5888E-06	2,348 47	2,546 71	0 00E+00	1 78E-02	1 93E-02								
U-238	-2 6129E-07	2,348 47	0 00	8 05E-02	7 98E-02	8 05E-02								
Y-90	6 4180E-01	2,348 47	2,546 71	0 00E+00	1 51E+03	1 63E+03								
Other Radionuclides					2 24E+03	2 43E+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 PWR Template on all but one parameter (enrichment) making PWR a reasonable match.
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	5 996	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		2,348 47	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup taken directly from SFD (converted to MWd)
Bounding	2,546 71	4 696 95	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.26		1 00
Bounding	0.29	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 SUNY-BUFFALO (6% RODS)
 SNF ID #: 176
 Fuel Units & Descr: 996 - ROD
 Heavy Metal Mass: BOL=537 541kg; EOL=499 992kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1965
 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: 65 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	1 2581E-09	35,707.51	71,415 03	0 00E+00	4 49E-05	8 98E-05	Avg MeV	
Am-241	1 4761E-01	35,707.51	71,415 03	0 00E+00	5 27E+03	1 05E+04	0 0150	1 933E+15
Am-242m	2 5032E-04	35,707.51	71,415 03	0 00E+00	8 94E+00	1 79E+01	0 0250	3 840E+14
Am-243	6 2387E-04	35,707.51	71,415 03	0 00E+00	2 23E+01	4 46E+01	0 0375	3 590E+14
C-14	4 7739E-05	35,707.51	71,415 03	0 00E+00	1 70E+00	3 41E+00	0 0575	4 926E+14
Cl-36	8 0297E-07	35,707.51	71,415 03	0 00E+00	2 87E-02	5 73E-02	0 0850	2 101E+14
Cm-243	1 2099E-04	35,707.51	71,415 03	0 00E+00	4 32E+00	8 64E+00	0 1250	1 371E+14
Cm-244	1 5560E-02	35,707.51	71,415 03	0 00E+00	5 56E+02	1 11E+03	0 2250	1 787E+14
Co-60	4 9580E-05	35,707.51	71,415 03	0 00E+00	1 77E+00	3 54E+00	0 3750	7 735E+13
Cs-134	1 7022E-09	35,707.51	71,415 03	0 00E+00	6 08E-05	1 22E-04	0 5750	1 841E+15
Cs-135	1 4439E-05	35,707.51	71,415 03	0 00E+00	5 15E-01	1 03E+00	0 8500	1 476E+13
Cs-137	6 9929E-01	35,707.51	71,415 03	0 00E+00	2 50E+04	4 99E+04	1 2500	6 900E+12
Eu-154	1 8023E-03	35,707.51	71,415 03	0 00E+00	6 44E+01	1 29E+02	1 7500	3 970E+11
Eu-155	2 6793E-05	35,707.51	71,415 03	0 00E+00	9 57E-01	1 91E+00	2 2500	6 992E-07
Fe-55	1 4580E-08	35,707.51	71,415 03	0 00E+00	5 21E-04	1 04E-03	2 7500	3 478E+08
H-3	3 8566E-03	35,707.51	71,415 03	0 00E+00	1 38E+02	2 75E+02	3 5000	1 726E+07
I-129	9 8288E-07	35,707.51	71,415 03	0 00E+00	3 51E-02	7 02E-02	5 0000	7 371E+06
Kr-85	4 0617E-03	35,707.51	71,415 03	0 00E+00	1 45E+02	2 90E+02	7 0000	8 485E+05
Np-237	1 2645E-05	35,707 51	71,415 03	0 00E+00	4 52E-01	9 03E-01	11 0000	9 739E+04
Pa-231	1 6376E-09	35,707.51	71,415 03	0 00E+00	5 85E-05	1 17E-04		
Pb-210	2 8795E-10	35,707 51	71,415 03	0 00E+00	1 03E-05	2 06E-05		
Pm-147	1 3264E-07	35,707 51	71,415 03	0 00E+00	4 74E-03	9 47E-03		
Pu-238	5 8882E-02	35,707 51	71,415 03	0 00E+00	2 10E+03	4 21E+03		
Pu-239	1 1613E-02	35,707 51	71,415 03	0 00E+00	4 15E+02	8 29E+02		
Pu-240	1 5142E-02	35,707 51	71,415 03	0 00E+00	5 41E+02	1 08E+03		
Pu-241	2 1269E-01	35,707 51	71,415 03	0 00E+00	7 59E+03	1 52E+04		
Pu-242	6 4260E-05	35,707 51	71,415 03	0 00E+00	2 29E+00	4 59E+00		
Ra-226	5 8689E-10	35,707 51	71,415 03	0 00E+00	2 10E-05	4 19E-05		
Ra-228	5 3036E-12	35,707 51	71,415 03	0 00E+00	1 89E-07	3 79E-07		
Ru-106	6 8136E-19	35,707 51	71,415 03	0 00E+00	2 43E-14	4 87E-14		
Se-79	1 2372E-05	35,707 51	71,415 03	0 00E+00	4 42E-01	8 84E-01		
Sn-126	2 5194E-05	35,707 51	71,415 03	0 00E+00	9 00E-01	1 80E+00		
Sr-90	4 4913E-01	35,707 51	71,415 03	0 00E+00	1 60E+04	3 21E+04		
Tc-99	3 9357E-04	35,707 51	71,415 03	0 00E+00	1 41E+01	2 81E+01		
Th-229	1 9331E-10	35,707 51	71,415 03	0 00E+00	6 90E-06	1 38E-05		
Th-230	3 5223E-08	35,707 51	71,415 03	0 00E+00	1 26E-03	2 52E-03		
Th-232	5 3085E-12	35,707 51	71,415 03	0 00E+00	1 90E-07	3 79E-07		
Tl-208	1 3102E-07	35,707 51	71,415 03	0 00E+00	4 68E-03	9 36E-03		
U-232	3 5497E-07	35,707 51	71,415 03	0 00E+00	1 27E-02	2 54E-02		
U-233	2 6647E-08	35,707 51	71,415 03	0 00E+00	9 52E-04	1 90E-03		
U-234	5 5023E-05	35,707 51	71,415 03	0 00E+00	1 96E+00	3 93E+00		
U-235	-1 4485E-06	35,707 51	0 00	6 93E-02	1 76E-02	6 93E-02		
U-236	7 5969E-06	35,707 51	71,415 03	0 00E+00	2 71E-01	5 43E-01		
U-238	-2 6129E-07	35,707 51	0 00	1 70E-01	1 61E-01	1 70E-01		
Y-90	4 4913E-01	35,707 51	71,415 03	0 00E+00	1 60E+04	3 21E+04		
Other Radionuclides					2 42E+04	4 84E+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 PWR Template on all but one parameter (enrichment) making PWR a reasonable match.
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	5 965123646	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		35 707 51	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding		71 415 03	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	1 90		1 00
Bounding	3 80		

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 RESIDUE FAILED PBF RODS
 SNF ID # 381
 Fuel Units & Descr: 1 - DEBRIS
 Heavy Metal Mass BOL= , EOL=1 109kg
 ROD Storage Site INEEL

¹Fuel decay start date 1985
 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 35 years

Estimated
 Canister usage
 HIC
 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	2.3344E-08	1,047 61	1,047 61	0 00E+00	2.45E-05	2 45E-05	Avg MeV	
Am-241	1 1135E-04	1,047 61	1,047 61	0 00E+00	1 17E-01	1.17E-01	0 0150	7 819E+13
Am-242m	8 5075E-09	1,047 61	1,047 61	0 00E+00	8 91E-06	8.91E-06	0 0250	1 625E+13
Am-243	9 8519E-10	1,047 61	1,047 61	0 00E+00	1 03E-06	1.03E-06	0 0375	1 405E+13
C-14	2 3012E-04	1,047 61	1,047 61	0 00E+00	2 41E-01	2 41E-01	0 0575	1.515E+13
Cl-36	1 2261E-06	1,047 61	1,047.61	0 00E+00	2 28E-03	1.28E-03	0 0850	9 153E+12
Cm-243	2 4875E-10	1,047.61	1,047.61	0 00E+00	2 43E-06	2 43E-06	0 1250	5 943E+12
Cm-244	2.3178E-09	1,047.61	1,047.61	0 00E+00	7 42E+01	7 42E+01	0.3750	3 437E+12
Co-60	7.0849E-02	1,047 61	1,047 61	0 00E+00	3 17E-03	3 17E-03	0 5750	5 661E+13
Cs-134	3 0266E-06	1,047 61	1,047 61	0 00E+00	3 18E-02	3.18E-02	0 8500	5 730E+11
Cs-135	3 0316E-05	1,047 61	1,047 61	0 00E+00	1.52E+03	1.52E+03	1.2500	5.696E+12
Cs-137	1 4511E+00	1,047 61	1,047 61	0 00E+00	7 01E-01	7 01E-01	1 7500	1 478E+10
Eu-154	6 6955E-04	1,047 61	1,047 61	0 00E+00	7 32E-01	7.32E-01	2.2500	3 069E+07
Eu-155	6 9850E-04	1,047 61	1,047 61	0 00E+00	1 29E+00	1.29E+00	2.7500	8.871E+05
Fe-55	1 2318E-03	1,047 61	1,047 61	0 00E+00	2 63E+00	2 63E+00	3.5000	6.255E+01
H-3	2 5141E-03	1,047 61	1,047 61	0 00E+00	7 67E-04	7 67E-04	5 0000	2 573E+01
I-129	7.3195E-07	1,047.61	1,047 61	0 00E+00	4 32E+01	4 32E+01	7 0000	2 841E+00
Kr-85	4 1281E-02	1,047.61	1,047 61	0 00E+00	1.20E-03	1.20E-03	11 0000	3 187E-01
Np-237	1.1489E-06	1,047 61	1,047 61	0 00E+00	4 74E-05	4 74E-05		
Pa-231	4.5241E-08	1,047 61	1,047 61	0 00E+00	1.22E+00	1.22E+00		
Pb-210	6 4476E-13	1,047 61	1,047 61	0 00E+00	6 75E-10	6 75E-10		
Pm-147	1 1651E-03	1,047 61	1,047 61	0 00E+00	3 09E-01	3 09E-01		
Pu-238	2 9517E-04	1,047 61	1,047 61	0 00E+00	7 00E-01	7 00E-01		
Pu-239	6 6772E-04	1,047 61	1,047 61	0 00E+00	9 10E-02	9 10E-02		
Pu-240	8 6839E-05	1,047.61	1,047.61	0 00E+00	7 49E-01	7 49E-01		
Pu-241	7 1514E-04	1,047.61	1,047.61	0 00E+00	2.07E-06	2.07E-06		
Pu-242	1 9717E-09	1,047 61	1,047 61	0 00E+00	1.85E-09	1.85E-09		
Ra-226	1.7654E-12	1,047.61	1,047 61	0 00E+00	8 69E-09	8 69E-09		
Ra-228	8.2928E-12	1,047 61	1,047 61	0 00E+00	1 93E-07	1 93E-07		
Ru-106	1.8419E-10	1,047 61	1,047 61	0 00E+00	1 39E-02	1 39E-02		
Se-79	1.3223E-05	1,047 61	1,047 61	0 00E+00	1 39E-02	1 39E-02		
Sn-126	1 1493E-05	1,047 61	1,047 61	0 00E+00	1 20E-02	1 20E-02		
Sr-90	1.3649E+00	1,047 61	1,047 61	0 00E+00	1 43E+03	1 43E+03		
Tc-99	4 6656E-04	1,047 61	1,047 61	0 00E+00	4 89E-01	4 89E-01		
Th-229	1 4547E-11	1,047 61	1,047.61	0 00E+00	1.52E-08	1.52E-08		
Th-230	1 6617E-10	1,047.61	1,047 61	0 00E+00	1.74E-07	1.74E-07		
Th-232	8 3361E-12	1,047 61	1,047 61	0 00E+00	8 73E-09	8 73E-09		
Tl-208	2.1664E-08	1,047 61	1,047 61	0 00E+00	2.27E-05	2 27E-05		
U-232	5 8669E-08	1,047 61	1,047 61	0 00E+00	6 15E-05	6 15E-05		
U-233	3.1847E-09	1,047 61	1,047 61	0 00E+00	3 34E-06	3 34E-06		
U-234	3 8769E-07	1,047 61	1,047 61	0 00E+00	4 06E-04	4 06E-04		
U-235	-2 7761E-06	1,047 61	0 00	4 48E-03	1 57E-03	4 48E-03		
U-236	1 6190E-05	1,047 61	1,047 61	0 00E+00	1 70E-02	1.70E-02	1.83E+01	1.83E+01
U-238	-2 8547E-09	1,047 61	0 00	4 84E-05	4.54E-05	4 84E-05	Total	Total
Y-90	1 3652E+00	1,047 61	1,047.61	0 00E+00	1 43E+03	1 43E+03		
Other Radionuclides					1.73E+03	1 73E+03		

Thermal Power
 Normal Heat Output (Watts)
 Bounding Heat Output (Watts)
 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	U	U	
BOL Enrichment %		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		1,047 61	Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding		1,047 61	

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: ROBERT E GINNA	Fuel decay start date: 1972
SNF ID #: 182	Estimates as of: 2030
Fuel Units & Descr: 40 - 14 X 14 ROD ARRAY	Template: PWR (Light Water, Zirc, 0 to 5%, U)
Heavy Metal Mass: BOL=15287.2kg; EOL=15126.928kg	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:
Bare Fuel Transfer

II. Estimates

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-09	154,660.60	218,499.95	0.00E+00	1.66E-04	2.35E-04	Avg. MeV	
Am-241	1.4751E-01	154,660.60	218,499.95	0.00E+00	2.28E+04	3.22E+04	0.0150	8.314E+15
Am-242m	2.6809E-04	154,660.60	218,499.95	0.00E+00	4.15E+01	5.86E+01	0.0250	1.666E+15
Am-243	6.2484E-04	154,660.60	218,499.95	0.00E+00	9.66E+01	1.37E+02	0.0375	1.570E+15
C-14	4.7820E-05	154,660.60	218,499.95	0.00E+00	7.40E+00	1.04E+01	0.0575	1.965E+15
Cl-36	8.0297E-07	154,660.60	218,499.95	0.00E+00	1.24E-01	1.75E-01	0.0850	9.180E+14
Cm-243	1.7426E-04	154,660.60	218,499.95	0.00E+00	2.70E+01	3.81E+01	0.1250	6.107E+14
Cm-244	2.7616E-02	154,660.60	218,499.95	0.00E+00	4.27E+03	6.03E+03	0.2250	7.837E+14
Co-60	3.5610E-04	154,660.60	218,499.95	0.00E+00	5.51E+01	7.78E+01	0.3750	3.385E+14
Cs-134	2.6260E-07	154,660.60	218,499.95	0.00E+00	4.06E-02	5.74E-02	0.5750	7.971E+15
Cs-135	1.4433E-05	154,660.60	218,499.95	0.00E+00	2.23E+00	3.15E+00	0.8500	7.783E+13
Cs-137	9.8870E-01	154,660.60	218,499.95	0.00E+00	1.53E+05	2.16E+05	1.2500	4.952E+13
Eu-154	6.0320E-03	154,660.60	218,499.95	0.00E+00	9.33E+02	1.32E+03	1.7500	2.177E+12
Eu-155	2.1770E-04	154,660.60	218,499.95	0.00E+00	3.37E+01	4.76E+01	2.2500	3.579E+08
Fe-55	7.9296E-07	154,660.60	218,499.95	0.00E+00	1.23E-01	1.73E-01	2.7500	1.261E+09
H-3	8.9486E-03	154,660.60	218,499.95	0.00E+00	1.38E+03	1.96E+03	3.5000	9.001E+07
I-129	9.8288E-07	154,660.60	218,499.95	0.00E+00	1.52E-01	2.15E-01	5.0000	3.847E+07
Kr-85	1.0707E-02	154,660.60	218,499.95	0.00E+00	1.66E+03	2.34E+03	7.0000	4.432E+06
Np-237	1.1927E-05	154,660.60	218,499.95	0.00E+00	1.84E+00	2.61E+00	11.0000	5.089E+05
Pa-231	1.4703E-09	154,660.60	218,499.95	0.00E+00	2.27E-04	3.21E-04		
Pb-210	1.6828E-10	154,660.60	218,499.95	0.00E+00	2.60E-05	3.68E-05		
Pm-147	6.9606E-06	154,660.60	218,499.95	0.00E+00	1.08E+00	1.52E+00		
Pu-238	6.6263E-02	154,660.60	218,499.95	0.00E+00	1.02E+04	1.45E+04		
Pu-239	1.1618E-02	154,660.60	218,499.95	0.00E+00	1.80E+03	2.54E+03		
Pu-240	1.5142E-02	154,660.60	218,499.95	0.00E+00	2.34E+03	3.31E+03		
Pu-241	4.3766E-01	154,660.60	218,499.95	0.00E+00	6.77E+04	9.56E+04		
Pu-242	6.4260E-05	154,660.60	218,499.95	0.00E+00	9.94E+00	1.40E+01		
Ra-226	3.8501E-10	154,660.60	218,499.95	0.00E+00	5.95E-05	8.41E-05		
Ra-228	5.2955E-12	154,660.60	218,499.95	0.00E+00	8.19E-07	1.16E-06		
Ru-106	2.0413E-14	154,660.60	218,499.95	0.00E+00	3.16E-09	4.46E-09		
Se-79	1.2376E-05	154,660.60	218,499.95	0.00E+00	1.91E+00	2.70E+00		
Sn-126	2.5210E-05	154,660.60	218,499.95	0.00E+00	3.90E+00	5.51E+00		
Sr-90	6.4163E-01	154,660.60	218,499.95	0.00E+00	9.92E+04	1.40E+05		
Tc-99	3.9357E-04	154,660.60	218,499.95	0.00E+00	6.09E+01	8.60E+01		
Th-229	1.5644E-10	154,660.60	218,499.95	0.00E+00	2.42E-05	3.42E-05		
Th-230	2.7972E-08	154,660.60	218,499.95	0.00E+00	4.33E-03	6.11E-03		
Th-232	5.3036E-12	154,660.60	218,499.95	0.00E+00	8.20E-07	1.16E-06		
Th-208	1.5136E-07	154,660.60	218,499.95	0.00E+00	2.34E-02	3.31E-02		
U-232	4.1005E-07	154,660.60	218,499.95	0.00E+00	6.34E-02	8.96E-02		
U-233	2.5856E-08	154,660.60	218,499.95	0.00E+00	4.00E-03	5.65E-03		
U-234	5.2665E-05	154,660.60	218,499.95	0.00E+00	8.15E+00	1.15E+01		
U-235	-1.4487E-06	154,660.60	0.00	1.15E+00	9.26E-01	1.15E+00		
U-236	7.5888E-06	154,660.60	218,499.95	0.00E+00	1.17E+00	1.66E+00		
U-238	-2.6129E-07	154,660.60	0.00	4.96E+00	4.92E+00	4.96E+00		
Y-90	6.4180E-01	154,660.60	218,499.95	0.00E+00	9.93E+04	1.40E+05		
Other Radionuclides					1.47E+05	2.08E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.80E+03	3.95E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LIGHT WATER	LIGHT WATER
Fuel Cladding	ZIRC	ZIRC
BOL HM Constituents	U	U
BOL Enrichment %:	3.480035585	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	154,660.60	152,411.09
Bounding	218,499.95	304,822.18

Basis for burnup used in estimate:
Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/Given Burnup
Nominal	0.29	0.99
Bounding	0.41	1.40

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: ROVER (UBM)
 SNF ID #: 840
 Fuel Units & Descr: 65 - PARTICULATE
 Heavy Metal Mass: BOL=119 775kg EOL=119 775kg
 ROD Storage Site: INEEL

Fuel decay start date: 2050
 Estimates as of: 2030
 Template: (Worst Case)
 Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 5 years

Estimated
 Canister usage
 18"x15"
 5 91

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7456E-07	2,276.58	4,553.16	0.00E+00	1.99E-03	3.98E-03	Avg MeV	
Am-241	4.2816E+00	2,276.58	4,553.16	0.00E+00	9.75E+03	1.95E+04	0.0150	2.664E+16
Am-242m	1.9312E-02	2,276.58	4,553.16	0.00E+00	4.40E+01	8.79E+01	0.0250	5.207E+15
Am-243	1.6368E-02	2,276.58	4,553.16	0.00E+00	3.73E+01	7.45E+01	0.0375	4.516E+15
C-14	1.2134E-01	2,276.58	4,553.16	0.00E+00	2.76E+02	5.52E+02	0.0575	4.402E+15
Cl-36	2.2860E-03	2,276.58	4,553.16	0.00E+00	5.20E+00	1.04E+01	0.0850	2.396E+15
Cm-243	1.7968E-03	2,276.58	4,553.16	0.00E+00	4.09E+00	8.18E+00	0.1250	2.560E+15
Cm-244	5.3120E-01	2,276.58	4,553.16	0.00E+00	1.21E+03	2.42E+03	0.2250	1.612E+15
Co-60	1.4534E+03	2,276.58	4,553.16	0.00E+00	3.31E+06	6.62E+06	0.3750	7.648E+14
Cs-134	8.1336E+00	2,276.58	4,553.16	0.00E+00	1.85E+04	3.70E+04	0.5750	9.568E+15
Cs-135	4.3976E-04	2,276.58	4,553.16	0.00E+00	1.00E+00	2.00E+00	0.8500	2.576E+15
Cs-137	4.2070E+01	2,276.58	4,553.16	0.00E+00	9.58E+04	1.92E+05	1.2500	4.911E+17
Eu-154	1.4005E+01	2,276.58	4,553.16	0.00E+00	3.19E+04	6.38E+04	1.7500	4.442E+13
Eu-155	4.5553E+00	2,276.58	4,553.16	0.00E+00	1.04E+04	2.07E+04	2.2500	2.094E+13
Fe-55	8.7194E+02	2,276.58	4,553.16	0.00E+00	1.99E+06	3.97E+06	2.7500	1.745E+11
H-3	1.3083E+00	2,276.58	4,553.16	0.00E+00	2.98E+03	5.96E+03	3.5000	1.744E+10
I-129	1.0618E-05	2,276.58	4,553.16	0.00E+00	2.42E-02	4.83E-02	5.0000	1.544E+07
Kr-85	4.1611E+00	2,276.58	4,553.16	0.00E+00	9.47E+03	1.89E+04	7.0000	1.776E+06
Np-237	1.5617E-04	2,276.58	4,553.16	0.00E+00	3.56E-01	7.11E-01	11.0000	2.038E+05
Pa-231	2.8576E-06	2,276.58	4,553.16	0.00E+00	6.51E-03	1.30E-02		
Pb-210	3.1687E-10	2,276.58	4,553.16	0.00E+00	7.21E-07	1.44E-06		
Pm-147	4.6559E+01	2,276.58	4,553.16	0.00E+00	1.06E+05	2.12E+05		
Pu-238	3.7728E+00	2,276.58	4,553.16	0.00E+00	8.59E+03	1.72E+04		
Pu-239	4.1680E-01	2,276.58	4,553.16	0.00E+00	9.49E+02	1.90E+03		
Pu-240	2.9264E-01	2,276.58	4,553.16	0.00E+00	6.66E+02	1.33E+03		
Pu-241	2.0640E+02	2,276.58	4,553.16	0.00E+00	4.70E+05	9.40E+05		
Pu-242	2.4560E-03	2,276.58	4,553.16	0.00E+00	5.59E+00	1.12E+01		
Ra-226	3.0225E-09	2,276.58	4,553.16	0.00E+00	6.88E-06	1.38E-05		
Ra-228	4.4512E-07	2,276.58	4,553.16	0.00E+00	1.01E-03	2.03E-03		
Ru-106	3.6772E+00	2,276.58	4,553.16	0.00E+00	8.37E+03	1.67E+04		
Se-79	1.9188E-04	2,276.58	4,553.16	0.00E+00	4.37E-01	8.74E-01		
Sn-126	1.6673E-04	2,276.58	4,553.16	0.00E+00	3.80E-01	7.59E-01		
Sr-90	4.0404E+01	2,276.58	4,553.16	0.00E+00	9.20E+04	1.84E+05		
Tc-99	6.7678E-03	2,276.58	4,553.16	0.00E+00	1.54E+01	3.08E+01		
Th-229	4.1968E-07	2,276.58	4,553.16	0.00E+00	9.55E-04	1.91E-03		
Th-230	1.2679E-06	2,276.58	4,553.16	0.00E+00	2.89E-03	5.77E-03		
Th-232	6.0208E-07	2,276.58	4,553.16	0.00E+00	1.37E-03	2.74E-03		
Tl-208	1.0992E-04	2,276.58	4,553.16	0.00E+00	2.50E-01	5.00E-01		
U-232	3.1650E-04	2,276.58	4,553.16	0.00E+00	7.21E-01	1.44E+00		
U-233	3.6144E-04	2,276.58	4,553.16	0.00E+00	8.23E-01	1.65E+00		
U-234	1.2788E-02	2,276.58	4,553.16	0.00E+00	2.91E+01	5.82E+01		
U-235	5.7486E-04	2,276.58	4,553.16	2.41E-01	1.55E+00	2.86E+00		
U-236	2.3485E-04	2,276.58	4,553.16	0.00E+00	5.35E-01	1.07E+00		
U-238	1.1581E-04	2,276.58	4,553.16	2.81E-03	2.66E-01	5.30E-01		
Y-90	4.0428E+01	2,276.58	4,553.16	0.00E+00	9.20E+04	1.84E+05		
Other Radionuclides					2.88E+05	5.75E+05		

Thermal Power

Nominal Heat Output (Watts)	5.85E+04
Bounding Heat Output (Watts)	1.13E+05
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 fuel didn't closely match any existing templates, therefore the worst case template was used
Fuel Cladding	NONE	SST/Inconel	
BOL HM Constituents	U	U, Th, & Pu	
BOL Enrichment %:	93.02375258	0 to 100	

Burnup Summary (MWd) ⁴			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		2,276.58	Nominal burnup assumed to be 2% of BOL heavy metal mass
Bounding		4,553.16	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.57		13.02
Bounding	1.14		

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

⁴ 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 BLKT I
 SNF ID #: 374
 Fuel Units & Descr: 3 - 443 ROD ARRAY
 Heavy Metal Mass: BOL=3795 7kg; EOL=3755 2kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1962
 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: 35 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	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	9 7360E-05	50,103.24	88,060.24	0.00E+00	4 88E+00	8 57E+00		
Am-241	2 4345E-04	50,103.24	88,060.24	0 00E+00	1.22E+01	2 14E+01	0 0150	7.263E+15
Am-242m	1 4821E-06	50,103.24	88,060.24	0 00E+00	7 43E-02	1 31E-01	0 0250	1 496E+15
Am-243	3 1152E-07	50,103.24	88,060.24	0 00E+00	1 56E-02	2 74E-02	0 0375	1 279E+15
C-14	9 2432E-05	50,103.24	88,060.24	0 00E+00	4 63E+00	8 14E+00	0 0575	1 398E+15
Cl-36	1 8103E-06	50,103.24	88,060.24	0 00E+00	9 07E-02	1 59E-01	0 0850	8 927E+14
Cr-243	3 0597E-07	50,103.24	88,060.24	0 00E+00	1 53E-02	2 69E-02	0 1250	5 594E+14
Cr-244	1 4149E-05	50,103.24	88,060.24	0 00E+00	7 09E-01	1 25E+00	0 2250	8 005E+14
Co-60	8 7369E-04	50,103.24	88,060.24	0 00E+00	4.38E+01	7 69E+01	0 3750	3.214E+14
Cs-134	2 5601E-05	50,103.24	88,060.24	0 00E+00	1.28E+00	2.25E+00	0 5750	4 908E+15
Cs-135	2 8639E-05	50,103.24	88,060.24	0 00E+00	1 43E+00	2 52E+00	0 8500	8 770E+13
Cs-137	1 4772E+00	50,103.24	88,060.24	0 00E+00	7 40E+04	1 30E+05	1 2500	3 874E+13
Eu-154	8 6025E-03	50,103.24	88,060.24	0 00E+00	4.31E+02	7 58E+02	1 7500	6 042E+12
Eu-155	6 6062E-04	50,103.24	88,060.24	0 00E+00	3 31E+01	5 82E+01	2 2500	1 756E+08
Fe-55	2 3011E-06	50,103.24	88,060.24	0 00E+00	1.15E-01	2 03E-01	2 7500	4.318E+13
H-3	2 1277E-03	50,103.24	88,060.24	0 00E+00	1 07E+02	1 87E+02	3 5000	1 626E+05
I-129	1 5853E-06	50,103.24	88,060.24	0 00E+00	7 94E-02	1 40E-01	5 0000	5.097E+04
Kr-85	6 2625E-02	50,103.24	88,060.24	0 00E+00	3 14E+03	5 51E+03	7 0000	3 727E+03
Np-237	1 2620E-07	50,103.24	88,060.24	0 00E+00	6 32E-03	1 11E-02	11 0000	2.853E+02
Pa-231	1 2017E-04	50,103.24	88,060.24	0 00E+00	6 02E+00	1.06E+01		
Pb-210	1 4247E-08	50,103.24	88,060.24	0 00E+00	7 14E-04	1.25E-03		
Pm-147	2 6224E-04	50,103.24	88,060.24	0.00E+00	1 31E+01	2.31E+01		
Pu-238	4 2477E-04	50,103.24	88,060.24	0 00E+00	2 13E+01	3.74E+01		
Pu-239	2 7519E-05	50,103.24	88,060.24	0 00E+00	1 38E+00	2 42E+00		
Pu-240	1 6184E-05	50,103.24	88,060.24	0 00E+00	8 11E-01	1 43E+00		
Pu-241	1 4695E-03	50,103.24	88,060.24	0 00E+00	7 36E+01	1.29E+02		
Pu-242	4 0831E-08	50,103.24	88,060.24	0 00E+00	2 05E-03	3 60E-03		
Ra-226	2 1423E-08	50,103.24	88,060.24	0 00E+00	1 07E-03	1 89E-03		
Ra-228	4 6236E-06	50,103.24	88,060.24	0 00E+00	2 32E-01	4 07E-01		
Ru-106	4 0208E-11	50,103.24	88,060.24	0 00E+00	2 01E-06	3 54E-06		
Se-79	3 5417E-05	50,103.24	88,060.24	0 00E+00	1.77E+00	3 12E+00		
Sn-126	3 9848E-05	50,103.24	88,060.24	0 00E+00	2 00E+00	3 51E+00		
Sr-90	1 4928E+00	50,103.24	88,060.24	0 00E+00	7.48E+04	1 31E+05		
Tc-99	3 2525E-04	50,103.24	88,060.24	0 00E+00	1 63E+01	2 86E+01		
Th-229	6 4582E-05	50,103.24	88,060.24	0 00E+00	3.24E+00	5 69E+00		
Th-230	1 1432E-06	50,103.24	88,060.24	0 00E+00	5 73E-02	1 01E-01		
Th-232	-9 0328E-08	50,103.24	0 00	4 01E-01	3 96E-01	4 01E-01		
Tl-208	1 3964E-02	50,103.24	88,060.24	0 00E+00	7 00E+02	1.23E+03		
U-232	3.7822E-02	50,103.24	88,060.24	0 00E+00	1 90E+03	3 33E+03		
U-233	-3 3244E-03	50,103.24	0 00	1 35E+03	1 18E+03	1 35E+03		
U-234	8.1769E-04	50,103.24	88,060.24	0 00E+00	4 10E+01	7.20E+01		
U-235	5.7813E-08	50,103.24	88,060.24	2 76E-04	3.17E-03	5 37E-03		
U-236	1.3273E-07	50,103.24	88,060.24	0 00E+00	6 65E-03	1 17E-02		
U-238	-3 1121E-10	50,103.24	0 00	1 76E-04	1 61E-04	1 76E-04		
Y-90	1.4928E+00	50,103.24	88,060.24	0 00E+00	7 48E+04	1.31E+05		
Other Radionuclides					8 36E+04	1 47E+05		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							1.37E+03	2.39E+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	ZIRC	
BOL HM Constituents	Th and U	Th and U	
BOL Enrichment %	0.089989331	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	50,103.24	39,413 10	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup taken directly from SFD (converted to MWd)
Bounding:	88 060.24	78 826 19	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 59	0 79	1 00
Bounding	1 04	0 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 SHIPPIINGPORT LWBR BLKT II
 SNF ID # 375
 Fuel Units & Descr. 3 - 261 ROD ARRAY
 Heavy Metal Mass BOL=4373.5kg EOL=4331.7kg
 ROD Storage Site INEEL

¹Fuel decay start date 1982
 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 35 years

Estimated
 Canister usage
 24"x15"
 3.00

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	9.7360E-05	64,290.45	110,212.20	0.00E+00	6.26E+00	1.07E+01	Avg MeV	
Am-241	2.4345E-04	64,290.45	110,212.20	0.00E+00	1.57E+01	2.68E+01	0.0150	9.090E+15
Am-242m	1.4821E-06	64,290.45	110,212.20	0.00E+00	9.53E-02	1.63E-01	0.0250	1.872E+15
Am-243	3.1152E-07	64,290.45	110,212.20	0.00E+00	2.00E-02	3.43E-02	0.0375	1.600E+15
C-14	9.2432E-05	64,290.45	110,212.20	0.00E+00	5.94E+00	1.02E+01	0.0575	1.749E+15
Cl-36	1.8103E-06	64,290.45	110,212.20	0.00E+00	1.16E-01	2.00E-01	0.0850	1.117E+15
Cm-243	3.0597E-07	64,290.45	110,212.20	0.00E+00	1.97E-02	3.37E-02	0.1250	7.001E+14
Cm-244	1.4149E-05	64,290.45	110,212.20	0.00E+00	9.10E-01	1.56E+00	0.2250	1.002E+15
Co-60	8.7369E-04	64,290.45	110,212.20	0.00E+00	5.62E+01	9.63E+01	0.3750	4.023E+14
Cs-134	2.5601E-05	64,290.45	110,212.20	0.00E+00	1.65E+00	2.82E+00	0.5750	6.143E+15
Cs-135	2.8639E-05	64,290.45	110,212.20	0.00E+00	1.84E+00	3.16E+00	0.8500	1.098E+14
Cs-137	1.4772E+00	64,290.45	110,212.20	0.00E+00	9.50E+04	1.63E+05	1.2500	4.849E+13
Eu-154	8.6025E-03	64,290.45	110,212.20	0.00E+00	5.53E+02	9.48E+02	1.7500	7.562E+12
Eu-155	6.6062E-04	64,290.45	110,212.20	0.00E+00	4.25E+01	7.28E+01	2.2500	2.197E+08
Fe-55	2.3011E-06	64,290.45	110,212.20	0.00E+00	1.48E-01	2.54E-01	2.7500	5.404E+13
H-3	2.1277E-03	64,290.45	110,212.20	0.00E+00	1.37E+02	2.35E+02	3.5000	2.026E+05
I-129	1.5853E-06	64,290.45	110,212.20	0.00E+00	1.02E-01	1.75E-01	5.0000	6.353E+04
Kr-85	6.2625E-02	64,290.45	110,212.20	0.00E+00	4.03E+03	6.90E+03	7.0000	4.647E+03
Np-237	1.2620E-07	64,290.45	110,212.20	0.00E+00	8.11E-03	1.39E-02	11.0000	3.560E+02
Pa-231	1.2017E-04	64,290.45	110,212.20	0.00E+00	7.73E+00	1.32E+01		
Pb-210	1.4247E-08	64,290.45	110,212.20	0.00E+00	9.16E-04	1.57E-03		
Pm-147	2.6224E-04	64,290.45	110,212.20	0.00E+00	1.69E+01	2.89E+01		
Pu-238	4.2477E-04	64,290.45	110,212.20	0.00E+00	2.73E+01	4.68E+01		
Pu-239	2.7519E-05	64,290.45	110,212.20	0.00E+00	1.77E+00	3.03E+00		
Pu-240	1.6184E-05	64,290.45	110,212.20	0.00E+00	1.04E+00	1.78E+00		
Pu-241	1.4695E-03	64,290.45	110,212.20	0.00E+00	9.45E+01	1.62E+02		
Pu-242	4.0831E-08	64,290.45	110,212.20	0.00E+00	2.63E-03	4.50E-03		
Ra-226	2.1423E-08	64,290.45	110,212.20	0.00E+00	1.38E-03	2.36E-03		
Ra-228	4.6236E-06	64,290.45	110,212.20	0.00E+00	2.97E-01	5.10E-01		
Ru-106	4.0208E-11	64,290.45	110,212.20	0.00E+00	2.58E-06	4.43E-06		
Se-79	3.5417E-05	64,290.45	110,212.20	0.00E+00	2.28E+00	3.90E+00		
Sn-126	3.9848E-05	64,290.45	110,212.20	0.00E+00	2.56E+00	4.39E+00		
Sr-90	1.4928E+00	64,290.45	110,212.20	0.00E+00	9.60E+04	1.65E+05		
Tc-99	3.2525E-04	64,290.45	110,212.20	0.00E+00	2.09E+01	3.58E+01		
Th-229	6.4582E-05	64,290.45	110,212.20	0.00E+00	4.15E+00	7.12E+00		
Th-230	1.1432E-06	64,290.45	110,212.20	0.00E+00	7.35E-02	1.26E-01		
Th-232	-9.0328E-08	64,290.45	0.00	4.62E-01	4.56E-01	4.62E-01		
Ti-208	1.3964E-02	64,290.45	110,212.20	0.00E+00	8.98E+02	1.54E+03		
U-232	3.7822E-02	64,290.45	110,212.20	0.00E+00	2.43E+03	4.17E+03		
U-233	-3.3244E-03	64,290.45	0.00	1.55E+03	1.34E+03	1.55E+03		
U-234	8.1769E-04	64,290.45	110,212.20	0.00E+00	5.26E+01	9.01E+01	Nominal Output (Watts)	Bounding Heat Output (Watts)
U-235	5.7813E-08	64,290.45	110,212.20	3.18E-04	4.03E-03	6.69E-03	1.75E+03	2.98E+03
U-236	1.3273E-07	64,290.45	110,212.20	0.00E+00	8.53E-03	1.46E-02	Total	Total
U-238	-3.1121E-10	64,290.45	0.00	2.03E-04	1.83E-04	2.03E-04		
Y-90	1.4928E+00	64,290.45	110,212.20	0.00E+00	9.60E+04	1.65E+05		
Other Radionuclides					1.07E+05	1.84E+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	ZIRC	
BOL HM Constituents	Th and U	Th and U	
BOL Enrichment %	0.07120718	60 to 100	
Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal	64,290.45	40,678.11	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup taken directly from SFD (converted to MWd)
Bounding	110,212.20	81,356.22	
Checks			Estimated EOL HM/Grven EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.66	0.63	0.99
Bounding	1.13	0.74	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT LWBR BLKT III
 SNF ID #: 376
 Fuel Units & Descr: 6 - 445 ROD ARRAY
 Heavy Metal Mass: BOL=8776.5kg, EOL=8700 87kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1982
 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: 35 years

Estimated
 Canister usage
 24"x15"
 6 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	9 7360E-05	129,014 55	221,167 80	0 00E+00	1.26E+01	2 15E+01	Avg MeV	
Am-241	2 4345E-04	129,014 55	221,167 80	0 00E+00	3 14E+01	5 38E+01	0 0150	1.824E+16
Am-242m	1 4821E-06	129,014 55	221,167 80	0 00E+00	1 91E-01	3 28E-01	0 0250	3 757E+15
Am-243	3 1152E-07	129,014 55	221,167 80	0 00E+00	4 02E-02	6 89E-02	0 0375	3 211E+15
C-14	9 2432E-05	129,014 55	221,167 80	0 00E+00	1 19E+01	2 04E+01	0 0575	3 510E+15
Cl-36	1 8103E-06	129 014 55	221,167 80	0 00E+00	2 34E-01	4 00E-01	0 0850	2 242E+15
Cm-243	3 0597E-07	129,014 55	221,167 80	0 00E+00	3 95E-02	6 77E-02	0 1250	1 405E+15
Cm-244	1 4149E-05	129,014 55	221,167 80	0 00E+00	1 83E+00	3 13E+00	0 2250	2 010E+15
Co-60	8 7369E-04	129,014 55	221,167 80	0 00E+00	1.13E+02	1 93E+02	0 3750	8 073E+14
Cs-134	2 5601E-05	129,014 55	221,167 80	0 00E+00	3 30E+00	5 66E+00	0 5750	1 233E+16
Cs-135	2 8639E-05	129,014 55	221,167 80	0 00E+00	3 69E+00	6 33E+00	0 8500	2 203E+14
Cs-137	1 4772E+00	129,014 55	221,167 80	0 00E+00	1 91E+05	3 27E+05	1 2500	9 731E+13
Eu-154	8 6025E-03	129,014 55	221,167 80	0 00E+00	1 11E+03	1 90E+03	1 7500	1 518E+13
Eu-155	6 6062E-04	129,014 55	221,167 80	0 00E+00	8 52E+01	1 46E+02	2 2500	4 409E+08
Fe-55	2 3011E-06	129,014 55	221,167 80	0 00E+00	2 97E-01	5 09E-01	2 7500	1 084E+14
H-3	2 1277E-03	129,014 55	221,167 80	0 00E+00	2 75E+02	4 71E+02	3 5000	4 067E+05
I-129	1 5853E-06	129,014 55	221,167 80	0 00E+00	2 05E-01	3 51E-01	5 0000	1 275E+05
Kr-85	6 2625E-02	129,014 55	221,167 80	0 00E+00	8 08E+03	1 39E+04	7 0000	9 326E+03
Np-237	1 2620E-07	129,014 55	221,167 80	0 00E+00	1 63E-02	2 79E-02	11 0000	7 144E+02
Pa-231	1 2017E-04	129,014 55	221,167 80	0 00E+00	1 55E+01	2 66E+01		
Pb-210	1 4247E-08	129,014 55	221,167 80	0 00E+00	1 84E-03	3 15E-03		
Pm-147	2 6224E-04	129,014 55	221,167 80	0 00E+00	3 38E+01	5 80E+01		
Pu-238	4 2477E-04	129,014 55	221,167 80	0 00E+00	5 48E+01	9 39E+01		
Pu-239	2 7519E-05	129,014 55	221,167 80	0 00E+00	3 55E+00	6 09E+00		
Pu-240	1 6184E-06	129,014 55	221,167 80	0 00E+00	2 09E+00	3 58E+00		
Pu-241	1 4695E-03	129,014 55	221,167 80	0 00E+00	1.90E+02	3.25E+02		
Pu-242	4 0831E-08	129,014 55	221,167 80	0 00E+00	5.27E-03	9 03E-03		
Ra-226	2 1423E-08	129,014 55	221,167 80	0 00E+00	2 76E-03	4 74E-03		
Ra-228	4 6236E-06	129,014 55	221,167 80	0 00E+00	5 97E-01	1 02E+00		
Ru-106	4 0208E-11	129,014 55	221,167 80	0 00E+00	5 19E-06	8 89E-06		
Se-79	3 5417E-05	129,014 55	221,167 80	0 00E+00	4 57E+00	7 83E+00		
Sn-126	3 9848E-05	129,014 55	221,167 80	0 00E+00	5 14E+00	8 81E+00		
Sr-90	1 4928E+00	129,014 55	221,167 80	0 00E+00	1 93E+05	3 30E+05		
Tc-99	3 2525E-04	129,014 55	221,167 80	0 00E+00	4 20E+01	7 19E+01		
Th-229	6 4582E-05	129,014 55	221,167 80	0 00E+00	8 33E+00	1 43E+01		
Th-230	1 1432E-06	129,014 55	221,167 80	0 00E+00	1 47E-01	2 53E-01		
Th-232	-9 0328E-08	129,014 55	0 00	9 27E-01	9 15E-01	9 27E-01		
Tl-208	1 3964E-02	129,014 55	221,167 80	0 00E+00	1 80E+03	3 09E+03		
U-232	3 7822E-02	129,014 55	221,167 80	0 00E+00	4 88E+03	8 37E+03		
U-233	-3 3244E-03	129,014 55	0 00	3 12E+03	2 69E+03	3 12E+03		
U-234	8 1769E-04	129,014 55	221,167 80	0 00E+00	1 05E+02	1 81E+02		
U-235	5 7813E-08	129,014 55	221,167 80	6 38E-04	8 10E-03	1 34E-02		
U-236	1 3273E-07	129,014 55	221,167 80	0 00E+00	1 71E-02	2 94E-02		
U-238	-3 1121E-10	129,014 55	0 00	4 08E-04	3 68E-04	4 08E-04		
Y-90	1 4928E+00	129,014 55	221,167 80	0 00E+00	1.93E+05	3 30E+05		
Other Radionuclides					2.15E+05	3 69E+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	ZIRC	
BOL HM Constituents:	Th and U	Th and U	
BOL Enrichment %	0 07286152	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	129 014 55	73,600 31	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup taken directly from SFD (converted to MWd)
Bounding	221,167 80	147,200 62	

Checks			Estimated EOL HM/Gven EOL HM
	Burnup Multiplier	Estimated Burnup/Gven Burnup	
Nominal	0 66	0 57	0 99
Bounding	1 13	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 SHIPPINGPORT LWBR REFLECT IV
 SNF ID # 371
 Fuel Units & Descr: 9 - 261 ROD ARRAY
 Heavy Metal Mass: BOL=11491.6kg EOL=11491.5kg
 ROD Storage Site INEEL

Fuel decay start date 1982
 Estimates as of 2030
 Template LWBR (Light Water, Zirc, 60 to 100%, Th and U)
 *Template Burnup(MWd) 10269.14
 Template BOL Heavy Metal Mass (MT) 0.45991251
 Template Decay Time 35 years

Estimated
 Canister usage:
 24"x15"
 9.00

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	9.7360E-05	25,281.52	51,712.20	0.00E+00	2.46E+00	5.03E+00	Avg MeV	
Am-241	2.4345E-04	25,281.52	51,712.20	0.00E+00	6.15E+00	1.26E+01	0.0150	4.275E+15
Am-242m	1.4821E-06	25,281.52	51,712.20	0.00E+00	3.75E-02	7.66E-02	0.0250	8.785E+14
Am-243	3.1152E-07	25,281.52	51,712.20	0.00E+00	7.88E-03	1.61E-02	0.0375	7.510E+14
C-14	9.2432E-05	25,281.52	51,712.20	0.00E+00	2.34E+00	4.78E+00	0.0575	8.207E+14
Cl-36	1.8103E-06	25,281.52	51,712.20	0.00E+00	4.58E-02	9.36E-02	0.0850	5.243E+14
Cm-243	3.0597E-07	25,281.52	51,712.20	0.00E+00	7.74E-03	1.58E-02	0.1250	3.285E+14
Cm-244	1.4149E-05	25,281.52	51,712.20	0.00E+00	3.58E-01	7.32E-01	0.2250	4.701E+14
Co-60	8.7369E-04	25,281.52	51,712.20	0.00E+00	2.21E+01	4.52E+01	0.3750	1.888E+14
Cs-134	2.5601E-05	25,281.52	51,712.20	0.00E+00	6.47E-01	1.32E+00	0.5750	2.882E+15
Cs-135	2.8639E-05	25,281.52	51,712.20	0.00E+00	7.24E-01	1.48E+00	0.8500	5.150E+13
Cs-137	1.4772E+00	25,281.52	51,712.20	0.00E+00	3.73E+04	7.64E+04	1.2500	2.275E+13
Eu-154	8.6025E-03	25,281.52	51,712.20	0.00E+00	2.17E+02	4.45E+02	1.7500	3.548E+12
Eu-155	6.6062E-04	25,281.52	51,712.20	0.00E+00	1.67E+01	3.42E+01	2.2500	1.032E+08
Fe-55	2.3011E-06	25,281.52	51,712.20	0.00E+00	5.82E-02	1.19E-01	2.7500	2.536E+13
H-3	2.1277E-03	25,281.52	51,712.20	0.00E+00	5.38E+01	1.10E+02	3.5000	1.169E+05
I-129	1.5853E-06	25,281.52	51,712.20	0.00E+00	4.01E-02	8.20E-02	5.0000	3.634E+04
Kr-85	6.2625E-02	25,281.52	51,712.20	0.00E+00	1.58E+03	3.24E+03	7.0000	2.605E+03
Np-237	1.2620E-07	25,281.52	51,712.20	0.00E+00	3.19E-03	6.53E-03	11.0000	1.940E+02
Pa-231	1.2017E-04	25,281.52	51,712.20	0.00E+00	3.04E+00	6.21E+00		
Pb-210	1.4247E-08	25,281.52	51,712.20	0.00E+00	3.60E-04	7.37E-04		
Pm-147	2.6224E-04	25,281.52	51,712.20	0.00E+00	6.63E+00	1.36E+01		
Pu-238	4.2477E-04	25,281.52	51,712.20	0.00E+00	1.07E+01	2.20E+01		
Pu-239	2.7519E-05	25,281.52	51,712.20	0.00E+00	6.96E-01	1.42E+00		
Pu-240	1.6184E-05	25,281.52	51,712.20	0.00E+00	4.09E-01	8.37E-01		
Pu-241	1.4695E-03	25,281.52	51,712.20	0.00E+00	3.71E+01	7.60E+01		
Pu-242	4.0831E-08	25,281.52	51,712.20	0.00E+00	1.03E-03	2.11E-03		
Ra-226	2.1423E-08	25,281.52	51,712.20	0.00E+00	5.42E-04	1.11E-03		
Ra-228	4.6236E-06	25,281.52	51,712.20	0.00E+00	1.17E-01	2.39E-01		
Ru-106	4.0208E-11	25,281.52	51,712.20	0.00E+00	1.02E-06	2.08E-06		
Se-79	3.5417E-05	25,281.52	51,712.20	0.00E+00	8.95E-01	1.83E+00		
Sn-126	3.9848E-05	25,281.52	51,712.20	0.00E+00	1.01E+00	2.06E+00		
Sr-90	1.4928E+00	25,281.52	51,712.20	0.00E+00	3.77E+04	7.72E+04		
Tc-99	3.2525E-04	25,281.52	51,712.20	0.00E+00	8.22E+00	1.68E+01		
Th-229	6.4582E-05	25,281.52	51,712.20	0.00E+00	1.63E+00	3.34E+00		
Th-230	1.1432E-06	25,281.52	51,712.20	0.00E+00	2.89E-02	5.91E-02		
Th-232	-9.0328E-08	25,281.52	0.00	1.21E+00	1.21E+00	1.21E+00		
Ti-208	1.3964E-02	25,281.52	51,712.20	0.00E+00	3.53E+02	7.22E+02		
U-232	3.7822E-02	25,281.52	51,712.20	0.00E+00	9.56E+02	1.96E+03		
U-233	-3.3244E-03	25,281.52	0.00	4.08E+03	4.08E+03	4.08E+03		
U-234	8.1769E-04	25,281.52	51,712.20	0.00E+00	2.07E+01	4.23E+01		
U-235	5.7813E-08	25,281.52	51,712.20	8.35E-04	2.30E-03	3.82E-03		
U-236	1.3273E-07	25,281.52	51,712.20	0.00E+00	3.36E-03	6.86E-03		
U-238	-3.1121E-10	25,281.52	0.00	5.34E-04	5.26E-04	5.34E-04		
Y-90	1.4928E+00	25,281.52	51,712.20	0.00E+00	3.77E+04	7.72E+04		
Other Radionuclides					4.22E+04	8.63E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.90E+02	1.50E+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
Fuel Cladding	ZIRC	ZIRC	This fuel matches on all parameters except enrichment (unknown)
BOL HM Constituents	Th and U	Th and U	
BOL Enrichment %		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	25,281.52	97.22	Nominal burnup taken directly from SFD (converted to MWd)
Bounding	51,712.20	194.44	Bounding burnup taken directly from SFD (converted to MWd)

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.10	0.00	1.00
Bounding	0.20	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: SHIPPINGPORT LWBR REFLECT V
 SNF ID #: 372
 Fuel Units & Descr: 6 - 166 ROD ARRAY
 Heavy Metal Mass: BOL=5850kg, EOL=5844 7kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1982
 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: 35 years

Estimated
 Canister usage
 24"x15"
 6 00

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9 7360E-05	12,870 00	26,325 00	0 00E+00	1 25E+00	2 56E+00	Avg MeV	
Am-241	2 4345E-04	12,870 00	26,325 00	0 00E+00	3 13E+00	6 41E+00	0 0150	2 176E+15
Am-242m	1 4821E-06	12,870 00	26,325 00	0 00E+00	1 91E-02	3 90E-02	0 0250	4 472E+14
Am-243	3 1152E-07	12,870 00	26,325 00	0 00E+00	4 01E-03	8 20E-03	0 0375	3 823E+14
C-14	9 2432E-05	12,870 00	26,325 00	0 00E+00	1 19E+00	2 43E+00	0 0575	4 178E+14
Cl-36	1 8103E-06	12,870 00	26,325 00	0 00E+00	2 33E-02	4 77E-02	0 0850	2 669E+14
Cm-243	3 0597E-07	12,870 00	26,325 00	0 00E+00	3 94E-03	8 05E-03	0 1250	1 672E+14
Cm-244	1 4149E-05	12,870 00	26,325 00	0 00E+00	1 82E-01	3 72E-01	0 2250	2 393E+14
Co-60	8 7369E-04	12,870 00	26,325 00	0 00E+00	1 12E+01	2 30E+01	0 3750	9 610E+13
Cs-134	2 5601E-05	12,870 00	26,325 00	0 00E+00	3 29E-01	6 74E-01	0 5750	1 467E+15
Cs-135	2 8639E-05	12,870 00	26,325 00	0 00E+00	3 69E-01	7 54E-01	0 8500	2 622E+13
Cs-137	1 4772E+00	12,870 00	26,325 00	0 00E+00	1 90E+04	3 89E+04	1 2500	1 158E+13
Eu-154	8 6025E-03	12,870 00	26,325 00	0 00E+00	1 11E+02	2 26E+02	1 7500	1 806E+12
Eu-155	6 6062E-04	12,870 00	26,325 00	0 00E+00	8 50E+00	1 74E+01	2 2500	5 251E+07
Fe-55	2 3011E-06	12,870 00	26,325 00	0 00E+00	2 96E-02	6 06E-02	2 7500	1 291E+13
H-3	2 1277E-03	12 870 00	26 325 00	0 00E+00	2 74E+01	5 60E+01	3 5000	5 952E+04
I-129	1 5853E-06	12,870 00	26,325 00	0 00E+00	2 04E-02	4 17E-02	5 0000	1 850E+04
Kr-85	6 2625E-02	12,870 00	26,325 00	0 00E+00	8 06E+02	1 65E+03	7 0000	1 326E+03
Np-237	1 2620E-07	12,870 00	26,325 00	0 00E+00	1 62E-03	3 32E-03	11 0000	9 875E+01
Pa-231	1 2017E-04	12,870 00	26,325 00	0 00E+00	1 55E+00	3 16E+00		
Pb-210	1 4247E-08	12,870 00	26,325 00	0 00E+00	1 83E-04	3 75E-04		
Pm-147	2 6224E-04	12,870 00	26,325 00	0 00E+00	3 38E+00	6 90E+00		
Pu-238	4 2477E-04	12,870 00	26,325 00	0 00E+00	5 47E+00	1 12E+01		
Pu-239	2 7519E-05	12,870 00	26,325 00	0 00E+00	3 54E-01	7 24E-01		
Pu-240	1 6184E-05	12,870 00	26,325 00	0 00E+00	2 08E-01	4 26E-01		
Pu-241	1 4695E-03	12,870 00	26,325 00	0 00E+00	1 89E+01	3 87E+01		
Pu-242	4 0831E-08	12,870 00	26,325 00	0 00E+00	5 25E-04	1 07E-03		
Ra-226	2 1423E-08	12,870 00	26,325 00	0 00E+00	2 76E-04	5 64E-04		
Ra-228	4 6236E-06	12,870 00	26,325 00	0 00E+00	5 95E-02	1 22E-01		
Ru-106	4 0208E-11	12,870 00	26,325 00	0 00E+00	5 17E-07	1 06E-06		
Se-79	3 5417E-05	12,870 00	26,325 00	0 00E+00	4 56E-01	9 32E-01		
Sn-126	3 9848E-05	12,870 00	26,325 00	0 00E+00	5 13E-01	1 05E+00		
Sr-90	1 4928E+00	12,870 00	26,325 00	0 00E+00	1 92E+04	3 93E+04		
Tc-99	3 2525E-04	12,870 00	26,325 00	0 00E+00	4 19E+00	8 56E+00		
Th-229	6 4582E-05	12,870 00	26,325 00	0 00E+00	8 31E-01	1 70E+00		
Th-230	1 1432E-06	12,870 00	26,325 00	0 00E+00	1 47E-02	3 01E-02		
Th-232	-9 0328E-08	12,870 00	0 00	6 18E-01	6 17E-01	6 18E-01		
Tl-208	1 3964E-02	12,870 00	26,325 00	0 00E+00	1 80E+02	3 68E+02		
U-232	3 7822E-02	12,870 00	26,325 00	0 00E+00	4 87E+02	9 96E+02		
U-233	-3 3244E-03	12,870 00	0 00	2 08E+03	2 03E+03	2 08E+03		
U-234	8 1769E-04	12,870 00	26,325 00	0 00E+00	1 05E+01	2 15E+01		
U-235	5 7813E-08	12,870 00	26,325 00	4 25E-04	1 17E-03	1 95E-03		
U-236	1 3273E-07	12,870 00	26,325 00	0 00E+00	1 71E-03	3 49E-03		
U-238	-3 1121E-10	12,870 00	0 00	2 72E-04	2 68E-04	2 72E-04		
Y-90	1 4928E+00	12,870 00	26,325 00	0 00E+00	1 92E+04	3 93E+04		
Other Radionuclides					2 15E+04	4 39E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.02E+02	7.62E+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	Th and U	Th and U	
BOL Enrichment %:		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	12,870 00	5 157 57	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup taken directly from SFD (converted to MWd)
Bounding	26 325 00	10,315 14	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 10	0 40	1 00
Bounding	0 20	0 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 SHIPPIINGPORT LWBR SCRAP
 SNF ID # 377
 Fuel Units & Descr 7 - CANISTER OF SCRAP
 Heavy Metal Mass BOL=3127kg EOL=3116 4kg
 ROD Storage Site INEEL

Fuel decay start date 1982
 Estimates as of 2030
 Template LWBR (Light Water, Zirc, 60 to 100% Th and U)
 Template Burnup(MWd): 10269 14
 Template BOL Heavy Metal Mass (MT) 0 45991251
 Template Decay Time 35 years

Estimated
 Canister usage:
 HIC
 7 00

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9 7360E-05	10,315 62	166,981 81	0 00E+00	1 00E+00	1 63E+01	Avg MeV	
Am-241	2 4345E-04	10,315 62	166,981 81	0 00E+00	2 51E+00	4 07E+01	0 0150	1.377E+16
Am-242m	1 4821E-06	10,315 62	166,981 81	0 00E+00	1.53E-02	2 47E-01	0 0250	2.837E+15
Am-243	3 1152E-07	10,315 62	166,981 81	0 00E+00	3 21E-03	5 20E-02	0 0375	2 424E+15
C-14	9 2432E-05	10,315 62	166,981.81	0 00E+00	9 53E-01	1 54E+01	0 0575	2 650E+15
Cl-36	1 8103E-06	10,315 62	166,981.81	0 00E+00	1 87E-02	3 02E-01	0 0850	1 693E+15
Cm-243	3 0597E-07	10,315 62	166,981.81	0 00E+00	3 16E-03	5.11E-02	0 1250	1 661E+15
Cm-244	1 4149E-05	10,315 62	166,981.81	0 00E+00	1 46E-01	2 36E+00	0 2250	1 518E+15
Co-60	8 7369E-04	10,315 62	166,981 81	0 00E+00	9 01E+00	1 46E+02	0 3750	6 095E+14
Cs-134	2 5601E-05	10,315 62	166,981 81	0 00E+00	2 64E-01	4 27E+00	0 5750	9 307E+15
Cs-135	2 8639E-05	10,315 62	166,981 81	0 00E+00	2 95E-01	4 78E+00	0 8500	1 663E+14
Cs-137	1 4772E+00	10,315 62	166,981 81	0 00E+00	1 52E+04	2 47E+05	1 2500	7 347E+13
Eu-154	8 6025E-03	10,315 62	166,981 81	0 00E+00	8 87E+01	1 44E+03	1 7500	1 146E+13
Eu-155	6 6062E-04	10,315 62	166,981 81	0 00E+00	6 81E+00	1 10E+02	2 2500	3 329E+08
Fe-55	2 3011E-06	10,315 62	166,981 81	0 00E+00	2 37E-02	3 84E-01	2 7500	8 188E+13
H-3	2 1277E-03	10,315 62	166,981.81	0 00E+00	2 19E+01	3 55E+02	3 5000	2 989E+05
I-129	1 5853E-06	10,315 62	166,981.81	0 00E+00	1 64E-02	2 65E-01	5 0000	9 384E+04
Kr-85	6 2625E-02	10,315 62	166,981.81	0 00E+00	6 46E+02	1 05E+04	7 0000	6 884E+03
Np-237	1 2620E-07	10,315 62	166,981 81	0 00E+00	1 30E-03	2 11E-02	11 0000	5 294E+02
Pa-231	1 2017E-04	10,315 62	166,981 81	0 00E+00	1 24E+00	2 01E+01		
Pb-210	1 4247E-08	10,315 62	166,981 81	0 00E+00	1 47E-04	2 38E-03		
Pm-147	2 6224E-04	10,315 62	166,981 81	0 00E+00	2 71E+00	4 38E+01		
Pu-238	4 2477E-04	10,315 62	166,981 81	0 00E+00	4 38E+00	7 09E+01		
Pu-239	2 7519E-05	10,315 62	166,981 81	0 00E+00	2 84E-01	4 60E+00		
Pu-240	1 6184E-05	10,315 62	166,981 81	0 00E+00	1 67E-01	2 70E+00		
Pu-241	1 4695E-03	10,315 62	166,981 81	0 00E+00	1 52E+01	2 45E+02		
Pu-242	4 0831E-08	10,315 62	166,981.81	0 00E+00	4 21E-04	6 82E-03		
Ra-226	2 1423E-08	10,315 62	166,981.81	0 00E+00	2 21E-04	3 58E-03		
Ra-228	4 6236E-06	10,315 62	166,981.81	0 00E+00	4 77E-02	7 72E-01		
Ru-106	4 0208E-11	10,315 62	166,981 81	0 00E+00	4 15E-07	6 71E-06		
Se-79	3 5417E-05	10,315 62	166,981 81	0 00E+00	3 65E-01	5 91E+00		
Sn-126	3 9848E-05	10,315 62	166,981 81	0 00E+00	4 11E-01	6 65E+00		
Sr-90	1 4928E+00	10,315 62	166,981 81	0 00E+00	1 54E+04	2 49E+05		
Tc-99	3 2525E-04	10,315 62	166,981 81	0 00E+00	3 36E+00	5 43E+01		
Th-229	6 4582E-05	10,315 62	166,981 81	0 00E+00	6 66E-01	1 08E+01		
Th-230	1 1432E-06	10,315 62	166,981 81	0 00E+00	1 18E-02	1 91E-01		
Th-232	-9 0328E-08	10,315 62	0 00	3 30E-01	3 29E-01	3 30E-01		
Ti-208	1 3964E-02	10,315 62	166,981.81	0 00E+00	1 44E+02	2 33E+03		
U-232	3 7822E-02	10,315 62	166,981 81	0 00E+00	3 90E+02	6 32E+03		
U-233	-3 3244E-03	10,315 62	0 00	1 11E+03	1 08E+03	1 11E+03		
U-234	8 1769E-04	10,315 62	166,981 81	0 00E+00	8 44E+00	1 37E+02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	5 7813E-08	10,315 62	166,981 81	2 27E-04	8 24E-04	9 88E-03	3 06E+02	4 48E+03
U-236	1 3273E-07	10,315 62	166,981 81	0 00E+00	1 37E-03	2 22E-02	Total	Total
U-238	-3 1121E-10	10,315 62	0 00	1 45E-04	1 42E-04	1 45E-04		
Y-90	1 4928E+00	10,315 62	166,981 81	0 00E+00	1 54E+04	2 49E+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
Fuel Cladding	ZIRC	ZIRC	This fuel matches on all parameters except enrichment (unknown)
BOL HM Constituents	Th and U	Th and U	
BOL Enrichment %	60 to 100	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		10 315 62	Nominal burnup calculated from the heavy metal mass destroyed
Bounding	166 981.81	20 631.25	Bounding burnup taken directly from SFD (converted to MWd)

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 15		1 00
Bounding	2 39	0 12	

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: SHIPPINGPORT LWBR SCRAP (LINER 15718)
 SNF ID #: 379
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=244 6kg; EOL=242 9kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1982
 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: 35 years

Estimated
 Canister usage
 HIC
 1 00

Radionuclide	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9 7360E-05	1,654 38	13,061 64	0 00E+00	1 61E-01	1 27E+00	Avg MeV	
Am-241	2 4345E-04	1,654 38	13,061 64	0 00E+00	4 03E-01	3 18E+00	0 0150	1 077E+15
Am-242m	1 4821E-06	1,654 38	13,061 64	0 00E+00	2 45E-03	1 94E-02	0 0250	2 219E+14
Am-243	3 1152E-07	1,654 38	13,061 64	0 00E+00	5.15E-04	4 07E-03	0 0375	1 896E+14
C-14	9 2432E-05	1,654 38	13,061 64	0 00E+00	1.53E-01	1 21E+00	0 0575	2 073E+14
Cl-36	1 8103E-06	1,654 38	13,061 64	0 00E+00	2 99E-03	2 36E-02	0 0850	1 324E+14
Cm-243	3 0597E-07	1,654 38	13,061 64	0 00E+00	5 06E-04	4 00E-03	0 1250	8 297E+13
Cm-244	1 4149E-05	1,654 38	13,061 64	0 00E+00	2 34E-02	1 85E-01	0 2250	1 187E+14
Co-60	8 7369E-04	1,654 38	13,061 64	0 00E+00	1 45E+00	1.14E+01	0 3750	4 768E+13
Cs-134	2 5601E-05	1,654 38	13,061 64	0 00E+00	4 24E-02	3 34E-01	0 5750	7 280E+14
Cs-135	2 8639E-05	1,654 38	13,061 64	0 00E+00	4 74E-02	3 74E-01	0 8500	1 301E+13
Cs-137	1 4772E+00	1,654 38	13,061 64	0 00E+00	2 44E+03	1.93E+04	1.2500	5 747E+12
Eu-154	8 6025E-03	1,654 38	13,061 64	0 00E+00	1 42E+01	1.12E+02	1 7500	8 962E+11
Eu-155	6 6062E-04	1,654 38	13,061 64	0 00E+00	1 09E+00	8 63E+00	2.2500	2 604E+07
Fe-55	2 3011E-06	1,654 38	13,061 64	0 00E+00	3 81E-03	3 01E-02	2 7500	6 404E+12
H-3	2 1277E-03	1,654 38	13,061 64	0 00E+00	3 52E+00	2 78E+01	3.5000	2 338E+04
I-129	1 5853E-06	1,654 38	13,061 64	0 00E+00	2 62E-03	2 07E-02	5 0000	7 340E+03
Kr-85	6 2625E-02	1,654 38	13,061 64	0 00E+00	1 04E+02	8 18E+02	7 0000	5 385E+02
Np-237	1 2620E-07	1,654 38	13,061 64	0 00E+00	2 09E-04	1 65E-03	11 0000	4 141E+01
Pa-231	1 2017E-04	1,654 38	13,061 64	0 00E+00	1 99E-01	1 57E+00		
Pb-210	1 4247E-08	1,654 38	13,061 64	0 00E+00	2 36E-05	1 86E-04		
Pm-147	2 6224E-04	1,654 38	13,061 64	0 00E+00	4 34E-01	3 43E+00		
Pu-238	4 2477E-04	1,654 38	13,061 64	0 00E+00	7 03E-01	5 55E+00		
Pu-239	2 7519E-05	1,654 38	13,061 64	0 00E+00	4 55E-02	3 59E-01		
Pu-240	1 6184E-05	1,654 38	13,061 64	0 00E+00	2 68E-02	2 11E-01		
Pu-241	1 4695E-03	1,654 38	13,061 64	0 00E+00	2 43E+00	1 92E+01		
Pu-242	4 0831E-08	1,654 38	13,061 64	0 00E+00	6.75E-05	5 33E-04		
Ra-226	2 1423E-08	1,654 38	13,061 64	0 00E+00	3.54E-05	2 80E-04		
Ra-228	4 6236E-06	1,654 38	13,061 64	0 00E+00	7 65E-03	6 04E-02		
Ru-106	4 0208E-11	1,654 38	13,061 64	0 00E+00	6 65E-08	5 25E-07		
Se-79	3 5417E-05	1,654 38	13,061 64	0 00E+00	5 86E-02	4 63E-01		
Sn-126	3 9848E-05	1,654 38	13,061 64	0 00E+00	6 59E-02	5 20E-01		
Sr-90	1 4928E+00	1,654 38	13,061 64	0 00E+00	2 47E+03	1.95E+04		
Tc-99	3 2525E-04	1,654 38	13,061 64	0 00E+00	5 38E-01	4 25E+00		
Th-229	6 4582E-05	1,654 38	13,061 64	0 00E+00	1 07E-01	8 44E-01		
Th-230	1 1432E-06	1,654 38	13,061 64	0 00E+00	1 89E-03	1 49E-02		
Th-232	-9 0328E-08	1,654 38	0 00	2 58E-02	2 57E-02	2 58E-02		
Tl-208	1 3964E-02	1,654 38	13,061 64	0 00E+00	2.31E+01	1 82E+02		
U-232	3 7822E-02	1,654 38	13,061 64	0 00E+00	6.26E+01	4 94E+02		
U-233	-3 3244E-03	1,654 38	0 00	8 69E+01	8 14E+01	8 69E+01	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	8 1769E-04	1,654 38	13,061 64	0 00E+00	1.35E+00	1 07E+01	4 65E+01	3.51E+02
U-235	5 7813E-08	1,654 38	13 061 64	1 78E-05	1 13E-04	7.73E-04	Total	Total
U-236	1 3273E-07	1,654 38	13,061 64	0 00E+00	2 20E-04	1 73E-03		
U-238	-3 1121E-10	1,654 38	0 00	1 14E-05	1 08E-05	1 14E-05		
Y-90	1 4928E+00	1,654 38	13,061 64	0 00E+00	2 47E+03	1 95E+04		
Other Radionuclides					2 76E+03	2 18E+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	ZIRC	
BOL HM Constituents	Th and U	Th and U	
BOL Enrichment %	0 71	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		1 654 38	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup taken directly from SFD (converted to MWd).
Bounding	13 061 64	3 308 75	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0 30		1 00
Bounding	2 39	0 25	

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

²Total burnup for all fuel associated with this worksheet must be 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 3kg EOL=5110 5kg
 ROD Storage Site INEEL

Fuel decay start date 1982
 Estimates as of 2030
 Template LWBR (Light Water, Zirc, 60 to 100%, Th and U)
 *Template Burnup(MWd) 10269 14
 Template BOL Heavy Metal Mass (MT) 0 45991251
 Template Decay Time 35 years

Estimated
 Canister usage
 18"x15"
 12 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	9 7360E-05	155,505.33	278,657.20	0 00E+00	1 51E+01	2 71E+01	Avg MeV	
Am-241	2 4345E-04	155,505.33	278,657.20	0 00E+00	3 79E+01	6 78E+01	0 0150	2 298E+16
Am-242m	1 4821E-06	155,505.33	278,657.20	0 00E+00	2 30E-01	4 13E-01	0 0250	4 734E+15
Am-243	3 1152E-07	155,505.33	278,657.20	0 00E+00	4 84E-02	8 68E-02	0 0375	4 046E+15
C-14	9 2432E-05	155,505.33	278,657.20	0 00E+00	1 44E+01	2 58E+01	0 0575	4 422E+15
Cl-36	1 8103E-06	155,505.33	278,657.20	0 00E+00	2 82E-01	5 04E-01	0 0850	2 825E+15
Cm-243	3 0597E-07	155,505.33	278,657.20	0 00E+00	4 76E-02	8 53E-02	0 1250	1 770E+15
Cm-244	1 4149E-05	155,505.33	278,657.20	0 00E+00	2 20E+00	3 94E+00	0 2250	2 533E+15
Co-60	8 7369E-04	155,505.33	278,657.20	0 00E+00	1 36E+02	2 43E+02	0 3750	1 017E+15
Cs-134	2 5601E-05	155,505.33	278,657.20	0 00E+00	3 98E+00	7 13E+00	0 5750	1 553E+16
Cs-135	2 8639E-05	155,505.33	278,657.20	0 00E+00	4 45E+00	7 98E+00	0 8500	2 775E+14
Cs-137	1 4772E+00	155,505.33	278,657.20	0 00E+00	2 30E+05	4 12E+05	1 2500	1 226E+14
Eu-154	8 6025E-03	155,505.33	278,657.20	0 00E+00	1 34E+03	2 40E+03	1 7500	1 912E+13
Eu-155	6 6062E-04	155,505.33	278,657.20	0 00E+00	1 03E+02	1 84E+02	2 2500	5 555E+08
Fe-55	2 3011E-06	155,505.33	278,657.20	0 00E+00	3 58E-01	6 41E-01	2 7500	1 366E+14
H-3	2 1277E-03	155,505.33	278,657.20	0 00E+00	3 31E+02	5 93E+02	3 5000	4 988E+05
I-129	1 5853E-06	155,505.33	278,657.20	0 00E+00	2 47E-01	4 42E-01	5 0000	1 566E+05
Kr-85	6 2625E-02	155,505.33	278,657.20	0 00E+00	9 74E+03	1 75E+04	7 0000	1 149E+04
Np-237	1 2620E-07	155,505.33	278,657.20	0 00E+00	1 96E-02	3 52E-02	11 0000	8 834E+02
Pa-231	1 2017E-04	155,505.33	278,657.20	0 00E+00	1 87E+01	3 35E+01		
Pb-210	1 4247E-08	155,505.33	278,657.20	0 00E+00	2 22E-03	3 97E-03		
Pm-147	2 6224E-04	155,505.33	278,657.20	0 00E+00	4 08E+01	7 31E+01		
Pu-238	4 2477E-04	155,505.33	278,657.20	0 00E+00	6 61E+01	1 18E+02		
Pu-239	2 7519E-05	155,505.33	278,657.20	0 00E+00	4 28E+00	7 67E+00		
Pu-240	1 6184E-05	155,505.33	278,657.20	0 00E+00	2 52E+00	4 51E+00		
Pu-241	1 4695E-03	155,505.33	278,657.20	0 00E+00	2 29E+02	4 09E+02		
Pu-242	4 0831E-08	155,505.33	278,657.20	0 00E+00	6 35E-03	1 14E-02		
Ra-226	2 1423E-08	155,505.33	278,657.20	0 00E+00	3 33E-03	5 97E-03		
Ra-228	4 6236E-06	155,505.33	278,657.20	0 00E+00	7 19E-01	1 29E+00		
Ru-106	4 0208E-11	155,505.33	278,657.20	0 00E+00	6 25E-06	1 12E-05		
Se-79	3 5417E-05	155,505.33	278,657.20	0 00E+00	5 51E+00	9 87E+00		
Sn-126	3 9848E-05	155,505.33	278,657.20	0 00E+00	6 20E+00	1 11E+01		
Sr-90	1 4928E+00	155,505.33	278,657.20	0 00E+00	2 32E+05	4 16E+05		
Tc-99	3 2525E-04	155,505.33	278,657.20	0 00E+00	5 06E+01	9 06E+01		
Th-229	6 4582E-05	155,505.33	278,657.20	0 00E+00	1 00E+01	1 80E+01		
Th-230	1 1432E-06	155,505.33	278,657.20	0 00E+00	1 78E-01	3 19E-01		
Th-232	-9 0328E-08	155,505.33	0 00	5 51E-01	5 37E-01	5 51E-01		
Th-208	1 3964E-02	155,505.33	278,657.20	0 00E+00	2 17E+03	3 89E+03		
U-232	3 7822E-02	155,505.33	278,657.20	0 00E+00	5 88E+03	1 05E+04		
U-233	-3 3244E-03	155,505.33	0 00	1 85E+03	1 34E+03	1 85E+03		
U-234	8 1769E-04	155,505.33	278,657.20	0 00E+00	1 27E+02	2 28E+02		
U-235	5 7813E-08	155,505.33	278,657.20	3 79E-04	9 37E-03	1 65E-02		
U-236	1 3273E-07	155,505.33	278,657.20	0 00E+00	2 06E-02	3 70E-02		
U-238	-3 1121E-10	155,505.33	0 00	2 42E-04	1 94E-04	2 42E-04		
Y-90	1 4928E+00	155,505.33	278,657.20	0 00E+00	2 32E+05	4 16E+05		
Other Radionuclides					2 59E+05	4 65E+05		

Thermal Power
 Nominal Heat Output (Watts) 4.18E+03
 Bounding Heat Output (Watts) 7.48E+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	This Template was used for the following reasons This fuel matches on all parameters except enrichment.
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	Th and U	Th and U	
BOL Enrichment %	0 070817874	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	155,505.33	104,906.57	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup taken directly from SFD (converted to MWd)
Bounding	278,657.20	-209 813 14	

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	

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel
 *Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

Fuel decay start date: 1969
 Estimates as of: 2030
 Template: PWR (Light Water, Zirc, 0 to 5%, U)
 Template Burnup(MWd): 61 92
 Template BOL Heavy Metal Mass (MT): 0 00176911
 Template Decay Time: 50 years

Estimated
 Canister usage:
 18"x15"
 36 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	1 0733E-09	13,560.21	27,120.41	0 00E+00	1 46E-05	2 91E-05		
Am-241	1 4751E-01	13,560.21	27,120.41	0 00E+00	2 00E+03	4 00E+03	0 0150	1 032E+15
Am-242m	2 6809E-04	13,560.21	27,120.41	0 00E+00	3 64E+00	7 27E+00	0 0250	2 068E+14
Am-243	6 2484E-04	13,560.21	27,120.41	0 00E+00	8 47E+00	1 69E+01	0 0375	1 949E+14
C-14	4 7820E-05	13,560.21	27,120.41	0 00E+00	6 48E-01	1 30E+00	0 0575	2 438E+14
Cl-36	8 0297E-07	13,560.21	27,120.41	0 00E+00	1 09E-02	2 18E-02	0 0850	1 139E+14
Cm-243	1 7426E-04	13,560.21	27,120.41	0 00E+00	2 36E+00	4 73E+00	0 1250	7 580E+13
Cm-244	2 7616E-02	13,560.21	27,120.41	0 00E+00	3 74E+02	7 49E+02	0 2250	9 727E+13
Co-60	3 5610E-04	13,560.21	27,120.41	0 00E+00	4 83E+00	9 66E+00	0 3750	4 201E+13
Cs-134	2 6260E-07	13,560.21	27,120.41	0 00E+00	3 56E-03	7 12E-03	0 5750	9 893E+14
Cs-135	1 4433E-05	13 560.21	27,120.41	0 00E+00	1 96E-01	3 91E-01	0 8500	9 660E+12
Cs-137	9 8870E-01	13,560.21	27,120.41	0 00E+00	1 34E+04	2 68E+04	1 2500	6 147E+12
Eu-154	6 0320E-03	13,560.21	27,120.41	0 00E+00	8 18E+01	1 64E+02	1 7500	2 703E+11
Eu-155	2 1770E-04	13,560.21	27,120.41	0 00E+00	2 95E+00	5 90E+00	2 2500	4 442E+07
Fe-55	7 9296E-07	13,560.21	27,120.41	0 00E+00	1 08E-02	2 15E-02	2 7500	1 566E+08
H-3	8 9486E-03	13,560.21	27,120.41	0 00E+00	1 21E+02	2 43E+02	3 5000	1 117E+07
I-129	9 8288E-07	13,560.21	27,120.41	0 00E+00	1 33E-02	2 67E-02	5 0000	4 774E+06
Kr-85	1 0707E-02	13,560.21	27,120.41	0 00E+00	1 45E+02	2 90E+02	7 0000	5 500E+05
Np-237	1 1927E-05	13,560.21	27,120.41	0 00E+00	1 62E-01	3 23E-01	11.0000	6.315E+04
Pa-231	1 4703E-09	13,560.21	27,120.41	0 00E+00	1 99E-05	3 99E-05		
Pb-210	1 6828E-10	13,560.21	27,120.41	0 00E+00	2 28E-06	4 56E-06		
Pm-147	6 9606E-06	13,560.21	27,120.41	0 00E+00	9 44E-02	1 89E-01		
Pu-238	6 6263E-02	13,560.21	27,120.41	0 00E+00	8 99E+02	1 80E+03		
Pu-239	1 1618E-02	13,560.21	27,120.41	0 00E+00	1 58E+02	3 15E+02		
Pu-240	1 5142E-02	13,560.21	27,120.41	0 00E+00	2 05E+02	4 11E+02		
Pu-241	4 3766E-01	13,560.21	27,120.41	0 00E+00	5 93E+03	1 19E+04		
Pu-242	6 4260E-05	13,560.21	27,120.41	0 00E+00	8 71E-01	1 74E+00		
Ra-226	3 8501E-10	13,560.21	27,120.41	0 00E+00	5 22E-06	1 04E-05		
Ra-228	5 2955E-12	13,560.21	27,120.41	0 00E+00	7 18E-08	1 44E-07		
Ru-106	2 0413E-14	13,560.21	27,120.41	0 00E+00	2 77E-10	5 54E-10		
Se-79	1 2376E-05	13,560.21	27,120.41	0 00E+00	1 68E-01	3 36E-01		
Sn-126	2 5210E-05	13,560.21	27,120.41	0 00E+00	3 42E-01	6 84E-01		
Sr-90	6 4163E-01	13,560.21	27,120.41	0 00E+00	8 70E+03	1 74E+04		
Tc-99	3 9357E-04	13,560.21	27,120.41	0 00E+00	5 34E+00	1 07E+01		
Th-229	1 5644E-10	13,560.21	27,120.41	0 00E+00	2 12E-06	4 24E-06		
Th-230	2 7972E-08	13,560.21	27,120.41	0 00E+00	3 79E-04	7 59E-04		
Th-232	5 3036E-12	13,560.21	27,120.41	0 00E+00	7 19E-08	1 44E-07		
Tl-208	1 5136E-07	13,560.21	27,120.41	0 00E+00	2 05E-03	4 10E-03		
U-232	4 1005E-07	13,560.21	27,120.41	0 00E+00	5 56E-03	1 11E-02		
U-233	2 5856E-08	13,560.21	27,120.41	0 00E+00	3 51E-04	7 01E-04		
U-234	5 2665E-05	13,560.21	27,120.41	0 00E+00	7 14E-01	1 43E+00		
U-235	-1 4487E-06	13,560.21	0 00	1 24E-02	0 00E+00	1 24E-02		
U-236	7 5888E-06	13,560.21	27,120.41	0 00E+00	1 03E-01	2 06E-01		
U-238	-2 6129E-07	13,560.21	0 00	1 94E-01	1 91E-01	1 94E-01		
Y-90	6 4180E-01	13,560.21	27,120.41	0 00E+00	8 70E+03	1 74E+04		
Other Radionuclides					1 29E+04	2 58E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.45E+02	4.91E+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	U	
BOL Enrichment %	0 98643828	0 to 5	

Burnup Summary (MWd) ³			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal	6 481 51	13,560.21	
Bounding		27 120 41	

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 66	2 09	1 01
Bounding	1 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 SHIPPINGPORT PWR C2 BLKT
 SNF ID # 192
 Fuel Units & Descr 17 - 17 FLAT PLATES
 Heavy Metal Mass BOL=1323.635kg EOL=1038.999kg
 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
 18"x15"
 17.00

Radionuclide	m		x _n		y _n		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	1.0733E-09	270,675.47	541,350.94	0.00E+00	2.91E-04	5.81E-04	Avg MeV	
Am-241	1.4751E-01	270,675.47	541,350.94	0.00E+00	3.99E+04	7.99E+04	0.0150	2.060E+16
Am-242m	2.6809E-04	270,675.47	541,350.94	0.00E+00	7.26E+01	1.45E+02	0.0250	4.128E+15
Am-243	6.2484E-04	270,675.47	541,350.94	0.00E+00	1.69E+02	3.38E+02	0.0375	3.890E+15
C-14	4.7820E-05	270,675.47	541,350.94	0.00E+00	1.29E+01	2.59E+01	0.0575	4.867E+15
Cl-36	8.0297E-07	270,675.47	541,350.94	0.00E+00	2.17E-01	4.35E-01	0.0850	2.274E+15
Cm-243	1.7426E-04	270,675.47	541,350.94	0.00E+00	4.72E+01	9.43E+01	0.1250	1.513E+15
Cm-244	2.7616E-02	270,675.47	541,350.94	0.00E+00	7.48E+03	1.50E+04	0.2250	1.942E+15
Co-60	3.5610E-04	270,675.47	541,350.94	0.00E+00	9.64E+01	1.93E+02	0.3750	8.386E+14
Cs-134	2.6260E-07	270,675.47	541,350.94	0.00E+00	7.11E-02	1.42E-01	0.5750	1.975E+16
Cs-135	1.4433E-05	270,675.47	541,350.94	0.00E+00	3.91E+00	7.81E+00	0.8500	1.928E+14
Cs-137	9.8870E-01	270,675.47	541,350.94	0.00E+00	2.68E+05	5.35E+05	1.2500	1.227E+14
Eu-154	6.0320E-03	270,675.47	541,350.94	0.00E+00	1.63E+03	3.27E+03	1.7500	5.395E+12
Eu-155	2.1770E-04	270,675.47	541,350.94	0.00E+00	5.89E+01	1.18E+02	2.2500	8.866E+08
Fe-55	7.9296E-07	270,675.47	541,350.94	0.00E+00	2.15E-01	4.29E-01	2.7500	3.125E+09
H-3	8.9486E-03	270,675.47	541,350.94	0.00E+00	2.42E+03	4.84E+03	3.5000	2.229E+08
I-129	9.8288E-07	270,675.47	541,350.94	0.00E+00	2.66E-01	5.32E-01	5.0000	9.528E+07
Kr-85	1.0707E-02	270,675.47	541,350.94	0.00E+00	2.90E+03	5.80E+03	7.0000	1.098E+07
Np-237	1.1927E-05	270,675.47	541,350.94	0.00E+00	3.23E+00	6.46E+00	11.0000	1.260E+06
Pa-231	1.4703E-09	270,675.47	541,350.94	0.00E+00	3.98E-04	7.96E-04		
Pb-210	1.6828E-10	270,675.47	541,350.94	0.00E+00	4.55E-05	9.11E-05		
Pm-147	6.9606E-06	270,675.47	541,350.94	0.00E+00	1.88E+00	3.77E+00		
Pu-238	6.6263E-02	270,675.47	541,350.94	0.00E+00	1.79E+04	3.59E+04		
Pu-239	1.1618E-02	270,675.47	541,350.94	0.00E+00	3.14E+03	6.29E+03		
Pu-240	1.5142E-02	270,675.47	541,350.94	0.00E+00	4.10E+03	8.20E+03		
Pu-241	4.3766E-01	270,675.47	541,350.94	0.00E+00	1.18E+05	2.37E+05		
Pu-242	6.4260E-05	270,675.47	541,350.94	0.00E+00	1.74E+01	3.48E+01		
Ra-226	3.8501E-10	270,675.47	541,350.94	0.00E+00	1.04E-04	2.08E-04		
Ra-228	5.2955E-12	270,675.47	541,350.94	0.00E+00	1.43E-06	2.87E-06		
Ru-106	2.0413E-14	270,675.47	541,350.94	0.00E+00	5.53E-09	1.11E-08		
Se-79	1.2376E-05	270,675.47	541,350.94	0.00E+00	3.35E+00	6.70E+00		
Sn-126	2.5210E-05	270,675.47	541,350.94	0.00E+00	6.82E+00	1.36E+01		
Sr-90	6.4163E-01	270,675.47	541,350.94	0.00E+00	1.74E+05	3.47E+05		
Tc-99	3.9357E-04	270,675.47	541,350.94	0.00E+00	1.07E+02	2.13E+02		
Th-229	1.5644E-10	270,675.47	541,350.94	0.00E+00	4.23E-05	8.47E-05		
Th-230	2.7972E-08	270,675.47	541,350.94	0.00E+00	7.57E-03	1.51E-02		
Th-232	5.3036E-12	270,675.47	541,350.94	0.00E+00	1.44E-06	2.87E-06		
Ti-208	1.5136E-07	270,675.47	541,350.94	0.00E+00	4.10E-02	8.19E-02		
U-232	4.1005E-07	270,675.47	541,350.94	0.00E+00	1.11E-01	2.22E-01		
U-233	2.5856E-08	270,675.47	541,350.94	0.00E+00	7.00E-03	1.40E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	5.2665E-05	270,675.47	541,350.94	0.00E+00	1.43E+01	2.85E+01	4.90E+03	9.79E+03
U-235	-1.4487E-06	270,675.47	0.00	2.03E-02	0.00E+00	2.03E-02	Total	Total
U-236	7.5888E-06	270,675.47	541,350.94	0.00E+00	2.05E+00	4.11E+00		
U-238	-2.6129E-07	270,675.47	0.00	4.42E-01	3.71E-01	4.42E-01		
Y-90	6.4180E-01	270,675.47	541,350.94	0.00E+00	1.74E+05	3.47E+05		
Other Radionuclides					2.58E+05	5.16E+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	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	0.71	0 to 5	

Burnup Summary (MWd) ²		Basis for burnup used in estimate	
	From SFD		Estimated
Nominal	18,892.25	270,675.47	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding		541,350.94	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	5.84	14.33	- 1.17
Bounding	11.69		

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 PWR-C1-S4
 SNF ID #: 194
 Fuel Units & Descr: 1 - 17 FLAT PLATES
 Heavy Metal Mass: BOL=3.024kg EOL=2.063kg
 ROD Storage Site: INEEL

Fuel decay start date: 1964
 Estimates as of: 2030
 Template: Pathfinder (Light Water, SST, 60 to 100%, U)
 Template Burnup(MWd): 6 01
 Template BOL Heavy Metal Mass (MT): 0 00012882
 Template Decay Time: 65 years

Estimated
 Canister usage
 18"x15"
 1 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 5940E-08	908 00	1,815 99	0 00E+00	4 17E-05	8 34E-05	Avg MeV	
Am-241	1 1471E-04	908 00	1,815 99	0 00E+00	1 04E-01	2 08E-01	0 0150	6 628E+13
Am-242m	7 4210E-09	908 00	1,815 99	0 00E+00	6 74E-06	1 35E-05	0 0250	1 377E+13
Am-243	9 8236E-10	908 00	1,815 99	0 00E+00	8 92E-07	1 78E-06	0 0375	1 197E+13
C-14	2 2928E-04	908 00	1,815 99	0 00E+00	2 08E-01	4 16E-01	0 0575	1 284E+13
Cl-36	1 2260E-06	908 00	1,815 99	0 00E+00	1 11E-03	2 23E-03	0 0850	7 757E+12
Cm-243	1 2000E-10	908 00	1,815 99	0 00E+00	1 09E-07	2 18E-07	0 1250	5 029E+12
Cm-244	7 3577E-10	908 00	1,815 99	0 00E+00	6 68E-07	1 34E-06	0 2250	6 685E+12
Co-60	1 3732E-03	908 00	1,815 99	0 00E+00	1 25E+00	2 49E+00	0 3750	2 916E+12
Cs-134	1 2709E-10	908 00	1,815 99	0 00E+00	1 15E-07	2 31E-07	0 5750	4 905E+13
Cs-135	3 0316E-05	908 00	1,815 99	0 00E+00	2 75E-02	5 51E-02	0 8500	4 764E+11
Cs-137	7 2579E-01	908 00	1,815 99	0 00E+00	6 59E+02	1 32E+03	1 2500	3 448E+11
Eu-154	5 9750E-05	908 00	1,815 99	0 00E+00	5 43E-02	1 09E-01	1 7500	1 225E+10
Eu-155	1 0577E-05	908 00	1,815 99	0 00E+00	9 60E-03	1 92E-02	2 2500	2 318E+08
Fe-55	4 1631E-07	908 00	1,815 99	0 00E+00	3 78E-04	7 56E-04	2 7500	1 038E+08
H-3	4 6722E-04	908 00	1,815 99	0 00E+00	4 24E-01	8 48E-01	3 5000	1 048E+02
I-129	7 3195E-07	908 00	1,815 99	0 00E+00	6 65E-04	1 33E-03	5 0000	4 327E+01
Kr-85	5 9418E-03	908 00	1,815 99	0 00E+00	5 40E+00	1 08E+01	7 0000	4 782E+00
Np-237	1 1499E-06	908 00	1,815 99	0 00E+00	1 04E-03	2 09E-03	11 0000	5 369E-01
Pa-231	7 0899E-08	908 00	1,815 99	0 00E+00	6 44E-05	1 29E-04		
Pb-210	2 2363E-12	908 00	1,815 99	0 00E+00	2 03E-09	4 06E-09		
Pm-147	4 2296E-07	908 00	1,815 99	0 00E+00	3 84E-04	7 68E-04		
Pu-238	2 3295E-04	908 00	1,815 99	0 00E+00	2 12E-01	4 23E-01		
Pu-239	6 6722E-04	908 00	1,815 99	0 00E+00	6 06E-01	1 21E+00		
Pu-240	8 6556E-05	908 00	1,815 99	0 00E+00	7 86E-02	1 57E-01		
Pu-241	1 6889E-04	908 00	1,815 99	0 00E+00	1 53E-01	3 07E-01		
Pu-242	1 9717E-09	908 00	1,815 99	0 00E+00	1 79E-06	3 58E-06		
Ra-226	4 5740E-12	908 00	1,815 99	0 00E+00	4 15E-09	8 31E-09		
Ra-228	8 3511E-12	908 00	1,815 99	0 00E+00	7 58E-09	1 52E-08		
Ru-106	2 0516E-19	908 00	1,815 99	0 00E+00	1 86E-16	3 73E-16		
Se-79	1 3220E-05	908 00	1,815 99	0 00E+00	1 20E-02	2 40E-02		
Sn-126	1 1489E-05	908 00	1,815 99	0 00E+00	1 04E-02	2 09E-02		
Sr-90	6 6872E-01	908 00	1,815 99	0 00E+00	6 07E+02	1 21E+03		
Tc-99	4 6639E-04	908 00	1,815 99	0 00E+00	4 23E-01	8 47E-01		
Th-229	2 3727E-11	908 00	1,815 99	0 00E+00	2 15E-08	4 31E-08		
Th-230	2 7354E-10	908 00	1,815 99	0 00E+00	2 48E-07	4 97E-07		
Th-232	8 3594E-12	908 00	1,815 99	0 00E+00	7 59E-09	1 52E-08		
Th-208	1 6228E-08	908 00	1,815 99	0 00E+00	1 47E-05	2 95E-05		
U-232	4 3960E-08	908 00	1,815 99	0 00E+00	3 99E-05	7 98E-05		
U-233	3 3344E-09	908 00	1,815 99	0 00E+00	3 03E-06	6 06E-06		
U-234	4 0749E-07	908 00	1,815 99	0 00E+00	3 70E-04	7 40E-04		
U-235	-2 7761E-06	908 00	0 00	6 08E-03	3 56E-03	6 08E-03		
U-236	1 6190E-05	908 00	1,815 99	0 00E+00	1 47E-02	2 94E-02		
U-238	-2 8547E-09	908 00	0 00	7 12E-05	6 86E-05	7 12E-05		
Y-90	6 6889E-01	908 00	1,815 99	0 00E+00	6 07E+02	1 21E+03		
Other Radionuclides					8 25E+02	1 65E+03		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							7.39E+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:	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	U	U	
BOL Enrichment %:	92.9998016	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		908 00	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding		1 815 99	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	6.44		1 01
Bounding	12.87		

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 PWR-C2-S1
 SNF ID # 195
 Fuel Units & Descr 19 - 19 FLAT PLATES
 Heavy Metal Mass BOL=343.226kg EOL=220 031kg
 ROD Storage Site INEEL

¹Fuel decay start date: 1969
 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"x15"
 19 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	
	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²						Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3 4276E-08	116,375 01	232,750 02	0 00E+00	3 99E-03	7 98E-03	Avg MeV		
Am-241	1 1458E-04	116,375 01	232,750 02	0 00E+00	1 33E+01	2 67E+01	0 0150	1 214E+16	
Am-242m	7 9468E-09	116,375 01	232,750 02	0 00E+00	9 25E-04	1 85E-03	0 0250	2 522E+15	
Am-243	9 8386E-10	116,375 01	232,750 02	0 00E+00	1 14E-04	2 29E-04	0 0375	2 187E+15	
C-14	2 2978E-04	116,375 01	232,750 02	0 00E+00	2 67E+01	5 35E+01	0 0575	2 352E+15	
Cl-36	1 2261E-06	116,375 01	232,750 02	0 00E+00	1 43E-01	2 85E-01	0 0850	1 421E+15	
Cm-243	1 7271E-10	116,375 01	232,750 02	0 00E+00	2 01E-05	4 02E-05	0 1250	9 217E+14	
Cm-244	1 3058E-09	116,375 01	232,750 02	0 00E+00	1 52E-04	3 04E-04	0 2250	1 224E+15	
Co-60	9 8636E-03	116,375 01	232,750 02	0 00E+00	1 15E+03	2 30E+03	0 3750	5 341E+14	
Cs-134	1 9617E-08	116,375 01	232,750 02	0 00E+00	2 28E-03	4 57E-03	0 5750	8 892E+15	
Cs-135	3 0316E-05	116,375 01	232,750 02	0 00E+00	3 53E+00	7 06E+00	0 8500	8 779E+13	
Cs-137	1 0263E+00	116,375 01	232,750 02	0 00E+00	1 19E+05	2 39E+05	1 2500	1 990E+14	
Eu-154	2 0017E-04	116,375 01	232,750 02	0 00E+00	2 33E+01	4 66E+01	1 7500	2 260E+12	
Eu-155	8 5957E-05	116,375 01	232,750 02	0 00E+00	1 00E+01	2 00E+01	2 2500	1 146E+09	
Fe-55	2 2646E-05	116,375 01	232,750 02	0 00E+00	2 64E+00	5 27E+00	2 7500	1 561E+08	
H-3	1 0835E-03	116,375 01	232,750 02	0 00E+00	1 26E+02	2 52E+02	3 5000	1 361E+04	
I-129	7 3195E-07	116,375 01	232,750 02	0 00E+00	8 52E-02	1 70E-01	5 0000	5 620E+03	
Kr-85	1 5661E-02	116,375 01	232,750 02	0 00E+00	1 82E+03	3 64E+03	7 0000	6 208E+02	
Np-237	1 1494E-06	116,375 01	232,750 02	0 00E+00	1 34E-01	2 68E-01	11 0000	6 968E+01	
Pa-231	5 8070E-08	116,375 01	232,750 02	0 00E+00	6 76E-03	1 35E-02			
Pb-210	1 2985E-12	116,375 01	232,750 02	0 00E+00	1 51E-07	3 02E-07			
Pm-147	2 2196E-05	116,375 01	232,750 02	0 00E+00	2 58E+00	5 17E+00			
Pu-238	2 6223E-04	116,375 01	232,750 02	0 00E+00	3 05E+01	6 10E+01			
Pu-239	6 6739E-04	116,375 01	232,750 02	0 00E+00	7 77E+01	1 55E+02			
Pu-240	8 6705E-05	116,375 01	232,750 02	0 00E+00	1 01E+01	2 02E+01			
Pu-241	3 4759E-04	116,375 01	232,750 02	0 00E+00	4 05E+01	8 09E+01			
Pu-242	1 9717E-09	116,375 01	232,750 02	0 00E+00	2 29E-04	4 59E-04			
Ra-226	3 0000E-12	116,375 01	232,750 02	0 00E+00	3 49E-07	6 98E-07			
Ra-228	8 3328E-12	116,375 01	232,750 02	0 00E+00	9 70E-07	1 94E-06			
Ru-106	6 1464E-15	116,375 01	232,750 02	0 00E+00	7 15E-10	1 43E-09			
Se-79	1 3221E-05	116,375 01	232,750 02	0 00E+00	1 54E+00	3 08E+00			
Sn-126	1 1491E-05	116,375 01	232,750 02	0 00E+00	1 34E+00	2 67E+00			
Sr-90	9 5541E-01	116,375 01	232,750 02	0 00E+00	1 11E+05	2 22E+05			
Tc-99	4 6656E-04	116,375 01	232,750 02	0 00E+00	5 43E+01	1 09E+02			
Th-229	1 9085E-11	116,375 01	232,750 02	0 00E+00	2 22E-06	4 44E-06			
Th-230	2 1913E-10	116,375 01	232,750 02	0 00E+00	2 55E-05	5 10E-05			
Th-232	8 3478E-12	116,375 01	232,750 02	0 00E+00	9 71E-07	1 94E-06			
Tl-208	1 8752E-08	116,375 01	232,750 02	0 00E+00	2 18E-03	4 36E-03			
U-232	5 0782E-08	116,375 01	232,750 02	0 00E+00	5 91E-03	1 18E-02			
U-233	3 2596E-09	116,375 01	232,750 02	0 00E+00	3 79E-04	7 59E-04			
U-234	3 9817E-07	116,375 01	232,750 02	0 00E+00	4 63E-02	9 27E-02			
U-235	-2 7761E-06	116,375 01	0 00	6 90E-01	3 67E-01	6 90E-01			
U-236	1 6190E-05	116,375 01	232,750 02	0 00E+00	1 88E+00	3 77E+00			
U-238	-2 8547E-09	116,375 01	0 00	8 07E-03	7 74E-03	8 07E-03			
Y-90	9 5557E-01	116,375 01	232,750 02	0 00E+00	1 11E+05	2 22E+05			
Other Radionuclides					1 42E+05	2 84E+05			

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
	LIGHT WATER	LIGHT WATER	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	U	U	
BOL Enrichment %	93 00008304	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
		116,375 01	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding		232,750 02	

Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	7.27		1 01
Bounding	14.54		

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: SHIPPINGPORT PWR-C2-S2 Fuel decay start date: 1974
 SNF ID #: 196 Estimates as of: 2030
 Fuel Units & Descr: 20 - 19 FLAT PLATES Template: Pathfinder (Light Water, SST, 60 to 100%, U)
 Heavy Metal Mass: BOL=419 354kg EOL=301 588kg Template Burnup(MWd): 6 01
 ROD Storage Site: INEEL Template BOL Heavy Metal Mass (MT): 0 00012882
Template Decay Time: 50 years

Estimated
Canister usage
18"x15"
20 00

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.4276E-08	111,247 37	222,494 74	0 00E+00	3 81E-03	7 63E-03	Av	MeV
Am-241	1 1458E-04	111,247 37	222,494.74	0 00E+00	1.27E+01	2 55E+01	0 0150	1 160E+16
Am-242m	7 9468E-09	111,247 37	222,494 74	0 00E+00	8 84E-04	1.77E-03	0 0250	2 411E+15
Am-243	9 8386E-10	111,247 37	222,494.74	0 00E+00	1 09E-04	2.19E-04	0 0375	2 090E+15
C-14	2.2978E-04	111,247 37	222,494.74	0 00E+00	2 56E+01	5 11E+01	0 0575	2 248E+15
Cl-36	1.2281E-06	111,247 37	222,494.74	0 00E+00	1 36E+01	2 73E-01	0 0575	1 358E+15
Cm-243	1.7271E-10	111,247 37	222,494 74	0 00E+00	1 92E-05	3 84E-05	0 1250	8 811E+14
Cm-244	1.3058E-09	111,247 37	222,494 74	0 00E+00	1 45E-04	2 91E-04	0.2250	1 170E+15
Co-60	9 8636E-03	111,247 37	222,494 74	0 00E+00	1 10E+03	2 19E+03	0.3750	5 105E+14
Cs-134	1 9617E-08	111,247 37	222,494 74	0 00E+00	2 18E-03	4.36E-03	0.5750	8 500E+15
Cs-135	3 0316E-05	111,247 37	222,494.74	0 00E+00	3 37E+00	6.75E+00	0 8500	8 392E+13
Cs-137	1 0263E+00	111,247 37	222,494 74	0 00E+00	1 14E+05	2 28E+05	1.2500	1 911E+14
Eu-154	2 0017E-04	111,247 37	222,494 74	0 00E+00	2 23E+01	4 45E+01	1 7500	2 161E+12
Eu-155	8 5957E-05	111,247 37	222,494 74	0 00E+00	9 56E+00	1 91E+01	2.2500	1 095E+09
Fe-55	2.2646E-05	111,247 37	222,494 74	0 00E+00	2 52E+00	5 04E+00	2 7500	1 492E+08
H-3	1 0835E-03	111,247 37	222,494 74	0 00E+00	1.21E+02	2 41E+02	3.5000	1 303E+04
I-129	7 3195E-07	111,247 37	222,494 74	0 00E+00	8 14E-02	1 63E-01	5 0000	5 380E+03
Kr-85	1 5661E-02	111,247 37	222,494 74	0 00E+00	1 74E+03	3 48E+03	7 0000	5 943E+02
Np-237	1 1494E-06	111,247 37	222,494 74	0 00E+00	1 28E-01	2 56E-01	11 0000	6 670E+01
Pa-231	5 8070E-08	111,247 37	222,494 74	0 00E+00	6 46E-03	1.29E-02		
Pb-210	1.2985E-12	111,247 37	222,494 74	0 00E+00	1 44E-07	2.89E-07		
Pm-147	2.2196E-05	111,247 37	222,494 74	0 00E+00	2 47E+00	4 94E+00		
Pu-238	2 6223E-04	111,247 37	222,494 74	0 00E+00	2 92E+01	5 83E+01		
Pu-239	6 6739E-04	111,247 37	222,494 74	0 00E+00	7 42E+01	1 48E+02		
Pu-240	8 6705E-05	111,247 37	222,494 74	0 00E+00	9 65E+00	1 93E+01		
Pu-241	3 4759E-04	111,247 37	222,494.74	0 00E+00	3 87E+01	7 73E+01		
Pu-242	1 9717E-09	111,247 37	222,494 74	0 00E+00	2 19E-04	4.39E-04		
Ra-226	3 0000E-12	111,247 37	222,494 74	0 00E+00	3 34E-07	6 67E-07		
Ra-228	8 3328E-12	111,247 37	222,494 74	0 00E+00	9 27E-07	1 85E-06		
Ru-106	6 1464E-15	111,247 37	222,494 74	0 00E+00	6 84E-10	1.37E-09		
Se-79	1 3221E-05	111,247 37	222,494 74	0 00E+00	1 47E+00	2.94E+00		
Sn-126	1 1491E-05	111,247 37	222,494 74	0 00E+00	1.28E+00	2.56E+00		
Sr-90	9 5541E-01	111,247 37	222,494 74	0 00E+00	1 06E+05	2 13E+05		
Tc-99	4 6656E-04	111,247 37	222,494 74	0 00E+00	5 19E+01	1 04E+02		
Th-229	1 9085E-11	111,247 37	222,494 74	0 00E+00	2 12E-06	4.25E-06		
Th-230	2 1913E-10	111,247 37	222,494 74	0 00E+00	2 44E-05	4 88E-05		
Th-232	8 3478E-12	111,247 37	222,494 74	0 00E+00	9 29E-07	1 86E-06		
Tl-208	1 8752E-08	111,247 37	222,494 74	0 00E+00	2 09E-03	4.17E-03		
U-232	5 0782E-08	111,247 37	222,494 74	0 00E+00	5 65E-03	1 13E-02		
U-233	3 2596E-09	111,247 37	222,494 74	0 00E+00	3 63E-04	7.25E-04		
U-234	3 9817E-07	111,247 37	222,494.74	0 00E+00	4 43E-02	8 86E-02		
U-235	-2 7761E-06	111,247 37	0 00	8 43E-01	5 34E-01	8 43E-01		
U-236	1 6190E-05	111,247 37	222,494.74	0 00E+00	1 80E+00	3 60E+00		
U-238	-2 8547E-09	111,247 37	0 00	9 87E-03	9 55E-03	9 87E-03		
Y-90	9 5557E-01	111,247 37	222,494.74	0 00E+00	1 06E+05	2.13E+05		
Other Radionuclides					1 36E+05	2.71E+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 Pathfinder Template on all but one parameter (cladding, but substituting Stainless Steel is a good conservative assumption)
Fuel Cladding:	ZIRC	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.00000016	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		111,247 37	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		222 494 74	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	5 69		1 01
Bounding	11 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

J. Fuel and Template Information

Fuel Name SM-1A	¹ Fuel decay start date 1971	Estimated Canister usage 18"x10" 5 81
SNF ID # 201	Estimates as of 2030	
Fuel Units & Descr: 93 - ASSEMBLY	Template Pathfinder (Light Water, SST, 60 to 100% U)	
Heavy Metal Mass BOL=79 775kg EOL=65 751kg	² Template Burnup(MWd) 6 01	
ROD Storage Site: INEEL	Template BOL Heavy Metal Mass (MT) 0 00012882	
	Template Decay Time 50 years	

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	13,248 12	26,496 23	0 00E+00	4 54E-04	9 08E-04	Avg MeV	
Am-241	1 1458E-04	13,248 12	26,496 23	0 00E+00	1 52E+00	3 04E+00	0 0150	1 382E+15
Am-242m	7 9468E-09	13,248 12	26,496 23	0 00E+00	1 05E-04	2 11E-04	0 0250	2 871E+14
Am-243	9 8386E-10	13,248 12	26,496 23	0 00E+00	1 30E-05	2 61E-05	0 0375	2 489E+14
C-14	2 2978E-04	13,248 12	26,496 23	0 00E+00	3 04E+00	6 09E+00	0 0575	2 678E+14
Cl-36	1 2271E-06	13,248 12	26,496 23	0 00E+00	1 62E-02	3 25E-02	0 0850	1 617E+14
Cm-243	1 7271E-10	13,248 12	26,496 23	0 00E+00	2 29E-06	4 58E-06	0 1250	1 049E+14
Cm-244	1 3058E-09	13,248 12	26,496 23	0 00E+00	1 73E-05	3 46E-05	0 2250	1 394E+14
Co-60	9 8636E-03	13,248 12	26,496 23	0 00E+00	1 31E+02	2 61E+02	0 3750	6 080E+13
Cs-134	1 9617E-08	13,248 12	26,496 23	0 00E+00	2 60E-04	5 20E-04	0 6750	1 012E+15
Cs-135	3 0316E-05	13,248 12	26,496 23	0 00E+00	4 02E-01	8 03E-01	0 8500	9 994E+12
Cs-137	1 0263E+00	13,248 12	26,496 23	0 00E+00	1 36E+04	2 72E+04	1 2500	2 276E+13
Eu-154	2 0017E-04	13,248 12	26,496 23	0 00E+00	2 65E+00	5 30E+00	1 7500	2 573E+11
Eu-155	8 5957E-05	13,248 12	26,496 23	0 00E+00	1 14E+00	2 28E+00	2 2500	1 304E+08
Fe-55	2 2646E-05	13,248 12	26,496 23	0 00E+00	3 00E-01	6 00E-01	2 7500	1 777E+07
H-3	1 0835E-03	13,248 12	26,496 23	0 00E+00	1 44E+01	2 87E+01	3 5000	1 558E+03
I-129	7 3195E-07	13,248 12	26,496 23	0 00E+00	9 70E-03	1 94E-02	5 0000	6 431E+02
Kr-85	1 5661E-02	13,248 12	26,496 23	0 00E+00	2 07E+02	4 15E+02	7 0000	7 104E+01
Np-237	1 1494E-06	13,248 12	26,496 23	0 00E+00	1 52E-02	3 05E-02	11 0000	7 974E+00
Pa-231	5 8070E-08	13,248 12	26,496 23	0 00E+00	7 69E-04	1 54E-03		
Pb-210	1 2985E-12	13,248 12	26,496 23	0 00E+00	1 72E-08	3 44E-08		
Pm-147	2 2196E-05	13,248 12	26,496 23	0 00E+00	2 94E-01	5 88E-01		
Pu-238	2 6223E-04	13,248 12	26,496 23	0 00E+00	3 47E+00	6 95E+00		
Pu-239	6 6739E-04	13,248 12	26,496 23	0 00E+00	8 84E+00	1 77E+01		
Pu-240	8 6705E-05	13,248 12	26,496 23	0 00E+00	1 15E+00	2 30E+00		
Pu-241	3 4759E-04	13,248 12	26,496 23	0 00E+00	4 60E+00	9 21E+00		
Pu-242	1 9717E-09	13,248 12	26,496 23	0 00E+00	2 61E-05	5 22E-05		
Ra-226	3 0000E-12	13,248 12	26,496 23	0 00E+00	3 97E-08	7 95E-08		
Ra-228	8 3328E-12	13,248 12	26,496 23	0 00E+00	1 10E-07	2 21E-07		
Ru-106	6 1464E-15	13,248 12	26,496 23	0 00E+00	8 14E-11	1 63E-10		
Se-79	1 3221E-05	13,248 12	26,496 23	0 00E+00	1 75E-01	3 50E-01		
Sn-126	1 1491E-05	13,248 12	26,496 23	0 00E+00	1 52E-01	3 04E-01		
Sr-90	9 5541E-01	13,248 12	26,496 23	0 00E+00	1 27E+04	2 53E+04		
Tc-99	4 6656E-04	13,248 12	26,496 23	0 00E+00	6 18E+00	1 24E+01		
Th-229	1 9085E-11	13,248 12	26,496 23	0 00E+00	2 53E-07	5 06E-07		
Th-230	2 1913E-10	13,248 12	26,496 23	0 00E+00	2 90E-06	5 81E-06		
Th-232	8 3478E-12	13,248 12	26,496 23	0 00E+00	1 11E-07	2 21E-07		
Ti-208	1 8752E-08	13,248 12	26,496 23	0 00E+00	2 48E-04	4 97E-04		
U-232	5 0782E-08	13,248 12	26,496 23	0 00E+00	6 73E-04	1 35E-03		
U-233	3 2596E-09	13,248 12	26,496 23	0 00E+00	4 32E-05	8 64E-05		
U-234	3 9817E-07	13,248 12	26,496 23	0 00E+00	5 27E-03	1 05E-02		
U-235	-2 7761E-06	13,248 12	0 00	1 60E-01	1 24E-01	1 60E-01		
U-236	1 6190E-05	13,248 12	26,496 23	0 00E+00	2 14E-01	4 29E-01		
U-238	-2 8547E-09	13,248 12	0 00	1 87E-03	1 84E-03	1 87E-03		
Y-90	9 5557E-01	13,248 12	26,496 23	0 00E+00	1 27E+04	2 53E+04		
					1 62E+04	3 23E+04		

Other Radionuclides

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	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	93 01311673	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal	408 77	13,248 12	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding		26 496 23	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	3.56	32 41	1 01
Bounding	7 12		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information:

Fuel Name: SNAP
 SNF ID #: 203
 Fuel Units & Descr: 615 - DECLAD ROD
 Heavy Metal Mass: BOL = ; EOL=29 766kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1958
 Estimates as of: 2030
 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: 65 years

Estimated
 Canister usage:
 HIC
 6 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 Inventones(Ci)	Bounding Fuel Inventones(Ci)	Avg MeV	
Ac-227	1 2442E-08	28,414 84	28,414 84	0 00E+00	3 54E-04	3 54E-04		
Am-241	4 0120E-03	28,414 84	28,414 84	0 00E+00	1 14E+02	1 14E+02	0 0150	9 715E+14
Am-242m	1 0749E-06	28,414 84	28,414 84	0 00E+00	3 05E-02	3 05E-02	0 0250	2 017E+14
Am-243	1 4692E-07	28,414 84	28,414 84	0 00E+00	4 17E-03	4 17E-03	0 0375	1 759E+14
C-14	1 2777E-04	28,414 84	28,414 84	0 00E+00	3 63E+00	3 63E+00	0 0575	1 896E+14
Ct-36	2 8120E-06	28,414 84	28,414 84	0 00E+00	7 99E-02	7 99E-02	0 0850	1 136E+14
Cm-243	4 1759E-08	28,414 84	28,414 84	0 00E+00	1 19E-03	1 19E-03	0 1250	7 365E+13
Cm-244	1 7098E-07	28,414 84	28,414 84	0 00E+00	4 86E-03	4 86E-03	0 2250	9 784E+13
Co-60	4 8241E-04	28,414 84	28,414 84	0 00E+00	1 37E+01	1 37E+01	0 3750	4 267E+13
Cs-134	1 5970E-06	28,414 84	28,414 84	0 00E+00	4 54E-06	4 54E-06	0 5750	7 289E+14
Cs-135	3 2195E-05	28,414 84	28,414 84	0 00E+00	9 15E-01	9 15E-01	0 8500	7 012E+12
Cs-137	6 8977E-01	28,414 84	28,414 84	0 00E+00	1 96E+04	1 96E+04	1 2500	3 401E+12
Eu-154	1 2238E-04	28,414 84	28,414 84	0 00E+00	3 48E+00	3 48E+00	1 7500	1 804E+11
Eu-155	6 7158E-06	28,414 84	28,414 84	0 00E+00	1 91E-01	1 91E-01	2 2500	2 504E+07
Fe-55	8 8165E-08	28,414 84	28,414 84	0 00E+00	2 51E-03	2 51E-03	2 7500	1 034E+07
H-3	3 8376E-04	28,414 84	28,414 84	0 00E+00	1 09E+01	1 09E+01	3 5000	3 460E+04
I-129	7 3684E-07	28,414 84	28,414 84	0 00E+00	2 09E-02	2 09E-02	5 0000	1 456E+04
Kr-85	5 2316E-03	28,414 84	28,414 84	0 00E+00	1 49E+02	1 49E+02	7 0000	1 643E+03
Np-237	1 3232E-06	28,414 84	28,414 84	0 00E+00	3 76E-02	3 76E-02	11 0000	1 867E+02
Pa-231	1 8722E-08	28,414 84	28,414 84	0 00E+00	5 32E-04	5 32E-04		
Pb-210	1 2620E-12	28,414 84	28,414 84	0 00E+00	3 59E-08	3 59E-08		
Pm-147	2 7714E-07	28,414 84	28,414 84	0 00E+00	7 87E-03	7 87E-03		
Pu-238	6 4707E-04	28,414 84	28,414 84	0 00E+00	1 84E+01	1 84E+01		
Pu-239	5 5203E-03	28,414 84	28,414 84	0 00E+00	1 57E+02	1 57E+02		
Pu-240	2 1143E-03	28,414 84	28,414 84	0 00E+00	6 01E+01	6 01E+01		
Pu-241	5 6872E-03	28,414 84	28,414 84	0 00E+00	1 62E+02	1 62E+02		
Pu-242	2 3128E-07	28,414 84	28,414 84	0 00E+00	6 57E-03	6 57E-03		
Ra-226	2 6466E-12	28,414 84	28,414 84	0 00E+00	7 52E-08	7 52E-08		
Ra-228	2 5278E-10	28,414 84	28,414 84	0 00E+00	7 18E-06	7 18E-06		
Ru-106	1 1377E-19	28,414 84	28,414 84	0 00E+00	3 23E-15	3 23E-15		
Se-79	1 3009E-05	28,414 84	28,414 84	0 00E+00	3 70E-01	3 70E-01		
Sn-126	1 2162E-05	28,414 84	28,414 84	0 00E+00	3 46E-01	3 46E-01		
Sr-90	6 2511E-01	28,414 84	28,414 84	0 00E+00	1 78E+04	1 78E+04		
Tc-99	4 4241E-04	28,414 84	28,414 84	0 00E+00	1 26E+01	1 26E+01		
Th-229	9 4105E-10	28,414 84	28,414 84	0 00E+00	2 67E-05	2 67E-05		
Th-230	1 7098E-10	28,414 84	28,414 84	0 00E+00	4 86E-06	4 86E-06		
Th-232	2 5278E-10	28,414 84	28,414 84	0 00E+00	7 18E-06	7 18E-06		
Tl-208	1 0305E-08	28,414 84	28,414 84	0 00E+00	2 93E-04	2 93E-04		
U-232	2 7669E-08	28,414 84	28,414 84	0 00E+00	7 86E-04	7 86E-04		
U-233	1 2239E-07	28,414 84	28,414 84	0 00E+00	3 48E-03	3 48E-03		
U-234	3 1278E-07	28,414 84	28,414 84	0 00E+00	8 89E-03	8 89E-03		
U-235	-2 6179E-06	28,414 84	0 00	2 57E-02	0 00E+00	2 57E-02		
U-236	1 2696E-05	28,414 84	28,414 84	0 00E+00	3 61E-01	3 61E-01		
U-238	-3 6331E-08	28,414 84	0 00	1 60E-02	1 50E-02	1 60E-02		
Y-90	6 2541E-01	28,414 84	28,414 84	0 00E+00	1 78E+04	1 78E+04		
Other Radionuclides					2 01E+04	2 01E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2 26E+02	2 26E+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) and enrichment (unknown)
Reactor Moderator	From SFD	Used	
Fuel Cladding	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
BOL HM Constituents	NONE	SST	
BOL Enrichment %	U	U	
		10 to 20.1	

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		28 414 84	
Bounding:		28 414 84	

Checks			Estimated EOL HM/Given EOL HM 1 78
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	14 00		
Bounding	14 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 SODIUM LOOP SAFETY FAC
 SNF ID # 352
 Fuel Units & Descr: 20 - ROD
 Heavy Metal Mass BOL=4.2kg EOL=3 968kg
 ROD Storage Site INEEL

¹Fuel decay start date 1981
 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"
 0.42

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	2 3072E-06	220 48	440 96	440 96	0 00E+00	5 09E-04	1 02E-03	Avg MeV	
Am-241	8 4448E+00	220 48	440 96	440 96	0 00E+00	1 86E+03	3 72E+03	0 0150	5 437E+14
Am-242m	1 6848E-02	220 48	440 96	440 96	0 00E+00	3 71E+00	7 43E+00	0 0250	1 075E+14
Am-243	1 6320E-02	220 48	440 96	440 96	0 00E+00	3 60E+00	7 20E+00	0.0375	9 393E+13
C-14	1.2090E-01	220 48	440 96	440 96	0 00E+00	2 67E+01	5 33E+01	0.0575	1 478E+14
Cl-36	2.2849E-03	220 48	440 96	440 96	0 00E+00	5 04E-01	1 01E+00	0 0850	5 769E+13
Cm-243	8 6624E-04	220 48	440 96	440 96	0 00E+00	1.91E-01	3 82E-01	0 1250	4 521E+13
Cm-244	1 6848E-01	220 48	440 96	440 96	0 00E+00	3 71E+01	7 43E+01	0.2250	4 998E+13
Co-60	2 8086E+01	220 48	440 96	440 96	0 00E+00	6 19E+03	1 24E+04	0.3750	2 138E+13
Cs-134	3.4148E-04	220 48	440 96	440 96	0 00E+00	7.53E-02	1 51E-01	0 5750	3 476E+14
Cs-135	4 3976E-04	220 48	440 96	440 96	0 00E+00	9 70E-02	1 94E-01	0.8500	1.328E+13
Cs-137	2 1049E+01	220 48	440 96	440 96	0 00E+00	4 64E+03	9 28E+03	1.2500	9.285E+14
Eu-154	1 2500E+00	220 48	440 96	440 96	0 00E+00	2 76E+02	5 51E+02	1 7500	4 107E+11
Eu-155	6 8986E-02	220 48	440 96	440 96	0 00E+00	1 52E+01	3 04E+01	2.2500	4 869E+09
Fe-55	2 9308E-01	220 48	440 96	440 96	0 00E+00	6 46E+01	1 29E+02	2 7500	1 372E+09
H-3	2 4311E-01	220 48	440 96	440 96	0 00E+00	5 36E+01	1 07E+02	3.5000	1 160E+06
I-129	1 0618E-05	220 48	440 96	440 96	0 00E+00	2.34E-03	4 68E-03	5 0000	4 925E+05
Kr-85	5 9882E-01	220 48	440 96	440 96	0 00E+00	1.32E+02	2 64E+02	7.0000	5 636E+04
Np-237	1 5668E-04	220 48	440 96	440 96	0 00E+00	3 45E-02	6 91E-02	11.0000	6 447E+03
Pa-231	2 8656E-06	220 48	440 96	440 96	0 00E+00	6.32E-04	1.26E-03		
Pb-210	2 3918E-08	220 48	440 96	440 96	0 00E+00	5.27E-06	1 05E-05		
Pm-147	1 6900E-02	220 48	440 96	440 96	0 00E+00	3 73E+00	7 45E+00		
Pu-238	-8 6120E-01	220 48	0 00	0 00	5 40E+02	3 50E+02	5 40E+02		
Pu-239	-4 8440E-02	220 48	0 00	0 00	6 53E+01	5 46E+01	6.53E+01		
Pu-240	-3 0095E-01	220 48	0 00	0 00	8 34E+01	1.70E+01	8 34E+01		
Pu-241	-1 0411E+02	220 48	0 00	0 00	2 15E+04	0 00E+00	2 15E+04		
Pu-242	-1 1381E-04	220 48	0 00	0 00	3 61E-01	3 36E-01	3.61E-01		
Ra-226	6 4400E-08	220 48	440 96	440 96	0 00E+00	1.42E-05	2 84E-05		
Ra-228	5 9952E-07	220 48	440 96	440 96	0 00E+00	1.32E-04	2 64E-04		
Ru-106	8 5526E-07	220 48	440 96	440 96	0 00E+00	1 89E-04	3 77E-04		
Se-79	1 9181E-04	220 48	440 96	440 96	0 00E+00	4.23E-02	8 46E-02		
Sn-126	1 6671E-04	220 48	440 96	440 96	0 00E+00	3 68E-02	7.35E-02		
Sr-90	1 9799E+01	220 48	440 96	440 96	0 00E+00	4.37E+03	8 73E+03		
Tc-99	6 7678E-03	220 48	440 96	440 96	0 00E+00	1.49E+00	2.98E+00		
Th-229	1 7488E-06	220 48	440 96	440 96	0 00E+00	3 86E-04	7.71E-04		
Th-230	5 8704E-06	220 48	440 96	440 96	0 00E+00	1.29E-03	2.59E-03		
Th-232	6 0208E-07	220 48	440 96	440 96	0 00E+00	1.33E-04	2 65E-04		
Th-208	8 7573E-05	220 48	440 96	440 96	0 00E+00	1 93E-02	3 86E-02		
U-232	2.3706E-04	220 48	440 96	440 96	0 00E+00	5.23E-02	1 05E-01		
U-233	3 6128E-04	220 48	440 96	440 96	0 00E+00	7 97E-02	1.59E-01		
U-234	1.2788E-02	220 48	440 96	440 96	0 00E+00	2.82E+00	5 64E+00		
U-235	5 7486E-04	220 48	440 96	440 96	1 81E-03	1.29E-01	2 55E-01		
U-236	2.3485E-04	220 48	440 96	440 96	0 00E+00	5 18E-02	1 04E-01		
U-238	1 1581E-04	220 48	440 96	440 96	2.25E-04	2 58E-02	5 13E-02		
Y-90	1 9804E+01	220 48	440 96	440 96	0 00E+00	4.37E+03	8.73E+03		
Other Radionuclides						1.36E+04	2.72E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	LIGHT WATER	(Worst Case)	This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding	SST	SST/Inconel	
BOL HM Constituents	Pu and U	U, Th & Pu	
BOL Enrichment %	78.235	0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	42 00	220 48	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding		440 96	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	1.57	5.25	35 20
Bounding	3 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: SODIUM LOOP SAFETY FAC
 SNF ID #: 367
 Fuel Units & Descr: 12 - ROD
 Heavy Metal Mass: BOL=6.256kg; EOL=7.332kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1981
 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"
 0.25

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	C _i /MWd From Template	Nominal 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	62.56	125.11	0.00E+00	1.44E-04	2.89E-04		
Am-241	8.4448E+00	62.56	125.11	0.00E+00	5.28E+02	1.06E+03	0.0150	1.595E+14
Am-242m	1.6848E-02	62.56	125.11	0.00E+00	1.05E+00	2.11E+00	0.0250	3.051E+13
Am-243	1.6320E-02	62.56	125.11	0.00E+00	1.02E+00	2.04E+00	0.0375	2.666E+13
Ci-14	1.2090E-01	62.56	125.11	0.00E+00	7.56E+00	1.51E+01	0.0575	4.194E+13
Ci-36	2.2849E-03	62.56	125.11	0.00E+00	1.43E-01	2.86E-01	0.0850	1.637E+13
Cm-243	8.6624E-04	62.56	125.11	0.00E+00	5.42E-02	1.08E-01	0.1250	1.283E+13
Cm-244	1.6848E-01	62.56	125.11	0.00E+00	1.05E+01	2.11E+01	0.2250	1.418E+13
Co-60	2.8086E+01	62.56	125.11	0.00E+00	1.76E+03	3.51E+03	0.3750	6.065E+12
Cs-134	3.4148E-04	62.56	125.11	0.00E+00	2.14E-02	4.27E-02	0.5750	9.862E+13
Cs-135	4.3976E-04	62.56	125.11	0.00E+00	2.75E-02	5.50E-02	0.8500	3.769E+12
Cs-137	2.1049E+01	62.56	125.11	0.00E+00	1.32E+03	2.63E+03	1.2500	2.634E+14
Eu-154	1.2500E+00	62.56	125.11	0.00E+00	7.82E+01	1.56E+02	1.7500	1.165E+11
Eu-155	6.8986E-02	62.56	125.11	0.00E+00	4.32E+00	8.63E+00	2.2500	1.382E+09
Fe-55	2.9308E-01	62.56	125.11	0.00E+00	1.83E+01	3.67E+01	2.7500	3.895E+08
H-3	2.4311E-01	62.56	125.11	0.00E+00	1.52E+01	3.04E+01	3.5000	4.249E+05
I-129	1.0618E-05	62.56	125.11	0.00E+00	6.64E-04	1.33E-03	5.0000	1.801E+05
Kr-85	5.9882E-01	62.56	125.11	0.00E+00	3.75E+01	7.49E+01	7.0000	2.056E+04
Np-237	1.5668E-04	62.56	125.11	0.00E+00	9.80E-03	1.96E-02	11.0000	2.350E+03
Pa-231	2.8656E-06	62.56	125.11	0.00E+00	1.79E-04	3.59E-04		
Pb-210	2.3918E-08	62.56	125.11	0.00E+00	1.50E-06	2.99E-06		
Pm-147	1.6900E-02	62.56	125.11	0.00E+00	1.06E+00	2.11E+00		
Pu-238	-8.6120E-01	62.56	0.00	8.04E-02	7.50E+02	8.04E+02		
Pu-239	-4.8440E-02	62.56	0.00	9.73E+01	9.42E+01	9.73E+01		
Pu-240	-3.0095E-01	62.56	0.00	1.24E+02	1.05E+02	1.24E+02		
Pu-241	-1.0411E+02	62.56	0.00	3.20E+04	2.55E+04	3.20E+04		
Pu-242	-1.1381E-04	62.56	0.00	5.38E-01	5.31E-01	5.38E-01		
Ra-226	6.4400E-09	62.56	125.11	0.00E+00	4.03E-06	8.06E-06		
Ra-228	5.9952E-07	62.56	125.11	0.00E+00	3.75E-05	7.50E-05		
Ru-106	8.5526E-07	62.56	125.11	0.00E+00	5.35E-05	1.07E-04		
Se-79	1.9181E-04	62.56	125.11	0.00E+00	1.20E-02	2.40E-02		
Sn-126	1.6671E-04	62.56	125.11	0.00E+00	1.04E-02	2.09E-02		
Sr-90	1.9799E+01	62.56	125.11	0.00E+00	1.24E+03	2.48E+03		
Tc-99	6.7678E-03	62.56	125.11	0.00E+00	4.23E-01	8.47E-01		
Th-229	1.7488E-06	62.56	125.11	0.00E+00	1.09E-04	2.19E-04		
Th-230	5.8704E-06	62.56	125.11	0.00E+00	3.67E-04	7.34E-04		
Th-232	6.0208E-07	62.56	125.11	0.00E+00	3.77E-05	7.53E-05		
Tl-208	8.7573E-05	62.56	125.11	0.00E+00	5.48E-03	1.10E-02		
U-232	2.3706E-04	62.56	125.11	0.00E+00	1.48E-02	2.97E-02		
U-233	3.6128E-04	62.56	125.11	0.00E+00	2.26E-02	4.52E-02		
U-234	1.2788E-02	62.56	125.11	0.00E+00	8.00E-01	1.60E+00		
U-235	5.7486E-04	62.56	125.11	2.69E-03	3.87E-02	7.46E-02		
U-236	2.3485E-04	62.56	125.11	0.00E+00	1.47E-02	2.94E-02		
U-238	1.1581E-04	62.56	125.11	3.35E-04	7.58E-03	1.48E-02		
Y-90	1.9804E+01	62.56	125.11	0.00E+00	1.24E+03	2.48E+03		
Other Radionuclides					3.86E+03	7.72E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD LIGHT WATER	Used (Worst Case)	
Fuel Cladding	SST	SST/Inconel	
BOL HM Constituents	Pu and U	U, Th, & Pu	
BOL Enrichment %	87.054	0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	62.56	-1,022.96	
Bounding		125.11	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.30	-16.35	
Bounding	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 SPEC (ORME)
 SNF ID # 208
 Fuel Units & Descr: 1 - FLAT PLATES IN CAN
 Heavy Metal Mass: BOL=2.39kg EOL=2.39kg
 ROD Storage Site: INEEL

Fuel decay start date 1958
 Estimates as of 2030
 Template HFBR (Heavy Water, Alum, 10 to 20%, U)
 Template Burnup (MWd) 15
 Template BOL Heavy Metal Mass (MT) 0.00034251
 Template Decay Time 65 years

Estimated
 Canister usage:
 HIC
 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	5.3460E-09	45 43	90 86	0.00E+00	2.43E-07	4.86E-07	0.0150	3.162E+12
Am-241	2.9433E-02	45 43	90 86	0.00E+00	1.34E+00	2.67E+00	0.0250	6.537E+11
Am-242m	7.2600E-06	45 43	90 86	0.00E+00	3.30E-04	6.60E-04	0.0375	5.725E+11
Am-243	6.3740E-06	45 43	90 86	0.00E+00	2.90E-04	5.79E-04	0.0575	6.440E+11
C-14	2.9460E-08	45 43	90 86	0.00E+00	1.34E-06	2.68E-06	0.0850	3.667E+11
Cl-36	5.9507E-35	45 43	90 86	0.00E+00	2.70E-33	5.41E-33	0.1250	2.383E+11
Cm-243	7.3933E-07	45 43	90 86	0.00E+00	3.36E-05	6.72E-05	0.2250	3.158E+11
Cm-244	1.9660E-05	45 43	90 86	0.00E+00	8.93E-04	1.79E-03	0.3750	1.376E+11
Co-60	4.3927E-08	45 43	90 86	0.00E+00	2.00E-06	3.99E-06	0.5750	2.415E+12
Cs-134	5.7507E-10	45 43	90 86	0.00E+00	2.61E-08	5.23E-08	0.8500	2.317E+10
Cs-135	4.8607E-06	45 43	90 86	0.00E+00	2.21E-04	4.42E-04	1.2500	8.345E+09
Cs-137	7.1533E-01	45 43	90 86	0.00E+00	3.25E+01	6.50E+01	1.7500	6.040E+08
Eu-154	5.5553E-04	45 43	90 86	0.00E+00	2.52E-02	5.05E-02	2.2500	6.384E+04
Eu-155	7.5800E-06	45 43	90 86	0.00E+00	3.44E-04	6.89E-04	2.7500	1.630E+04
Fe-55	8.7333E-09	45 43	90 86	0.00E+00	3.97E-07	7.94E-07	3.5000	3.379E+02
H-3	3.7313E-04	45 43	90 86	0.00E+00	1.70E-02	3.39E-02	5.0000	1.413E+02
I-129	7.1600E-07	45 43	90 86	0.00E+00	3.25E-05	6.51E-05	7.0000	1.584E+01
Kr-85	5.5793E-03	45 43	90 86	0.00E+00	2.53E-01	5.07E-01	11.0000	1.793E+00
Np-237	4.2207E-06	45 43	90 86	0.00E+00	1.92E-04	3.84E-04		
Pa-231	8.3333E-09	45 43	90 86	0.00E+00	3.79E-07	7.57E-07		
Pb-210	2.4613E-12	45 43	90 86	0.00E+00	1.12E-10	2.24E-10		
Pm-147	3.1780E-07	45 43	90 86	0.00E+00	1.44E-05	2.89E-05		
Pu-238	3.8753E-03	45 43	90 86	0.00E+00	1.76E-01	3.52E-01		
Pu-239	1.0300E-02	45 43	90 86	0.00E+00	4.68E-01	9.36E-01		
Pu-240	5.3920E-03	45 43	90 86	0.00E+00	2.45E-01	4.90E-01		
Pu-241	4.3067E-02	45 43	90 86	0.00E+00	1.96E+00	3.91E+00		
Pu-242	3.0713E-06	45 43	90 86	0.00E+00	1.40E-04	2.79E-04		
Ra-226	5.8127E-12	45 43	90 86	0.00E+00	2.64E-10	5.28E-10		
Ra-228	4.5447E-14	45 43	90 86	0.00E+00	2.06E-12	4.13E-12		
Ru-106	3.0860E-19	45 43	90 86	0.00E+00	1.40E-17	2.80E-17		
Se-79	1.2533E-05	45 43	90 86	0.00E+00	5.69E-04	1.14E-03		
Sn-126	1.1393E-05	45 43	90 86	0.00E+00	5.18E-04	1.04E-03		
Sr-90	6.3033E-01	45 43	90 86	0.00E+00	2.86E+01	5.73E+01		
Tc-99	4.3527E-04	45 43	90 86	0.00E+00	1.98E-02	3.96E-02		
Th-229	5.2893E-12	45 43	90 86	0.00E+00	2.40E-10	4.81E-10		
Th-230	4.6820E-10	45 43	90 86	0.00E+00	2.13E-08	4.25E-08		
Th-232	5.1647E-14	45 43	90 86	0.00E+00	2.35E-12	4.69E-12		
Ti-208	4.9873E-09	45 43	90 86	0.00E+00	2.27E-07	4.53E-07		
U-232	1.3513E-08	45 43	90 86	0.00E+00	6.14E-07	1.23E-06		
U-233	1.3927E-09	45 43	90 86	0.00E+00	6.33E-08	1.27E-07		
U-234	1.1380E-06	45 43	90 86	0.00E+00	5.17E-05	1.03E-04		
U-235	-2.5335E-06	45 43	0 00	2.66E-04	1.51E-04	2.66E-04		
U-236	1.3007E-05	45 43	90 86	0.00E+00	5.91E-04	1.18E-03		
U-238	-1.4207E-08	45 43	0 00	7.62E-04	7.61E-04	7.62E-04		
Y-90	6.3053E-01	45 43	90 86	0.00E+00	2.86E+01	5.73E+01		
Other Radionuclides					3.09E+01	6.19E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.22E-01	8.44E-01
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	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	5.146443515	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		45 43	Nominal burnup assumed to be 2% of BOL heavy metal mass Bounding burnup assumed to be twice nominal burnup
Bounding		90 86	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.43		0.98
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: SPSS (SPERT)
 SNF ID #: 213
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=0.59kg, EOL=0.588kg
 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 _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 Inventones(Ci)	Bounding Fuel Inventones(Ci)	Avg. MeV	
Ac-227	4.5940E-08	1.89	3.78	0.00E+00	8.68E-08	1.74E-07	0.0150	1.379E+11
Am-241	1.1471E-04	1.89	3.78	0.00E+00	2.17E-04	4.33E-04	0.0250	2.866E+10
Am-242m	7.4210E-09	1.89	3.78	0.00E+00	1.40E-08	2.80E-08	0.0375	2.490E+10
Am-243	9.8236E-10	1.89	3.78	0.00E+00	1.86E-09	3.71E-09	0.0575	2.672E+10
C-14	2.2928E-04	1.89	3.78	0.00E+00	4.33E-04	8.66E-04	0.0850	1.614E+10
Cl-36	1.2260E-06	1.89	3.78	0.00E+00	2.32E-06	4.63E-06	0.1250	1.047E+10
Cm-243	1.2000E-10	1.89	3.78	0.00E+00	2.27E-10	4.53E-10	0.2250	1.393E+10
Cm-244	7.3577E-10	1.89	3.78	0.00E+00	1.39E-09	2.78E-09	0.3750	6.067E+09
Co-60	1.3732E-03	1.89	3.78	0.00E+00	2.59E-03	5.19E-03	0.5750	1.021E+11
Cs-134	1.2709E-10	1.89	3.78	0.00E+00	2.40E-10	4.80E-10	0.8500	9.912E+08
Cs-135	3.0316E-05	1.89	3.78	0.00E+00	5.73E-05	1.15E-04	1.2500	7.174E+08
Cs-137	7.2579E-01	1.89	3.78	0.00E+00	1.37E+00	2.74E+00	1.7500	2.550E+07
Eu-154	5.9750E-05	1.89	3.78	0.00E+00	1.13E-04	2.26E-04	2.2500	4.822E+03
Eu-155	1.0577E-05	1.89	3.78	0.00E+00	2.00E-05	4.00E-05	2.7500	2.160E+03
Fe-55	4.1631E-07	1.89	3.78	0.00E+00	7.87E-07	1.57E-06	3.5000	3.302E-01
H-3	4.6722E-04	1.89	3.78	0.00E+00	8.83E-04	1.77E-03	5.0000	1.372E-01
I-129	7.3195E-07	1.89	3.78	0.00E+00	1.38E-06	2.77E-06	7.0000	1.527E-02
Kr-85	5.9418E-03	1.89	3.78	0.00E+00	1.12E-02	2.25E-02	11.0000	1.721E-03
Np-237	1.1499E-06	1.89	3.78	0.00E+00	2.17E-06	4.35E-06		
Pa-231	7.0899E-08	1.89	3.78	0.00E+00	1.34E-07	2.68E-07		
Pb-210	2.2363E-12	1.89	3.78	0.00E+00	4.22E-12	8.45E-12		
Pm-147	4.2296E-07	1.89	3.78	0.00E+00	7.99E-07	1.60E-06		
Pu-238	2.3295E-04	1.89	3.78	0.00E+00	4.40E-04	8.80E-04		
Pu-239	6.6722E-04	1.89	3.78	0.00E+00	1.26E-03	2.52E-03		
Pu-240	8.6556E-05	1.89	3.78	0.00E+00	1.64E-04	3.27E-04		
Pu-241	1.6889E-04	1.89	3.78	0.00E+00	3.19E-04	6.38E-04		
Pu-242	1.9717E-09	1.89	3.78	0.00E+00	3.73E-09	7.45E-09		
Ra-226	4.5740E-12	1.89	3.78	0.00E+00	8.64E-12	1.73E-11		
Ra-228	8.3511E-12	1.89	3.78	0.00E+00	1.58E-11	3.16E-11		
Ru-106	2.0516E-19	1.89	3.78	0.00E+00	3.88E-19	7.75E-19		
Se-79	1.3220E-05	1.89	3.78	0.00E+00	2.50E-05	5.00E-05		
Sn-126	1.1489E-05	1.89	3.78	0.00E+00	2.17E-05	4.34E-05		
Sr-90	6.6872E-01	1.89	3.78	0.00E+00	1.26E+00	2.53E+00		
Tc-99	4.6639E-04	1.89	3.78	0.00E+00	8.81E-04	1.76E-03		
Th-229	2.3727E-11	1.89	3.78	0.00E+00	4.48E-11	8.97E-11		
Th-230	2.7354E-10	1.89	3.78	0.00E+00	5.17E-10	1.03E-09		
Th-232	8.3594E-12	1.89	3.78	0.00E+00	1.58E-11	3.16E-11		
Tl-208	1.6228E-08	1.89	3.78	0.00E+00	3.07E-08	6.13E-08		
U-232	4.3960E-08	1.89	3.78	0.00E+00	8.31E-08	1.66E-07		
U-233	3.3344E-09	1.89	3.78	0.00E+00	6.30E-09	1.26E-08		
U-234	4.0749E-07	1.89	3.78	0.00E+00	7.70E-07	1.54E-06		
U-235	-2.7761E-06	1.89	0.00	1.19E-03	1.18E-03	1.19E-03		
U-236	1.6190E-05	1.89	3.78	0.00E+00	3.06E-05	6.12E-05		
U-238	-2.8547E-09	1.89	0.00	1.38E-05	1.38E-05	1.38E-05		
Y-90	6.6889E-01	1.89	3.78	0.00E+00	1.26E+00	2.53E+00		
Other Radionuclides					1.72E+00	3.43E+00		

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	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	93.051	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		1.89	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding		3.78	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.07		1.00
Bounding	0.14		

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: TM-2 CORE DEBRIS
 SNF ID #: 914
 Fuel Units & Descr: 341 - DEBRIS
 Heavy Metal Mass: BOL=82038 394kg, EOL=81749.226kg
 ROD Storage Site: INEEL

Fuel decay start date: 1979
 Estimates as of: 2030
 Template: PWR (Light Water, Zirc. 0 to 5%, U)
 Template Burnup (MWd): 61 92
 Template BOL Heavy Metal Mass (MT): 0 00176911
 Template Decay Time: 50 years

Estimated
 Canister usage,
 18"x15"
 341 00

II. Estimates							Gamma Sources	
Radionuclide	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Avg MeV		
Ac-227	1 0733E-09	274,985 09	549,970 18	0 00E+00	2 95E-04	5 90E-04		
Am-241	1 4751E-01	274,985 09	549,970 18	0 00E+00	4 06E+04	8 11E+04	0 0150	2 093E+16
Am-242m	2 6809E-04	274,985 09	549,970 18	0 00E+00	7 37E+01	1 47E+02	0 0250	4 194E+15
Am-243	6 2484E-04	274,985 09	549,970 18	0 00E+00	1 72E+02	3 44E+02	0 0375	3 952E+15
C-14	4 7820E-05	274,985 09	549,970 18	0 00E+00	1 31E+01	2 63E+01	0 0575	4 945E+15
Cl-36	8 0297E-07	274,985 09	549,970 18	0 00E+00	2 21E-01	4 42E-01	0 0850	2 311E+15
Cm-243	1 7426E-04	274,985 09	549,970 18	0 00E+00	4 79E+01	9 58E+01	0 1250	1 537E+15
Cm-244	2 7616E-02	274,985 09	549,970 18	0 00E+00	7 59E+03	1 52E+04	0 2250	1 973E+15
Co-60	3 5610E-04	274,985 09	549,970 18	0 00E+00	9 79E+01	1 96E+02	0 3750	8 519E+14
Cs-134	2 6260E-07	274,985 09	549,970 18	0 00E+00	7 22E-02	1 44E-01	0 5750	2 006E+16
Cs-135	1 4433E-05	274,985 09	549,970 18	0 00E+00	3 97E+00	7 94E+00	0 8500	1 959E+14
Cs-137	9 8870E-01	274,985 09	549,970 18	0 00E+00	2 72E+05	5 44E+05	1 2500	1 247E+14
Eu-154	6 0320E-03	274,985 09	549,970 18	0 00E+00	1 66E+03	3 32E+03	1 7500	5 480E+12
Eu-155	2 1770E-04	274,985 09	549,970 18	0 00E+00	5 99E+01	1 20E+02	2 2500	9 010E+08
Fe-55	7 9296E-07	274,985 09	549,970 18	0 00E+00	2 18E-01	4 36E-01	2 7500	3 175E+09
H-3	8 9486E-03	274,985 09	549,970 18	0 00E+00	2 46E+03	4 92E+03	3 5000	2 266E+08
I-129	9 8288E-07	274,985 09	549,970 18	0 00E+00	2 70E-01	5 41E-01	5 0000	9 686E+07
Kr-85	1 0707E-02	274,985 09	549,970 18	0 00E+00	2 94E+03	5 89E+03	7 0000	1 116E+07
Np-237	1 1927E-05	274,985 09	549,970 18	0 00E+00	3 28E+00	6 56E+00	11 0000	1 281E+06
Pa-231	1 4703E-09	274,985 09	549,970 18	0 00E+00	4 04E-04	8 09E-04		
Pb-210	1 6828E-10	274,985 09	549,970 18	0 00E+00	4 63E-05	9 25E-05		
Pm-147	6 9606E-06	274,985 09	549,970 18	0 00E+00	1 91E+00	3 83E+00		
Pu-238	6 6263E-02	274,985 09	549,970 18	0 00E+00	1 82E+04	3 64E+04		
Pu-239	1 1618E-02	274,985 09	549,970 18	0 00E+00	3 19E+03	6 39E+03		
Pu-240	1 5142E-02	274,985 09	549,970 18	0 00E+00	4 16E+03	8 33E+03		
Pu-241	4 3766E-01	274,985 09	549,970 18	0 00E+00	1 20E+05	2 41E+05		
Pu-242	6 4260E-05	274,985 09	549,970 18	0 00E+00	1 77E+01	3 53E+01		
Ra-226	3 8501E-10	274,985 09	549,970 18	0 00E+00	1 06E-04	2 12E-04		
Ra-228	5 2955E-12	274,985 09	549,970 18	0 00E+00	1 46E-06	2 91E-06		
Ru-106	2 0413E-14	274,985 09	549,970 18	0 00E+00	5 61E-09	1 12E-08		
Se-79	1 2376E-05	274,985 09	549,970 18	0 00E+00	3 40E+00	6 81E+00		
Sn-126	2 5210E-05	274,985 09	549,970 18	0 00E+00	6 93E+00	1 39E+01		
Sr-90	6 4163E-01	274,985 09	549,970 18	0 00E+00	1 76E+05	3 53E+05		
Tc-99	3 9357E-04	274,985 09	549,970 18	0 00E+00	1 08E+02	2 16E+02		
Th-229	1 5644E-10	274,985 09	549,970 18	0 00E+00	4 30E-05	8 60E-05		
Th-230	2 7972E-08	274,985 09	549,970 18	0 00E+00	7 69E-03	1 54E-02		
Th-232	5 3036E-12	274,985 09	549,970 18	0 00E+00	1 46E-06	2 92E-06		
Tl-208	1 5136E-07	274,985 09	549,970 18	0 00E+00	4 16E-02	8 32E-02		
U-232	4 1005E-07	274,985 09	549,970 18	0 00E+00	1 13E-01	2 26E-01		
U-233	2 5856E-08	274,985 09	549,970 18	0 00E+00	7 11E-03	1 42E-02		
U-234	5 2665E-05	274,985 09	549,970 18	0 00E+00	1 45E+01	2 90E+01		
U-235	-1 4487E-06	274,985 09	0 00	4 50E+00	4 10E+00	4 50E+00		
U-236	7 5888E-06	274,985 09	549,970 18	0 00E+00	2 09E+00	4 17E+00		
U-238	-2 6129E-07	274,985 09	0 00	2 69E+01	2 68E+01	2 69E+01		
Y-90	6 4180E-01	274,985 09	549,970 18	0 00E+00	1 76E+05	3 53E+05		
Other Radionuclides					2 62E+05	5 24E+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	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	2.539514873	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	260 471 90	274,985 09	
Bounding	489 359 02	549 970 18	

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	

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 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 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"
 2 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 0733E-09	66 57	133 13	133 13	0 00E+00	7 14E-08	1 43E-07	Avg MeV	
Am-241	1 4751E-01	66 57	133 13	133 13	0 00E+00	9 82E+00	1 96E+01	0 0150	5 066E+12
Am-242m	2 6809E-04	66 57	133 13	133 13	0 00E+00	1 78E-02	3 57E-02	0 0250	1 015E+12
Am-243	6 2484E-04	66 57	133 13	133 13	0 00E+00	4 16E-02	8 32E-02	0 0375	9 566E+11
C-14	4 7820E-05	66 57	133 13	133 13	0 00E+00	3 18E-03	6 37E-03	0 0575	1 197E+12
Cl-36	8 0297E-07	66 57	133 13	133 13	0 00E+00	5 35E-05	1 07E-04	0 0850	5 593E+11
Cm-243	1 7426E-04	66 57	133 13	133 13	0 00E+00	1 16E-02	2 32E-02	0 1250	3 721E+11
Cm-244	2 7616E-02	66 57	133 13	133 13	0 00E+00	1 84E+00	3 68E+00	0 2250	4 775E+11
Co-60	3 5610E-04	66 57	133 13	133 13	0 00E+00	2 37E-02	4 74E-02	0 3750	2 062E+11
Cs-134	2 6260E-07	66 57	133 13	133 13	0 00E+00	1 75E-05	3 50E-05	0 5750	4 857E+12
Cs-135	1 4433E-05	66 57	133 13	133 13	0 00E+00	9 61E-04	1 92E-03	0 8500	4 742E+10
Cs-137	9 8870E-01	66 57	133 13	133 13	0 00E+00	6 58E+01	1 32E+02	1 2500	3 018E+10
Eu-154	6 0320E-03	66 57	133 13	133 13	0 00E+00	4 02E-01	8 03E-01	1 7500	1 327E+09
Eu-155	2 1770E-04	66 57	133 13	133 13	0 00E+00	1 45E-02	2 90E-02	2 2500	2 181E+05
Fe-55	7 9296E-07	66 57	133 13	133 13	0 00E+00	5 28E-05	1 06E-04	2 7500	7 686E+05
H-3	8 9486E-03	66 57	133 13	133 13	0 00E+00	5 96E-01	1 19E+00	3 5000	5 486E+04
I-129	9 8288E-07	66 57	133 13	133 13	0 00E+00	6 54E-05	1 31E-04	5 0000	2 345E+04
Kr-85	1 0707E-02	66 57	133 13	133 13	0 00E+00	7 13E-01	1 43E+00	7 0000	2 701E+03
Np-237	1 1927E-05	66 57	133 13	133 13	0 00E+00	7 94E-04	1 59E-03	11 0000	3 102E+02
Pa-231	1 4703E-09	66 57	133 13	133 13	0 00E+00	9 79E-08	1 96E-07		
Pb-210	1 6828E-10	66 57	133 13	133 13	0 00E+00	1 12E-08	2 24E-08		
Pm-147	6 9606E-06	66 57	133 13	133 13	0 00E+00	4 63E-04	9 27E-04		
Pu-238	6 6263E-02	66 57	133 13	133 13	0 00E+00	4 41E+00	8 82E+00		
Pu-239	1 1618E-02	66 57	133 13	133 13	0 00E+00	7 73E-01	1 55E+00		
Pu-240	1 5142E-02	66 57	133 13	133 13	0 00E+00	1 01E+00	2 02E+00		
Pu-241	4 3766E-01	66 57	133 13	133 13	0 00E+00	2 91E+01	5 83E+01		
Pu-242	6 4260E-05	66 57	133 13	133 13	0 00E+00	4 28E-03	8 56E-03		
Ra-226	3 8501E-10	66 57	133 13	133 13	0 00E+00	2 56E-08	5 13E-08		
Ra-228	5 2955E-12	66 57	133 13	133 13	0 00E+00	3 53E-10	7 05E-10		
Ru-106	2 0413E-14	66 57	133 13	133 13	0 00E+00	1 36E-12	2 72E-12		
Se-79	1 2376E-05	66 57	133 13	133 13	0 00E+00	8 24E-04	1 65E-03		
Sn-126	2 5210E-05	66 57	133 13	133 13	0 00E+00	1 68E-03	3 36E-03		
Sr-90	6 4163E-01	66 57	133 13	133 13	0 00E+00	4 27E+01	8 54E+01		
Tc-99	3 9357E-04	66 57	133 13	133 13	0 00E+00	2 62E-02	5 24E-02		
Th-229	1 5644E-10	66 57	133 13	133 13	0 00E+00	1 04E-08	2 08E-08		
Th-230	2 7972E-08	66 57	133 13	133 13	0 00E+00	1 86E-06	3 72E-06		
Th-232	5 3036E-12	66 57	133 13	133 13	0 00E+00	3 53E-10	7 06E-10		
Ti-208	1 5136E-07	66 57	133 13	133 13	0 00E+00	1 01E-05	2 02E-05		
U-232	4 1005E-07	66 57	133 13	133 13	0 00E+00	2 73E-05	5 46E-05		
U-233	2 5856E-08	66 57	133 13	133 13	0 00E+00	1 72E-06	3 44E-06		
U-234	5 2665E-05	66 57	133 13	133 13	0 00E+00	3 51E-03	7 01E-03		
U-235	-1 4487E-06	66 57	0 00	0 00	1 29E-03	1 19E-03	1 29E-03		
U-236	7 5888E-06	66 57	133 13	133 13	0 00E+00	5 05E-04	1 01E-03		
U-238	-2 6129E-07	66 57	0 00	0 00	6 21E-03	6 19E-03	6 21E-03		
Y-90	6 4180E-01	66 57	133 13	133 13	0 00E+00	4 27E+01	8 54E+01		
Other Radonucleides						6 34E+01	1 27E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1 20E+00	2 41E+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	ZIRC	
BOL Enrichment %:	U	U	
	3.125	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	60 58	66 57	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding	113.81	133 13	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 10	1 10	1 00
Bounding	0 20	1 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: TORY-IA	¹ Fuel decay start date: 1962	Estimated Canister usage: HIC 3 65
SNF ID #: 230	Estimates as of: 2030	
Fuel Units & Descr: 146 - CANISTER OF SCRAP	Template: HFBR (Heavy Water, Alum 40 to 100% U)	
Heavy Metal Mass BOL=48 647kg EOL=48 647kg	² Template Burnup(MWd): 164.6	
ROD Storage Site: INEEL	Template BOL Heavy Metal Mass (MT): 0 000377	
	Template Decay Time: 65 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	1 9216E-09	896 18	1,792.36	0 00E+00	1 72E-06	3 44E-06		
Am-241	1 0419E-02	896 18	1,792.36	0 00E+00	9 34E+00	1 87E+01	0 0150	6.524E+13
Am-242m	1.1154E-06	896 18	1,792.36	0 00E+00	1 00E-03	2 00E-03	0 0250	1.331E+13
Am-243	3 6944E-05	896 18	1,792.36	0 00E+00	3 31E-02	6 62E-02	0 0375	1 162E+13
C-14	2 6324E-08	896 18	1,792.36	0 00E+00	2.36E-05	4 72E-05	0 0575	1.266E+13
Cl-36	4 4435E-31	896 18	1,792.36	0 00E+00	3 98E-28	7 96E-28	0 0850	7 492E+12
Cm-243	1 9101E-06	896 18	1,792.36	0 00E+00	1.71E-03	3 42E-03	0 1250	4 890E+12
Cm-244	8.3232E-04	896 18	1,792.36	0 00E+00	7.46E-01	1 49E+00	0 2250	6 460E+12
Co-60	1.3135E-07	896 18	1,792.36	0 00E+00	1.18E-04	2.35E-04	0 3750	2 814E+12
Cs-134	2 8943E-09	896 18	1,792.36	0 00E+00	2.59E-06	5.19E-06	0 5750	4.804E+13
Cs-135	4.2564E-06	896 18	1,792.36	0 00E+00	3 81E-03	7.63E-03	0 8500	4 993E+11
Cs-137	7.2053E-01	896 18	1,792.36	0 00E+00	6 46E+02	1 29E+03	1 2500	1 989E+11
Eu-154	1.3852E-03	896 18	1,792.36	0 00E+00	1.24E+00	2 48E+00	1 7500	1 320E+10
Eu-155	2 6634E-05	896 18	1,792.36	0 00E+00	2.39E-02	4.77E-02	2 2500	1 347E+06
Fe-55	8 4265E-09	896 18	1,792.36	0 00E+00	7.55E-06	1.51E-05	2 7500	2 069E+06
H-3	3 7066E-04	896 18	1,792.36	0 00E+00	3.32E-01	6 64E-01	3 5000	2 791E+04
I-129	6 6403E-07	896 18	1,792.36	0 00E+00	5 95E-04	1.19E-03	5 0000	1 177E+04
Kr-85	5 9010E-03	896 18	1,792.36	0 00E+00	5 29E+00	1 06E+01	7 0000	1 336E+03
Np-237	3.1713E-05	896 18	1,792.36	0 00E+00	2 84E-02	5 68E-02	11 0000	1 521E+02
Pa-231	2 9878E-09	896 18	1,792.36	0 00E+00	2 68E-06	5.36E-06		
Pb-210	3 0772E-10	896 18	1,792.36	0 00E+00	2 76E-07	5.52E-07		
Pm-147	1 6883E-07	896 18	1,792.36	0 00E+00	1.51E-04	3 03E-04		
Pu-238	1 0765E-01	896 18	1,792.36	0 00E+00	9 65E+01	1 93E+02		
Pu-239	6 9441E-04	896 18	1,792.36	0 00E+00	6.22E-01	1 24E+00		
Pu-240	3 8341E-04	896 18	1,792.36	0 00E+00	3 44E-01	6 87E-01		
Pu-241	1.5419E-02	896 18	1,792.36	0 00E+00	1 38E+01	2 76E+01		
Pu-242	3 0911E-06	896 18	1,792.36	0 00E+00	2.77E-03	5 54E-03		
Ra-226	6.4642E-10	896 18	1,792.36	0 00E+00	5 79E-07	1.16E-06		
Ra-228	5 8019E-14	896 18	1,792.36	0 00E+00	5.20E-11	1 04E-10		
Ru-106	2.7278E-19	896 18	1,792.36	0 00E+00	2 44E-16	4 89E-16		
Se-79	1.2333E-05	896 18	1,792.36	0 00E+00	1 11E-02	2 21E-02		
Sn-126	1 0188E-05	896 18	1,792.36	0 00E+00	9 13E-03	1 83E-02		
Sr-90	6.5371E-01	896 18	1,792.36	0 00E+00	5 86E+02	1 17E+03		
Tc-99	3.8050E-04	896 18	1,792.36	0 00E+00	3 41E-01	6 82E-01		
Th-229	4 4113E-11	896 18	1,792.36	0 00E+00	3 95E-08	7 91E-08		
Th-230	4.1233E-08	896 18	1,792.36	0 00E+00	3 70E-05	7 39E-05		
Th-232	6.5978E-14	896 18	1,792.36	0 00E+00	5 91E-11	1 18E-10		
Ti-208	3.2382E-08	896 18	1,792.36	0 00E+00	2 90E-05	5 80E-05		
U-232	8.7728E-08	896 18	1,792.36	0 00E+00	7 86E-05	1 57E-04		
U-233	1.1367E-08	896 18	1,792.36	0 00E+00	1 02E-05	2 04E-05		
U-234	7.0717E-05	896 18	1,792.36	0 00E+00	6 34E-02	1 27E-01		
U-235	-2 8661E-06	896 18	0 00	9 80E-02	9 54E-02	9 80E-02		
U-236	1 6701E-05	896 18	1,792.36	0 00E+00	1 50E-02	2 99E-02		
U-238	-9 4194E-09	896 18	0 00	1 12E-03	1 11E-03	1 12E-03		
Y-90	6.5371E-01	896 18	1,792.36	0 00E+00	5 86E+02	1 17E+03		
Other Radionuclides					6 23E+02	1 25E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.06E+01	2.13E+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 cladding (none) and moderator (Heavy Water is conservative)
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	BERYLLIUM	HEAVY WATER	
BOL HM Constituents	NONE	ALUM	
BOL Enrichment %	U	U	
	93 175	40 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:		896 18	
Bounding:		1 792 36	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.04		
Bounding	0.08		
			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 **TORY-IC** ¹Fuel decay start date 1964
 SNF ID # 231 Estimates as of 2030
 Fuel Units & Descr 655 - CANISTER OF SCRAP Template HFBR (Heavy Water, Alum, 40 to 100% U)
 Heavy Metal Mass BOL=59 081kg EOL=59 081kg ²Template Burnup(MWd) 164.6
 ROD Storage Site INEEL Template BOL Heavy Metal Mass (MT) 0.000377
 Template Decay Time 65 years

Estimated
 Canister usage
 18"x10"
 13 10

Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ³	Bounding Fuel Burnup (MWd) ³	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.9216E-09	1,088.39	2,176.79	0.00E+00	2.09E-06	4.18E-06	Avg MeV	
Am-241	1.0419E-02	1,088.39	2,176.79	0.00E+00	1.13E+01	2.27E+01	0.0150	7.923E+13
Am-242m	1.1154E-06	1,088.39	2,176.79	0.00E+00	1.21E-03	2.43E-03	0.0250	1.617E+13
Am-243	3.6944E-05	1,088.39	2,176.79	0.00E+00	4.02E-02	8.04E-02	0.0375	1.411E+13
C-14	2.6324E-08	1,088.39	2,176.79	0.00E+00	2.87E-05	5.73E-05	0.0575	1.537E+13
Cf-252	4.4435E-31	1,088.39	2,176.79	0.00E+00	4.84E-28	9.67E-28	0.0850	9.099E+12
Cm-243	1.9101E-06	1,088.39	2,176.79	0.00E+00	2.08E-03	4.16E-03	0.1250	5.939E+12
Cm-244	8.3232E-04	1,088.39	2,176.79	0.00E+00	9.06E-01	1.81E+00	0.2250	7.845E+12
Co-60	1.3135E-07	1,088.39	2,176.79	0.00E+00	1.43E-04	2.86E-04	0.3750	3.417E+12
Cs-134	2.8943E-09	1,088.39	2,176.79	0.00E+00	3.15E-06	6.30E-06	0.5750	5.835E+13
Cs-135	4.2564E-06	1,088.39	2,176.79	0.00E+00	4.63E-03	9.27E-03	0.8500	6.064E+11
Cs-137	7.2053E-01	1,088.39	2,176.79	0.00E+00	7.84E+02	1.57E+03	1.2500	2.415E+11
Eu-154	1.3852E-03	1,088.39	2,176.79	0.00E+00	1.51E+00	3.02E+00	1.7500	1.603E+10
Eu-155	2.6634E-05	1,088.39	2,176.79	0.00E+00	2.90E-02	5.80E-02	2.2500	1.635E+06
Fe-55	8.4265E-09	1,088.39	2,176.79	0.00E+00	9.17E-06	1.83E-05	2.7500	2.513E+06
H-3	3.7066E-04	1,088.39	2,176.79	0.00E+00	4.03E-01	8.07E-01	3.5000	3.390E+04
I-129	6.6403E-07	1,088.39	2,176.79	0.00E+00	7.23E-04	1.45E-03	5.0000	1.429E+04
Kr-85	5.9010E-03	1,088.39	2,176.79	0.00E+00	6.42E+00	1.28E+01	7.0000	1.622E+03
Np-237	3.1713E-05	1,088.39	2,176.79	0.00E+00	3.45E-02	6.90E-02	11.0000	1.848E+02
Pa-231	2.9878E-09	1,088.39	2,176.79	0.00E+00	3.25E-06	6.50E-06		
Pb-210	3.0772E-10	1,088.39	2,176.79	0.00E+00	3.35E-07	6.70E-07		
Pm-147	1.6883E-07	1,088.39	2,176.79	0.00E+00	1.84E-04	3.68E-04		
Pu-238	1.0765E-01	1,088.39	2,176.79	0.00E+00	1.17E+02	2.34E+02		
Pu-239	6.9441E-04	1,088.39	2,176.79	0.00E+00	7.56E-01	1.51E+00		
Pu-240	3.8341E-04	1,088.39	2,176.79	0.00E+00	4.17E-01	8.35E-01		
Pu-241	1.5419E-02	1,088.39	2,176.79	0.00E+00	1.68E+01	3.36E+01		
Pu-242	3.0911E-06	1,088.39	2,176.79	0.00E+00	3.36E-03	6.73E-03		
Ra-226	6.4642E-10	1,088.39	2,176.79	0.00E+00	7.04E-07	1.41E-06		
Ra-228	5.8019E-14	1,088.39	2,176.79	0.00E+00	6.31E-11	1.26E-10		
Ru-106	2.7278E-19	1,088.39	2,176.79	0.00E+00	2.97E-16	5.94E-16		
Se-79	1.2333E-05	1,088.39	2,176.79	0.00E+00	1.34E-02	2.68E-02		
Sn-126	1.0188E-05	1,088.39	2,176.79	0.00E+00	1.11E-02	2.22E-02		
Sr-90	6.5371E-01	1,088.39	2,176.79	0.00E+00	7.11E+02	1.42E+03		
Tc-99	3.8050E-04	1,088.39	2,176.79	0.00E+00	4.14E-01	8.28E-01		
Th-229	4.4113E-11	1,088.39	2,176.79	0.00E+00	4.80E-08	9.60E-08		
Th-230	4.1233E-08	1,088.39	2,176.79	0.00E+00	4.49E-05	8.98E-05		
Th-232	6.5978E-14	1,088.39	2,176.79	0.00E+00	7.18E-11	1.44E-10		
Tl-208	3.2382E-08	1,088.39	2,176.79	0.00E+00	3.52E-05	7.05E-05		
U-232	8.7728E-08	1,088.39	2,176.79	0.00E+00	9.55E-05	1.91E-04		
U-233	1.1367E-08	1,088.39	2,176.79	0.00E+00	1.24E-05	2.47E-05		
U-234	7.0717E-05	1,088.39	2,176.79	0.00E+00	7.70E-02	1.54E-01		
U-235	-2.8661E-06	1,088.39	0.00	1.19E-01	1.16E-01	1.19E-01		
U-236	1.6701E-05	1,088.39	2,176.79	0.00E+00	1.82E-02	3.64E-02		
U-238	-9.4194E-09	1,088.39	0.00	1.36E-03	1.35E-03	1.36E-03		
Y-90	6.5371E-01	1,088.39	2,176.79	0.00E+00	7.11E+02	1.42E+03		
Other Radionuclides					7.57E+02	1.51E+03		

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	U	U	
BOL Enrichment %	93.147	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		1,088.39	Nominal burnup assumed to be 2% of BOL heavy metal mass Bounding burnup assumed to be twice nominal burnup.
Bounding		2,176.79	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.04		0.98
Bounding	0.08		

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel
²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TREAT DRIVER
 SNF ID #: 232
 Fuel Units & Descr: 391 - ASSEMBLY
 Heavy Metal Mass, BOL=15 64kg EOL=14 897kg
 ROD Storage Site, INEEL

¹Fuel decay start date: 1994
 Estimates as of: 2030
 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,
 18"x15"
 14 48

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 2184E-10	783 73	1,567 46	0 00E+00	3 31E-07	6 61E-07	0 0150	7 616E+13
Am-241	9 6379E-02	783 73	1,567 46	0 00E+00	7 55E+01	1 51E+02	0 0250	1 557E+13
Am-242m	5 8463E-05	783 73	1,567 46	0 00E+00	4 58E-02	9 16E-02	0 0375	1 440E+13
Am-243	4 6279E-05	783 73	1,567 46	0 00E+00	3 63E-02	7 25E-02	0 0575	1 643E+13
C-14	9 2026E-05	783 73	1,567 46	0 00E+00	7 21E-02	1 44E-01	0 0850	8 643E+12
Cl-36	0 0000E+00	783 73	1,567 46	0 00E+00	0 00E+00	0 00E+00	0 1250	5 740E+12
Cm-243	0 0000E+00	783 73	1,567 46	0 00E+00	0 00E+00	0 00E+00	0 2250	7 415E+12
Cm-244	4 5445E-04	783 73	1,567 46	0 00E+00	3 56E-01	7 12E-01	0 3750	3 209E+12
Co-60	6 3707E-05	783 73	1,567 46	0 00E+00	4 99E-02	9 99E-02	0 5750	6 922E+13
Cs-134	1 4042E-05	783 73	1,567 46	0 00E+00	1 10E-02	2 20E-02	0 8500	7 032E+11
Cs-135	1 0066E-05	783 73	1,567 46	0 00E+00	7 89E-03	1 58E-02	1 2500	3 836E+11
Cs-137	1 1945E+00	783 73	1,567 46	0 00E+00	9 36E+02	1 87E+03	1 7500	1 945E+10
Eu-154	6 6451E-03	783 73	1,567 46	0 00E+00	5 21E+00	1 04E+01	2 2500	1 571E+06
Eu-155	2 9052E-04	783 73	1,567 46	0 00E+00	2 28E-01	4 55E-01	2 7500	3 668E+04
Fe-55	2 8807E-06	783 73	1,567 46	0 00E+00	2 26E-03	4 52E-03	3 5000	3 243E+04
H-3	2 1063E-03	783 73	1,567 46	0 00E+00	1 65E+00	3 30E+00	5 0000	1 369E+04
I-129	8 6006E-07	783 73	1,567 46	0 00E+00	6 74E-04	1 35E-03	7 0000	1 551E+03
Kr-85	2 6739E-02	783 73	1,567 46	0 00E+00	2 10E+01	4 19E+01	11 0000	1 766E+02
Np-237	8 5589E-06	783 73	1,567 46	0 00E+00	6 71E-03	1 34E-02		
Pa-231	1 2500E-09	783 73	1,567 46	0 00E+00	9 80E-07	1 96E-06		
Pb-210	2 3017E-11	783 73	1,567 46	0 00E+00	1 80E-08	3 61E-08		
Pm-147	5 9856E-04	783 73	1,567 46	0 00E+00	4 69E-01	9 38E-01		
Pu-238	2 0029E-02	783 73	1,567 46	0 00E+00	1 57E+01	3 14E+01		
Pu-239	2 8836E-02	783 73	1,567 46	0 00E+00	2 26E+01	4 52E+01		
Pu-240	2 2802E-02	783 73	1,567 46	0 00E+00	1 79E+01	3 57E+01		
Pu-241	6 1020E-01	783 73	1,567 46	0 00E+00	4 78E+02	9 56E+02		
Pu-242	1 4526E-05	783 73	1,567 46	0 00E+00	1 14E-02	2 28E-02		
Ra-226	9 7701E-11	783 73	1,567 46	0 00E+00	7 66E-08	1 53E-07		
Ra-228	1 1068E-14	783 73	1,567 46	0 00E+00	8 67E-12	1 73E-11		
Ru-106	5 9224E-10	783 73	1,567 46	0 00E+00	4 64E-07	9 28E-07		
Se-79	1 0899E-05	783 73	1,567 46	0 00E+00	8 54E-03	1 71E-02		
Sn-126	0 0000E+00	783 73	1,567 46	0 00E+00	0 00E+00	0 00E+00		
Sr-90	8 4899E-01	783 73	1,567 46	0 00E+00	6 65E+02	1 33E+03		
Tc-99	3 6494E-04	783 73	1,567 46	0 00E+00	2 86E-01	5 72E-01		
Th-229	1 2928E-12	783 73	1,567 46	0 00E+00	1 01E-09	2 03E-09		
Th-230	1 6293E-08	783 73	1,567 46	0 00E+00	1 28E-05	2 55E-05		
Th-232	1 6451E-14	783 73	1,567 46	0 00E+00	1 29E-11	2 58E-11		
Tl-208	3 4382E-15	783 73	1,567 46	0 00E+00	2 69E-12	5 39E-12		
U-232	0 0000E+00	783 73	1,567 46	0 00E+00	0 00E+00	0 00E+00		
U-233	9 9425E-10	783 73	1,567 46	0 00E+00	7 79E-07	1 56E-06		
U-234	6 5575E-05	783 73	1,567 46	0 00E+00	5 14E-02	1 03E-01		
U-235	-1 2944E-06	783 73	0 00	3 13E-02	3 02E-02	3 13E-02		
U-236	1 1951E-05	783 73	1,567 46	0 00E+00	9 37E-03	1 87E-02		
U-238	-3 0619E-07	783 73	0 00	3 94E-04	1 54E-04	3 94E-04		
Y-90	8 4928E-01	783 73	1,567 46	0 00E+00	6 66E+02	1 33E+03		
Other Radionuclides					8 98E+02	1 80E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1 34E+01	2 67E+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.
	From SFD	Used	
Reactor Moderator	GRAPHITE	GRAPHITE	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	92 5	0 to 5	

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 19	783 73	
Bounding		1 567 46	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	8 35	25 96	1 01
Bounding	16 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 8/5/20 FFCR OSU
 SNF ID # 1039
 Fuel Units & Descr. 3 - ELEMENT
 Heavy Metal Mass BOL=0.48kg EOL=0.472kg
 ROD Storage Site INEEL

¹Fuel decay start date: 2025
 Estimates as of 2030
 Template TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
 Template BOL Heavy Metal Mass (MT) 0.000195
 Template Decay Time 5 years

Estimated
 Canister usage
 18"x10"
 0.04

II. Estimates	m	x _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	7.73	15.46	0.00E+00	6.59E-09	1.32E-08	Avg MeV	
Am-241	1.8331E-03	7.73	15.46	0.00E+00	1.42E-02	2.83E-02	0.0150	2.499E+12
Am-242m	1.4129E-06	7.73	15.46	0.00E+00	1.09E-05	2.19E-05	0.0250	5.500E+11
Am-243	1.4774E-07	7.73	15.46	0.00E+00	1.14E-06	2.28E-06	0.0375	4.684E+11
C-14	1.2871E-04	7.73	15.46	0.00E+00	9.95E-04	1.99E-03	0.0575	4.807E+11
Cl-36	2.8120E-06	7.73	15.46	0.00E+00	2.17E-05	4.35E-05	0.0850	2.978E+11
Cm-243	1.7940E-07	7.73	15.46	0.00E+00	1.39E-06	2.77E-06	0.1250	2.163E+11
Cm-244	1.6962E-06	7.73	15.46	0.00E+00	1.31E-05	2.62E-05	0.2250	2.526E+11
Co-60	1.2839E+00	7.73	15.46	0.00E+00	9.93E+00	1.99E+01	0.3750	1.282E+11
Cs-134	9.0541E-02	7.73	15.46	0.00E+00	7.00E-01	1.40E+00	0.5750	1.704E+12
Cs-135	3.2195E-05	7.73	15.46	0.00E+00	2.49E-04	4.98E-04	0.8500	7.315E+10
Cs-137	2.7564E+00	7.73	15.46	0.00E+00	2.13E+01	4.26E+01	1.2500	1.486E+12
Eu-154	1.5368E-02	7.73	15.46	0.00E+00	1.19E-01	2.38E-01	1.7500	9.903E+08
Eu-155	2.9293E-02	7.73	15.46	0.00E+00	2.27E-01	4.53E-01	2.2500	1.596E+09
Fe-55	7.7158E-01	7.73	15.46	0.00E+00	5.97E+00	1.19E+01	2.7500	1.267E+07
H-3	1.1111E-02	7.73	15.46	0.00E+00	8.59E-02	1.72E-01	3.5000	1.474E+06
I-129	7.3684E-07	7.73	15.46	0.00E+00	5.70E-06	1.14E-05	5.0000	8.403E+00
Kr-85	2.5263E-01	7.73	15.46	0.00E+00	1.95E+00	3.91E+00	7.0000	9.516E-01
Np-237	1.2427E-06	7.73	15.46	0.00E+00	9.61E-06	1.92E-05	11.0000	1.084E-01
Pa-231	3.8511E-09	7.73	15.46	0.00E+00	2.98E-08	5.96E-08		
Pb-210	7.3880E-15	7.73	15.46	0.00E+00	5.71E-14	1.14E-13		
Pm-147	2.1023E+00	7.73	15.46	0.00E+00	1.63E+01	3.25E+01		
Pu-238	1.0383E-03	7.73	15.46	0.00E+00	8.03E-03	1.61E-02		
Pu-239	5.5293E-03	7.73	15.46	0.00E+00	4.28E-02	8.55E-02		
Pu-240	2.1278E-03	7.73	15.46	0.00E+00	1.65E-02	3.29E-02		
Pu-241	1.0195E-01	7.73	15.46	0.00E+00	7.88E-01	1.58E+00		
Pu-242	2.3128E-07	7.73	15.46	0.00E+00	1.79E-06	3.58E-06		
Ra-226	5.2782E-14	7.73	15.46	0.00E+00	4.08E-13	8.16E-13		
Ra-228	1.9338E-10	7.73	15.46	0.00E+00	1.50E-09	2.99E-09		
Ru-106	9.1684E-02	7.73	15.46	0.00E+00	7.09E-01	1.42E+00		
Se-79	1.3018E-05	7.73	15.46	0.00E+00	1.01E-04	2.01E-04		
Sn-126	1.2167E-05	7.73	15.46	0.00E+00	9.41E-05	1.88E-04		
Sr-90	2.6045E+00	7.73	15.46	0.00E+00	2.01E+01	4.03E+01		
Tc-99	4.4241E-04	7.73	15.46	0.00E+00	3.42E-03	6.84E-03		
Th-229	1.3713E-10	7.73	15.46	0.00E+00	1.06E-09	2.12E-09		
Th-230	1.8090E-11	7.73	15.46	0.00E+00	1.40E-10	2.80E-10		
Th-232	2.5278E-10	7.73	15.46	0.00E+00	1.95E-09	3.91E-09		
Th-208	1.6947E-08	7.73	15.46	0.00E+00	1.31E-07	2.62E-07		
U-232	4.8737E-08	7.73	15.46	0.00E+00	3.77E-07	7.54E-07		
U-233	1.2203E-07	7.73	15.46	0.00E+00	9.44E-07	1.89E-06		
U-234	1.5925E-07	7.73	15.46	0.00E+00	1.23E-06	2.46E-06		
U-235	-2.6194E-06	7.73	0.00	2.06E-04	1.86E-04	2.06E-04		
U-236	1.2693E-05	7.73	15.46	0.00E+00	9.81E-05	1.96E-04		
U-238	-3.6331E-08	7.73	0.00	1.29E-04	1.29E-04	1.29E-04		
Y-90	2.6060E+00	7.73	15.46	0.00E+00	2.02E+01	4.03E+01		
Other Radionuclides					2.79E+01	5.58E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.50E-01	9.00E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences ¹
	From SFD	Used	
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	19.9	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	4.68	7.73	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		15.46	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.47	1.65	1.00
Bounding	0.94		

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: TRIGA 8 5/20 FFCR UNIV. OF CAL-IRVINE
 SNF ID #: 1050
 Fuel Units & Descr: 2 - ELEMENT
 Heavy Metal Mass: BOL=0.383kg EOL=0.38kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 Estimates as of: 2030
 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) ³	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Avg. MeV	
Ac-227	8.5173E-10	3.73	7.47	0.00E+00	3.18E-09	6.36E-09	0.0150	1.207E+12
Am-241	1.8331E-03	3.73	7.47	0.00E+00	6.85E-03	1.37E-02	0.0250	2.656E+11
Am-242m	1.4129E-06	3.73	7.47	0.00E+00	5.28E-06	1.06E-05	0.0375	2.262E+11
Am-243	1.4774E-07	3.73	7.47	0.00E+00	5.52E-07	1.10E-06	0.0575	2.322E+11
C-14	1.2871E-04	3.73	7.47	0.00E+00	4.81E-04	9.61E-04	0.0850	1.438E+11
Cl-36	2.8120E-06	3.73	7.47	0.00E+00	1.05E-05	2.10E-05	0.1250	1.045E+11
Cm-243	1.7940E-07	3.73	7.47	0.00E+00	6.70E-07	1.34E-06	0.2250	1.220E+11
Cm-244	1.6962E-06	3.73	7.47	0.00E+00	6.33E-06	1.27E-05	0.3750	6.193E+10
Co-60	1.2839E+00	3.73	7.47	0.00E+00	4.79E+00	9.59E+00	0.5750	8.233E+11
Cs-134	9.0541E-02	3.73	7.47	0.00E+00	3.38E-01	6.76E-01	0.8500	3.533E+10
Cs-135	3.2195E-05	3.73	7.47	0.00E+00	1.20E-04	2.40E-04	1.2500	7.175E+11
Cs-137	2.7564E+00	3.73	7.47	0.00E+00	1.03E+01	2.06E+01	1.7500	4.783E+08
Eu-154	1.5368E-02	3.73	7.47	0.00E+00	5.74E-02	1.15E-01	2.2500	7.710E+08
Eu-155	2.9293E-02	3.73	7.47	0.00E+00	1.09E-01	2.19E-01	2.7500	6.118E+06
Fe-55	7.7158E-01	3.73	7.47	0.00E+00	2.88E+00	5.76E+00	3.5000	7.120E+05
H-3	1.1111E-02	3.73	7.47	0.00E+00	4.15E-02	8.30E-02	5.0000	4.153E+00
I-129	7.3684E-07	3.73	7.47	0.00E+00	2.75E-06	5.50E-06	7.0000	4.704E-01
Kr-85	2.5263E-01	3.73	7.47	0.00E+00	9.43E-01	1.89E+00	11.0000	5.361E-02
Np-237	1.2427E-06	3.73	7.47	0.00E+00	4.64E-06	9.28E-06		
Pa-231	3.8511E-09	3.73	7.47	0.00E+00	1.44E-08	2.88E-08		
Pb-210	7.3880E-15	3.73	7.47	0.00E+00	2.76E-14	5.52E-14		
Pm-147	2.1023E+00	3.73	7.47	0.00E+00	7.85E+00	1.57E+01		
Pu-238	1.0383E-03	3.73	7.47	0.00E+00	3.88E-03	7.76E-03		
Pu-239	5.5293E-03	3.73	7.47	0.00E+00	2.07E-02	4.13E-02		
Pu-240	2.1278E-03	3.73	7.47	0.00E+00	7.95E-03	1.59E-02		
Pu-241	1.0195E-01	3.73	7.47	0.00E+00	3.81E-01	7.62E-01		
Pu-242	2.3128E-07	3.73	7.47	0.00E+00	8.64E-07	1.73E-06		
Ra-226	5.2782E-14	3.73	7.47	0.00E+00	1.97E-13	3.94E-13		
Ra-228	1.9338E-10	3.73	7.47	0.00E+00	7.22E-10	1.44E-09		
Ru-106	9.1684E-02	3.73	7.47	0.00E+00	3.42E-01	6.85E-01		
Se-79	1.3018E-05	3.73	7.47	0.00E+00	4.86E-05	9.72E-05		
Sn-126	1.2167E-05	3.73	7.47	0.00E+00	4.54E-05	9.09E-05		
Sr-90	2.6045E+00	3.73	7.47	0.00E+00	9.73E+00	1.95E+01		
Tc-99	4.4241E-04	3.73	7.47	0.00E+00	1.65E-03	3.30E-03		
Th-229	1.3713E-10	3.73	7.47	0.00E+00	5.12E-10	1.02E-09		
Th-230	1.8090E-11	3.73	7.47	0.00E+00	6.76E-11	1.35E-10		
Th-232	2.5278E-10	3.73	7.47	0.00E+00	9.44E-10	1.89E-09		
Tl-208	1.6947E-08	3.73	7.47	0.00E+00	6.33E-08	1.27E-07		
U-232	4.8737E-08	3.73	7.47	0.00E+00	1.82E-07	3.64E-07		
U-233	1.2203E-07	3.73	7.47	0.00E+00	4.56E-07	9.11E-07		
U-234	1.5925E-07	3.73	7.47	0.00E+00	5.95E-07	1.19E-06		
U-235	-2.6194E-06	3.73	0.00	1.66E-04	1.56E-04	1.66E-04		
U-236	1.2693E-05	3.73	7.47	0.00E+00	4.74E-05	9.48E-05		
U-238	-3.6331E-08	3.73	0.00	1.03E-04	1.03E-04	1.03E-04		
Y-90	2.6060E+00	3.73	7.47	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	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20.00002088	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	3.73	2.86	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.
Bounding		7.47	

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 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 8.5/20 FFCR UNIV OF CAL-IRVINE
 SNF ID #: 1052
 Fuel Units & Descr: 1 - ELEMENT
 Heavy Metal Mass: BOL=0 183kg, EOL=0 183kg
 ROD Storage Site INEEL

¹Fuel decay start date 2035
 Estimates as of: 2030
 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 _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0150	1.961E+06
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0250	0.000E+00
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0375	2.676E+03
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0575	1.621E+03
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0850	2.286E+05
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.1250	4.514E+05
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.2250	1.598E+06
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.3750	3.986E+03
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.5750	1.961E+02
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.8500	3.056E+01
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.2500	1.802E+00
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.7500	8.816E-01
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.2500	5.107E-01
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.7500	2.967E-01
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	3.5000	2.653E-01
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	5.0000	1.140E-01
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	7.0000	1.312E-02
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	11.0000	1.508E-03
Np-237	1.2427E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pa-231	3.8511E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pb-210	7.3880E-15	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pm-147	2.1023E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-238	1.0383E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-239	5.5293E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-240	2.1278E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-241	1.0195E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-242	2.3128E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-226	5.2782E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-228	1.9338E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ru-106	9.1684E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Se-79	1.3018E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sn-126	1.2167E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sr-90	2.6045E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Tc-99	4.4241E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-229	1.3713E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-230	1.8090E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-232	2.5278E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-208	1.6947E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-232	4.8737E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-233	1.2203E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-234	1.5925E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-235	-2.6194E-06	0.00	0.00	7.92E-05	7.92E-05	7.92E-05		
U-236	1.2693E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-238	-3.6331E-08	0.00	0.00	4.93E-05	4.93E-05	4.93E-05		
Y-90	2.6060E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Other Radionuclides								

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.32E-06	3.32E-06
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

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

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

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.00		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: TRIGA (ACPR 12/20) JAPAN
 SNF ID #: 480
 Fuel Units & Descr: 182 - ELEMENT
 Heavy Metal Mass: BOL=48 357kg; EOL=48 23kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2010
 Estimates as of: 2030
 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"
 1 64

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 6436E-09	455 87	911 73	0 00E+00	1 21E-06	2 41E-06	Avg MeV	
Am-241	3 1429E-03	455 87	911 73	0 00E+00	1 43E+00	2 87E+00	0 0150	9 137E+13
Am-242m	1 3195E-06	455 87	911 73	0 00E+00	6 02E-04	1 20E-03	0 0250	1 902E+13
Am-243	1 4753E-07	455 87	911 73	0 00E+00	6 73E-05	1 35E-04	0 0375	1 648E+13
C-14	1 2847E-04	455 87	911 73	0 00E+00	5 86E-02	1 17E-01	0 0575	1 773E+13
Cl-36	2 8120E-06	455 87	911 73	0 00E+00	1 28E-03	2 56E-03	0 0850	1 070E+13
Cm-243	1 2465E-07	455 87	911 73	0 00E+00	5 68E-05	1 14E-04	0 1250	6 994E+12
Cm-244	9 5564E-07	455 87	911 73	0 00E+00	4 36E-04	8 71E-04	0 2250	9 188E+12
Co-60	1 7880E-01	455 87	911 73	0 00E+00	8 15E+01	1 63E+02	0 3750	4 027E+12
Cs-134	5 8692E-04	455 87	911 73	0 00E+00	2 68E-01	5 35E-01	0 5750	6 623E+13
Cs-135	3 2195E-05	455 87	911 73	0 00E+00	1 47E-02	2 94E-02	0 8500	7 465E+11
Cs-137	1 9489E+00	455 87	911 73	0 00E+00	8 88E+02	1 78E+03	1 2500	1 237E+13
Eu-154	4 5895E-03	455 87	911 73	0 00E+00	2 09E+00	4 18E+00	1 7500	1 918E+10
Eu-155	3 6045E-03	455 87	911 73	0 00E+00	1 64E+00	3 29E+00	2 2500	6 606E+07
Fe-55	1 4185E-02	455 87	911 73	0 00E+00	6 47E+00	1 29E+01	2 7500	7 279E+05
H-3	4 7895E-03	455 87	911 73	0 00E+00	2 18E+00	4 37E+00	3 5000	4 095E+03
I-129	7 3684E-07	455 87	911 73	0 00E+00	3 36E-04	6 72E-04	5 0000	5 037E+02
Kr-85	9 5820E-02	455 87	911 73	0 00E+00	4 37E+01	8 74E+01	7 0000	5 695E+01
Np-237	1 2552E-06	455 87	911 73	0 00E+00	5 72E-04	1 14E-03	11.0000	6 483E+00
Pa-231	7 0406E-09	455 87	911 73	0 00E+00	3 21E-06	6 42E-06		
Pb-210	5 8000E-14	455 87	911 73	0 00E+00	2 64E-11	5 29E-11		
Pm-147	4 0075E-02	455 87	911 73	0 00E+00	1 83E+01	3 65E+01		
Pu-238	9 2256E-04	455 87	911 73	0 00E+00	4 21E-01	8 41E-01		
Pu-239	5 5278E-03	455 87	911 73	0 00E+00	2 52E+00	5 04E+00		
Pu-240	2 1248E-03	455 87	911.73	0 00E+00	9 69E-01	1 94E+00		
Pu-241	4 9549E-02	455 87	911.73	0 00E+00	2 26E+01	4 52E+01		
Pu-242	2 3128E-07	455 87	911.73	0 00E+00	1 05E-04	2 11E-04		
Ra-226	2 4526E-13	455 87	911 73	0 00E+00	1 12E-10	2 24E-10		
Ra-228	2 4015E-10	455 87	911.73	0 00E+00	1 09E-07	2 19E-07		
Ru-106	3 0602E-06	455 87	911.73	0 00E+00	1 40E-03	2 79E-03		
Se-79	1 3015E-05	455 87	911.73	0 00E+00	5 93E-03	1 19E-02		
Sn-126	1 2165E-05	455 87	911.73	0 00E+00	5 55E-03	1 11E-02		
Sr-90	1 8226E+00	455 87	911.73	0 00E+00	8 31E+02	1 66E+03		
Tc-99	4 4241E-04	455 87	911.73	0 00E+00	2 02E-01	4 03E-01		
Th-229	3 0962E-10	455 87	911.73	0 00E+00	1 41E-07	2 82E-07		
Th-230	4 2346E-11	455 87	911.73	0 00E+00	1 93E-08	3 86E-08		
Th-232	2 5278E-10	455 87	911.73	0 00E+00	1 15E-07	2 30E-07		
Tl-208	1 5820E-08	455 87	911.73	0 00E+00	7 21E-06	1 44E-05		
U-232	4 2647E-08	455 87	911.73	0 00E+00	1 94E-05	3 89E-05		
U-233	1 2211E-07	455 87	911.73	0 00E+00	5 57E-05	1 11E-04		
U-234	1 9955E-07	455 87	911.73	0 00E+00	9 10E-05	1 82E-04		
U-235	-2 6194E-06	455 87	0 00	2 08E-02	1 97E-02	2 08E-02		
U-236	1 2693E-05	455 87	911.73	0 00E+00	5 79E-03	1 16E-02		
U-238	-3 6331E-08	455 87	0 00	1 30E-02	1 30E-02	1 30E-02		
Y-90	1 8241E+00	455 87	911.73	0 00E+00	8 32E+02	1 66E+03		
Other Radionuclides					8 78E+02	1 76E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1 14E+01	2 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	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19 95031243	10 to 20 1

Burnup Summary (MWd) ²		Basis for burnup used in estimate:
From SFD	Estimated	
Nominal	455.87	Nominal burnup taken directly from SFD (converted to MWd)
Bounding	911.73	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 (ACPR 12/20) PENN STATE UNIV
 SNF ID # 1002
 Fuel Units & Descr: 46 - ELEMENT
 Heavy Metal Mass BOL=12.779kg, EOL=12.006kg
 ROD Storage Site INEEL

¹Fuel decay start date: 2035
 Estimates as of: 2030
 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)		
Ac-227	8.5173E-10	737.72	1,475.44	0.00E+00	6.28E-07	1.26E-06	Avg MeV	
Am-241	1.8331E-03	737.72	1,475.44	0.00E+00	1.35E+00	2.70E+00	0.0150	2.385E+14
Am-242m	1.4129E-06	737.72	1,475.44	0.00E+00	1.04E-03	2.08E-03	0.0250	5.247E+13
Am-243	1.4774E-07	737.72	1,475.44	0.00E+00	1.09E-04	2.18E-04	0.0375	4.468E+13
C-14	1.2871E-04	737.72	1,475.44	0.00E+00	9.49E-02	1.90E-01	0.0575	4.587E+13
Cf-254	2.8120E-06	737.72	1,475.44	0.00E+00	2.07E-03	4.15E-03	0.0850	2.841E+13
Cm-243	1.7940E-07	737.72	1,475.44	0.00E+00	1.32E-04	2.65E-04	0.1250	2.063E+13
Cm-244	1.6962E-06	737.72	1,475.44	0.00E+00	1.25E-03	2.50E-03	0.2250	2.410E+13
Co-60	1.2839E+00	737.72	1,475.44	0.00E+00	9.47E+02	1.89E+03	0.3750	1.223E+13
Cs-134	9.0541E-02	737.72	1,475.44	0.00E+00	6.68E+01	1.34E+02	0.5750	1.626E+14
Cs-135	3.2195E-05	737.72	1,475.44	0.00E+00	2.38E-02	4.75E-02	0.8500	6.979E+12
Cs-137	2.7564E+00	737.72	1,475.44	0.00E+00	2.03E+03	4.07E+03	1.2500	1.417E+14
Eu-154	1.5368E-02	737.72	1,475.44	0.00E+00	1.13E+01	2.27E+01	1.7500	9.448E+10
Eu-155	2.9293E-02	737.72	1,475.44	0.00E+00	2.16E+01	4.32E+01	2.2500	1.523E+11
Fe-55	7.7158E-01	737.72	1,475.44	0.00E+00	5.69E+02	1.14E+03	2.7500	1.209E+09
H-3	1.1111E-02	737.72	1,475.44	0.00E+00	8.20E+00	1.64E+01	3.5000	1.406E+08
I-129	7.3684E-07	737.72	1,475.44	0.00E+00	5.44E-04	1.09E-03	5.0000	7.812E+02
Kr-85	2.5263E-01	737.72	1,475.44	0.00E+00	1.86E+02	3.73E+02	7.0000	8.843E+01
Np-237	1.2427E-06	737.72	1,475.44	0.00E+00	9.17E-04	1.83E-03	11.0000	1.007E+01
Pa-231	3.8511E-09	737.72	1,475.44	0.00E+00	2.84E-06	5.68E-06		
Pb-210	7.3880E-15	737.72	1,475.44	0.00E+00	5.45E-12	1.09E-11		
Pm-147	2.1023E+00	737.72	1,475.44	0.00E+00	1.55E+03	3.10E+03		
Pu-238	1.0383E-03	737.72	1,475.44	0.00E+00	7.66E-01	1.53E+00		
Pu-239	5.5293E-03	737.72	1,475.44	0.00E+00	4.08E+00	8.16E+00		
Pu-240	2.1278E-03	737.72	1,475.44	0.00E+00	1.57E+00	3.14E+00		
Pu-241	1.0195E-01	737.72	1,475.44	0.00E+00	7.52E+01	1.50E+02		
Pu-242	2.3128E-07	737.72	1,475.44	0.00E+00	1.71E-04	3.41E-04		
Ra-226	5.2782E-14	737.72	1,475.44	0.00E+00	3.89E-11	7.79E-11		
Ra-228	1.9338E-10	737.72	1,475.44	0.00E+00	1.43E-07	2.85E-07		
Ru-106	9.1684E-02	737.72	1,475.44	0.00E+00	6.76E+01	1.35E+02		
Se-79	1.3018E-05	737.72	1,475.44	0.00E+00	9.60E-03	1.92E-02		
Sn-126	1.2167E-05	737.72	1,475.44	0.00E+00	8.98E-03	1.80E-02		
Sr-90	2.6045E+00	737.72	1,475.44	0.00E+00	1.92E+03	3.84E+03		
Tc-99	4.4241E-04	737.72	1,475.44	0.00E+00	3.26E-01	6.53E-01		
Th-229	1.3713E-10	737.72	1,475.44	0.00E+00	1.01E-07	2.02E-07		
Th-230	1.8090E-11	737.72	1,475.44	0.00E+00	1.33E-08	2.67E-08		
Th-232	2.5278E-10	737.72	1,475.44	0.00E+00	1.86E-07	3.73E-07		
Ti-208	1.6947E-08	737.72	1,475.44	0.00E+00	1.25E-05	2.50E-05		
U-232	4.8737E-08	737.72	1,475.44	0.00E+00	3.60E-05	7.19E-05		
U-233	1.2203E-07	737.72	1,475.44	0.00E+00	9.00E-05	1.80E-04		
U-234	1.5925E-07	737.72	1,475.44	0.00E+00	1.17E-04	2.35E-04		
U-235	-2.6194E-06	737.72	0.00	5.47E-03	3.54E-03	5.47E-03		
U-236	1.2693E-05	737.72	1,475.44	0.00E+00	9.36E-03	1.87E-02		
U-238	-3.6331E-08	737.72	0.00	3.44E-03	3.42E-03	3.44E-03		
Y-90	2.6060E+00	737.72	1,475.44	0.00E+00	1.92E+03	3.85E+03		
Other Radonucleides					2.66E+03	5.32E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.29E+01	8.59E+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	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.79999842	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	240.93	737.72	
Bounding:		1,475.44	

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

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.69	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 (ACPR 12/20) SLOVENIA
 SNF ID #: 932
 Fuel Units & Descr: 1 - ELEMENT
 Heavy Metal Mass: BOL=0.276kg; EOL=0.276kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1999
 Estimates as of: 2030
 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 01

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventones(Ci)	Bounding Fuel Inventones(Ci)	Avg. MeV	
Ac-227	4 1459E-09	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Am-241	3 5850E-03	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 0150	2 933E+06
Am-242m	1 2899E-06	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 0250	0 000E+00
Am-243	1 4747E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 0375	4 000E+03
C-14	1 2839E-04	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 0575	2 436E+03
Cl-36	2 8120E-06	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 0850	3 418E+05
Cm-243	1 1038E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 1250	6 747E+05
Cm-244	7 8917E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 2250	2 388E+06
Co-60	9 2647E-02	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 3750	5 959E+03
Cs-134	1 0940E-04	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 5750	2 931E+02
Cs-135	3 2195E-05	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 8500	4 573E+01
Cs-137	1 7368E+00	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	1 2500	2 713E+00
Eu-154	3 0677E-03	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	1 7500	1 327E+00
Eu-155	1 7925E-03	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	2 2500	7 689E-01
Fe-55	3 7444E-03	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	2 7500	4 467E-01
H-3	3 6180E-03	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	3 5000	3 994E-01
I-129	7 3684E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	5 0000	1 716E-01
Kr-85	6 9368E-02	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	7 0000	1 975E-02
Np-237	1 2662E-06	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	11 0000	2 271E-03
Pa-231	9 1654E-09	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pb-210	1 3728E-13	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pm-147	1 0702E-02	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pu-238	8 8692E-04	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pu-239	5 5263E-03	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pu-240	2 1233E-03	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pu-241	3 8962E-02	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pu-242	2 3128E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Ra-226	4 6752E-13	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Ra-228	2 4827E-10	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Ru-106	9 8526E-08	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Se-79	1 3015E-05	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Sn-126	1 2165E-05	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Sr-90	1 6195E+00	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Tc-99	4 4241E-04	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Th-229	4 2451E-10	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Th-230	6 1398E-11	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Th-232	2 5278E-10	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Tl-208	1 5098E-08	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
U-232	4 0662E-08	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
U-233	1 2217E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
U-234	2 2391E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
U-235	-2 6194E-06	0 00	0 00	1 18E-04	1 18E-04	1 18E-04		
U-236	1 2695E-05	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
U-238	-3 6331E-08	0 00	0 00	7 42E-05	7 42E-05	7 42E-05		
Y-90	1 6195E+00	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Other Radionuclides					0 00E+00	0 00E+00		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4 98E-06	4 98E-06
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	19.88316824	10 to 20 1	

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

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	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 TRIGA (ACPR) ROMANIA
 SNF ID # 1077
 Fuel Units & Descr 75 - ELEMENT
 Heavy Metal Mass BOL=14 7kg EOL=14 445kg
 ROD Storage Site INEEL

¹Fuel decay start date: 1999
 Estimates as of 2030
 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 68

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	4 1459E-09	243 42	486 85	0 00E+00	1 01E-06	2 02E-06		
Am-241	3 5850E-03	243 42	486 85	0 00E+00	8 73E-01	1 75E+00	0 0150	4.321E+13
Am-242m	1.2899E-06	243 42	486 85	0 00E+00	3 14E-04	6 28E-04	0 0250	8 984E+12
Am-243	1.4747E-07	243 42	486 85	0 00E+00	3 59E-05	7.18E-05	0 0375	7 794E+12
C-14	1.2839E-04	243 42	486 85	0 00E+00	3 13E-02	6 25E-02	0 0575	8 394E+12
Cl-36	2 8120E-06	243 42	486 85	0 00E+00	6 85E-04	1 37E-03	0 0850	5 060E+12
Cm-243	1.1038E-07	243 42	486 85	0 00E+00	2 69E-05	5 37E-05	0 1250	3.301E+12
Cm-244	7 8917E-07	243 42	486 85	0 00E+00	1 92E-04	3 84E-04	0.2250	4 351E+12
Co-60	9 2647E-02	243 42	486 85	0 00E+00	2 26E+01	4 51E+01	0.3750	1.900E+12
Cs-134	1 0940E-04	243 42	486 85	0 00E+00	2 66E-02	5 33E-02	0 5750	3 150E+13
Cs-135	3 2195E-05	243 42	486 85	0 00E+00	7 84E-03	1.57E-02	0 8500	3 382E+11
Cs-137	1 7368E+00	243 42	486 85	0 00E+00	4.23E+02	8 46E+02	1.2500	3 473E+12
Eu-154	3 0677E-03	243 42	486 85	0 00E+00	7 47E-01	1 49E+00	1 7500	8.803E+09
Eu-155	1.7925E-03	243 42	486 85	0 00E+00	4 36E-01	8 73E-01	2.2500	1.856E+07
Fe-55	3 7444E-03	243 42	486 85	0 00E+00	9 11E-01	1 82E+00	2 7500	3 139E+05
H-3	3 6180E-03	243 42	486 85	0 00E+00	8 81E-01	1 76E+00	3 5000	6 707E+02
I-129	7.3684E-07	243 42	486 85	0 00E+00	1 79E-04	3 59E-04	5 0000	2.617E+02
Kr-85	6 9368E-02	243 42	486 85	0 00E+00	1 69E+01	3 38E+01	7 0000	2.955E+01
Np-237	1.2662E-06	243 42	486 85	0 00E+00	3 08E-04	6 16E-04	11 0000	3.361E+00
Pa-231	9.1654E-09	243 42	486 85	0 00E+00	2 23E-06	4.46E-06		
Pb-210	1.3728E-13	243 42	486 85	0 00E+00	3 34E-11	6.68E-11		
Pm-147	1 0702E-02	243 42	486 85	0 00E+00	2 61E+00	5.21E+00		
Pu-238	8 8692E-04	243 42	486 85	0 00E+00	2 16E-01	4.32E-01		
Pu-239	5.5263E-03	243 42	486 85	0 00E+00	1 35E+00	2 69E+00		
Pu-240	2.1233E-03	243 42	486 85	0 00E+00	5 17E-01	1 03E+00		
Pu-241	3 8962E-02	243 42	486 85	0 00E+00	9 48E+00	1 90E+01		
Pu-242	2.3128E-07	243 42	486 85	0 00E+00	5 63E-05	1 13E-04		
Ra-226	4 6752E-13	243 42	486 85	0 00E+00	1 14E-10	2.28E-10		
Ra-228	2 4827E-10	243 42	486 85	0 00E+00	6 04E-08	1.21E-07		
Ru-106	9 8526E-08	243 42	486 85	0 00E+00	2 40E-05	4 80E-05		
Se-79	1.3015E-05	243 42	486 85	0 00E+00	3 17E-03	6.34E-03		
Sn-126	1.2165E-05	243 42	486 85	0 00E+00	2 96E-03	5 92E-03		
Sr-90	1 6195E+00	243 42	486 85	0 00E+00	3 94E+02	7.88E+02		
Tc-99	4.4241E-04	243 42	486 85	0 00E+00	1 08E-01	2 15E-01		
Th-229	4.2451E-10	243 42	486 85	0 00E+00	1 03E-07	2 07E-07		
Th-230	6.1398E-11	243 42	486 85	0 00E+00	1 49E-08	2 99E-08		
Th-232	2.5278E-10	243 42	486 85	0 00E+00	6 15E-08	1.23E-07		
Ti-208	1.5098E-08	243 42	486 85	0 00E+00	3 68E-06	7 35E-06		
U-232	4.0662E-08	243 42	486 85	0 00E+00	9 90E-06	1 98E-05		
U-233	1.2217E-07	243 42	486 85	0 00E+00	2 97E-05	5 95E-05		
U-234	2.2391E-07	243 42	486 85	0 00E+00	5 45E-05	1 09E-04		
U-235	-2 6194E-06	243 42	0.00	6.32E-03	5 68E-03	6 32E-03		
U-236	1.2695E-05	243 42	486 85	0 00E+00	3 09E-03	6 18E-03		
U-238	-3 6331E-08	243 42	0 00	3 96E-03	3 95E-03	3 96E-03	5 17E+00	1 03E+01
Y-90	1.6195E+00	243 42	486 85	0 00E+00	3 94E+02	7 88E+02	Total	Total
Other Radionuclides					4 19E+02	8 38E+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	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	19 898	10 to 20 1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal	0 00	243 42	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding		486 85	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 49		1 00
Bounding	0 97		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (DEMOUNTABLE) U OF AZ
 SNF ID #: 971
 Fuel Units & Descr: 1 - ELEMENT
 Heavy Metal Mass: BOL=0 195kg EOL=0 181kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 Estimates as of: 2030
 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	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	8.5173E-10	13.46	26.92	0.00E+00	1.15E-08	2.29E-08	0.0150	4.351E+12
Am-241	1.8331E-03	13.46	26.92	0.00E+00	2.47E-02	4.93E-02	0.0250	9.574E+11
Am-242m	1.4129E-06	13.46	26.92	0.00E+00	1.90E-05	3.80E-05	0.0375	8.153E+11
Am-243	1.4774E-07	13.46	26.92	0.00E+00	1.99E-06	3.98E-06	0.0575	8.368E+11
C-14	1.2871E-04	13.46	26.92	0.00E+00	1.73E-03	3.46E-03	0.0850	5.184E+11
Ci-36	2.8120E-06	13.46	26.92	0.00E+00	3.78E-05	7.57E-05	0.1250	3.765E+11
Cm-243	1.7940E-07	13.46	26.92	0.00E+00	2.41E-06	4.83E-06	0.2250	4.398E+11
Cm-244	1.6962E-06	13.46	26.92	0.00E+00	2.28E-05	4.57E-05	0.3750	2.232E+11
Co-60	1.2839E+00	13.46	26.92	0.00E+00	1.73E+01	3.46E+01	0.5750	2.967E+12
Cs-134	9.0541E-02	13.46	26.92	0.00E+00	1.22E+00	2.44E+00	0.8500	1.273E+11
Cs-135	3.2195E-05	13.46	26.92	0.00E+00	4.33E-04	8.67E-04	1.2500	2.586E+12
Cs-137	2.7564E+00	13.46	26.92	0.00E+00	3.71E+01	7.42E+01	1.7500	1.724E+09
Eu-154	1.5368E-02	13.46	26.92	0.00E+00	2.07E-01	4.14E-01	2.2500	2.779E+09
Eu-155	2.9293E-02	13.46	26.92	0.00E+00	3.94E-01	7.89E-01	2.7500	2.205E+07
Fe-55	7.7158E-01	13.46	26.92	0.00E+00	1.04E+01	2.08E+01	3.5000	2.566E+06
H-3	1.1111E-02	13.46	26.92	0.00E+00	1.50E-01	2.99E-01	5.0000	1.423E+01
I-129	7.3684E-07	13.46	26.92	0.00E+00	9.92E-06	1.98E-05	7.0000	1.611E+00
Kr-85	2.5263E-01	13.46	26.92	0.00E+00	3.40E+00	6.80E+00	11.0000	1.835E-01
Np-237	1.2427E-06	13.46	26.92	0.00E+00	1.67E-05	3.35E-05		
Pa-231	3.8511E-09	13.46	26.92	0.00E+00	5.18E-08	1.04E-07		
Pb-210	7.3880E-15	13.46	26.92	0.00E+00	9.94E-14	1.99E-13		
Pm-147	2.1023E+00	13.46	26.92	0.00E+00	2.83E+01	5.66E+01		
Pu-238	1.0383E-03	13.46	26.92	0.00E+00	1.40E-02	2.80E-02		
Pu-239	5.5293E-03	13.46	26.92	0.00E+00	7.44E-02	1.49E-01		
Pu-240	2.1278E-03	13.46	26.92	0.00E+00	2.86E-02	5.73E-02		
Pu-241	1.0195E-01	13.46	26.92	0.00E+00	1.37E+00	2.74E+00		
Pu-242	2.3128E-07	13.46	26.92	0.00E+00	3.11E-06	6.23E-06		
Ra-226	5.2782E-14	13.46	26.92	0.00E+00	7.10E-13	1.42E-12		
Ra-228	1.9338E-10	13.46	26.92	0.00E+00	2.60E-09	5.21E-09		
Ru-106	9.1684E-02	13.46	26.92	0.00E+00	1.23E+00	2.47E+00		
Se-79	1.3018E-05	13.46	26.92	0.00E+00	1.75E-04	3.50E-04		
Sr-126	1.2167E-05	13.46	26.92	0.00E+00	1.64E-04	3.28E-04		
Sr-90	2.6045E+00	13.46	26.92	0.00E+00	3.51E+01	7.01E+01		
Tc-99	4.4241E-04	13.46	26.92	0.00E+00	5.95E-03	1.19E-02		
Th-229	1.3713E-10	13.46	26.92	0.00E+00	1.85E-09	3.69E-09		
Th-230	1.8090E-11	13.46	26.92	0.00E+00	2.43E-10	4.87E-10		
Th-232	2.5278E-10	13.46	26.92	0.00E+00	3.40E-09	6.80E-09		
Ti-208	1.6947E-08	13.46	26.92	0.00E+00	2.28E-07	4.56E-07		
U-232	4.8737E-08	13.46	26.92	0.00E+00	6.56E-07	1.31E-06		
U-233	1.2203E-07	13.46	26.92	0.00E+00	1.64E-06	3.29E-06		
U-234	1.5925E-07	13.46	26.92	0.00E+00	2.14E-06	4.29E-06		
U-235	-2.6194E-06	13.46	0.00	8.43E-05	4.90E-05	8.43E-05		
U-236	1.2693E-05	13.46	26.92	0.00E+00	1.71E-04	3.42E-04		
U-238	-3.6331E-08	13.46	0.00	5.24E-05	5.19E-05	5.24E-05		
Y-90	2.6060E+00	13.46	26.92	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	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	2.85	13.46	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		26.92	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	1.00
Bounding	4.05		

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: TRIGA (FLIP LEU-1 2020) THAILAND
 SNF ID #: 496
 Fuel Units & Descr: 36 - ELEMENT
 Heavy Metal Mass BOL=18 144kg EOL=15 649kg
 ROD Storage Site INEEL

Fuel decay start date 2010
 Estimates as of 2030
 Template TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Template Burnup(MWd) 6.65
 Template BOL Heavy Metal Mass (MT) 0.000195
 Template Decay Time 20 years

Estimated
 Canister usage
 18"x10"
 0.32

Radionuclide	m		x _n		b		y _n		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	2.6436E-09	2,381.55	4,763.11	0.00E+00	6.30E-06	1.26E-05				
Am-241	3.1429E-03	2,381.55	4,763.11	0.00E+00	7.48E+00	1.50E+01	0.0150	4.773E+14		
Am-242m	1.3195E-06	2,381.55	4,763.11	0.00E+00	3.14E-03	6.29E-03	0.0250	9.936E+13		
Am-243	1.4753E-07	2,381.55	4,763.11	0.00E+00	3.51E-04	7.03E-04	0.0375	8.608E+13		
C-14	1.2847E-04	2,381.55	4,763.11	0.00E+00	3.06E-01	6.12E-01	0.0575	9.260E+13		
Cl-36	2.8120E-06	2,381.55	4,763.11	0.00E+00	6.70E-03	1.34E-02	0.0850	5.590E+13		
Cm-243	1.2465E-07	2,381.55	4,763.11	0.00E+00	2.97E-04	5.94E-04	0.1250	3.654E+13		
Cm-244	9.5564E-07	2,381.55	4,763.11	0.00E+00	2.28E-03	4.55E-03	0.2250	4.800E+13		
Co-60	1.7880E-01	2,381.55	4,763.11	0.00E+00	4.26E+02	8.52E+02	0.3750	2.104E+13		
Cs-134	5.8692E-04	2,381.55	4,763.11	0.00E+00	1.40E+00	2.80E+00	0.5750	3.460E+14		
Cs-135	3.2195E-05	2,381.55	4,763.11	0.00E+00	7.67E-02	1.53E-01	0.8500	3.900E+12		
Cs-137	1.9489E+00	2,381.55	4,763.11	0.00E+00	4.64E+03	9.28E+03	1.2500	6.463E+13		
Eu-154	4.5895E-03	2,381.55	4,763.11	0.00E+00	1.09E+01	2.19E+01	1.7500	1.002E+11		
Eu-155	3.6045E-03	2,381.55	4,763.11	0.00E+00	8.58E+00	1.72E+01	2.2500	3.451E+08		
Fe-55	1.4185E-02	2,381.55	4,763.11	0.00E+00	3.38E+01	6.76E+01	2.7500	3.803E+06		
H-3	4.7895E-03	2,381.55	4,763.11	0.00E+00	1.14E+01	2.28E+01	3.5000	2.105E+04		
I-129	7.3684E-07	2,381.55	4,763.11	0.00E+00	1.75E-03	3.51E-03	5.0000	2.486E+03		
Kr-85	9.5820E-02	2,381.55	4,763.11	0.00E+00	2.28E+02	4.56E+02	7.0000	2.807E+02		
Np-237	1.2552E-06	2,381.55	4,763.11	0.00E+00	2.99E-03	5.98E-03	11.0000	3.194E+01		
Pa-231	7.0406E-09	2,381.55	4,763.11	0.00E+00	1.68E-05	3.35E-05				
Pb-210	5.8000E-14	2,381.55	4,763.11	0.00E+00	1.38E-10	2.76E-10				
Pm-147	4.0075E-02	2,381.55	4,763.11	0.00E+00	9.54E+01	1.91E+02				
Pu-238	9.2256E-04	2,381.55	4,763.11	0.00E+00	2.20E+00	4.39E+00				
Pu-239	5.5278E-03	2,381.55	4,763.11	0.00E+00	1.32E+01	2.63E+01				
Pu-240	2.1248E-03	2,381.55	4,763.11	0.00E+00	5.06E+00	1.01E+01				
Pu-241	4.9549E-02	2,381.55	4,763.11	0.00E+00	1.18E+02	2.36E+02				
Pu-242	2.3128E-07	2,381.55	4,763.11	0.00E+00	5.51E-04	1.10E-03				
Ra-226	2.4526E-13	2,381.55	4,763.11	0.00E+00	5.84E-10	1.17E-09				
Ra-228	2.4015E-10	2,381.55	4,763.11	0.00E+00	5.72E-07	1.14E-06				
Ru-106	3.0602E-06	2,381.55	4,763.11	0.00E+00	7.29E-03	1.46E-02				
Se-79	1.3015E-05	2,381.55	4,763.11	0.00E+00	3.10E-02	6.20E-02				
Sn-126	1.2165E-05	2,381.55	4,763.11	0.00E+00	2.90E-02	5.79E-02				
Sr-90	1.8226E+00	2,381.55	4,763.11	0.00E+00	4.34E+03	8.68E+03				
Tc-99	4.4241E-04	2,381.55	4,763.11	0.00E+00	1.05E+00	2.11E+00				
Th-229	3.0962E-10	2,381.55	4,763.11	0.00E+00	7.37E-07	1.47E-06				
Th-230	4.2346E-11	2,381.55	4,763.11	0.00E+00	1.01E-07	2.02E-07				
Th-232	2.5278E-10	2,381.55	4,763.11	0.00E+00	6.02E-07	1.20E-06				
Ti-208	1.5820E-08	2,381.55	4,763.11	0.00E+00	3.77E-05	7.54E-05				
U-232	4.2647E-08	2,381.55	4,763.11	0.00E+00	1.02E-04	2.03E-04				
U-233	1.2211E-07	2,381.55	4,763.11	0.00E+00	2.91E-04	5.82E-04				
U-234	1.9955E-07	2,381.55	4,763.11	0.00E+00	4.75E-04	9.50E-04				
U-235	-2.6194E-06	2,381.55	0.00	7.86E-03	1.62E-03	7.86E-03				
U-236	1.2693E-05	2,381.55	4,763.11	0.00E+00	3.02E-02	6.05E-02				
U-238	-3.6331E-08	2,381.55	0.00	4.88E-03	4.79E-03	4.88E-03				
Y-90	1.8241E+00	2,381.55	4,763.11	0.00E+00	4.34E+03	8.69E+03				
Other Radonucleides					4.59E+03	9.17E+03				

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.96E+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	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20.03968254	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	855.20	2,381.55	Nominal burnup calculated from the heavy metal mass destroyed
Bounding		4,763.11	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	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 LEU-I) BANGLADESH
 SNF ID #: 470
 Fuel Units & Descr: 100 - ELEMENT
 Heavy Metal Mass: BOL=50 4kg; EOL=46 06kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2010
 Estimates as of: 2030
 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: 20 years

Estimated
 Canister usage
 18"x10"
 0 90

II. Estimates	m	x _m	x _b	b	y _m	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 6436E-09	4,143 00	8,285 99	0 00E+00	1.10E-05	2.19E-05		
Am-241	3 1429E-03	4,143 00	8,285 99	0 00E+00	1 30E+01	2 60E+01	0 0150	8 304E+14
Am-242m	1 3195E-06	4,143 00	8,285 99	0 00E+00	5 47E-03	1 09E-02	0 0250	1 729E+14
Am-243	1 4753E-07	4,143 00	8,285 99	0 00E+00	6 11E-04	1 22E-03	0 0375	1 497E+14
C-14	1 2847E-04	4,143 00	8,285 99	0 00E+00	5 32E-01	1 06E+00	0 0575	1 611E+14
Cl-36	2 8120E-06	4,143 00	8,285 99	0 00E+00	1 17E-02	2 33E-02	0 0850	9 725E+13
Cm-243	1 2465E-07	4,143 00	8,285 99	0 00E+00	5 16E-04	1 03E-03	0 1250	6 356E+13
Cm-244	9 5564E-07	4,143 00	8,285 99	0 00E+00	3 96E-03	7 92E-03	0 2250	8 350E+13
Co-60	1 7880E-01	4,143 00	8,285 99	0 00E+00	7 41E+02	1 48E+03	0 3750	3 660E+13
Cs-134	5 8692E-04	4,143 00	8,285 99	0 00E+00	2 43E+00	4 86E+00	0 5750	6 019E+14
Cs-135	3 2195E-05	4,143 00	8,285 99	0 00E+00	1 33E-01	2 67E-01	0 8500	6 785E+12
Cs-137	1 9489E+00	4,143 00	8,285 99	0 00E+00	8 07E+03	1 61E+04	1 2500	1 124E+14
Eu-154	4 5895E-03	4,143 00	8,285 99	0 00E+00	1 90E+01	3 80E+01	1 7500	1 743E+11
Eu-155	3 6045E-03	4,143 00	8,285 99	0 00E+00	1 49E+01	2 99E+01	2 2500	6 004E+08
Fe-55	1 4185E-02	4,143 00	8,285 99	0 00E+00	5 88E+01	1 18E+02	2 7500	6 615E+06
H-3	4 7895E-03	4,143 00	8,285 99	0 00E+00	1 98E+01	3 97E+01	3 5000	3 665E+04
I-129	7 3684E-07	4,143 00	8,285 99	0 00E+00	3 05E-03	6 11E-03	5 0000	4 336E+03
Kr-85	9 5820E-02	4,143 00	8,285 99	0 00E+00	3 97E+02	7 94E+02	7 0000	4 897E+02
Np-237	1 2552E-06	4,143 00	8,285 99	0 00E+00	5 20E-03	1 04E-02	11 0000	5 572E+01
Pa-231	7 0406E-09	4,143 00	8,285 99	0 00E+00	2 92E-05	5 83E-05		
Pb-210	5 8000E-14	4,143 00	8,285 99	0 00E+00	2 40E-10	4 81E-10		
Pm-147	4 0075E-02	4,143 00	8,285 99	0 00E+00	1 66E+02	3 32E+02		
Pu-238	9 2256E-04	4,143 00	8,285 99	0 00E+00	3 82E+00	7 64E+00		
Pu-239	5 5278E-03	4,143 00	8,285 99	0 00E+00	2 29E+01	4 58E+01		
Pu-240	2 1248E-03	4,143 00	8,285 99	0 00E+00	8 80E+00	1 76E+01		
Pu-241	4 9549E-02	4,143 00	8,285 99	0 00E+00	2 05E+02	4 11E+02		
Pu-242	2 3128E-07	4,143 00	8,285 99	0 00E+00	9 58E-04	1 92E-03		
Ra-226	2 4526E-13	4,143 00	8,285 99	0 00E+00	1 02E-09	2 03E-09		
Ra-228	2 4015E-10	4,143 00	8,285 99	0 00E+00	9 95E-07	1 99E-06		
Ru-106	3 0602E-06	4,143 00	8,285 99	0 00E+00	1 27E-02	2 54E-02		
Se-79	1 3015E-05	4,143 00	8,285 99	0 00E+00	5 39E-02	1 08E-01		
Sn-126	1 2165E-05	4,143 00	8,285 99	0 00E+00	5 04E-02	1 01E-01		
Sr-90	1 8226E+00	4,143 00	8,285 99	0 00E+00	7 55E+03	1 51E+04		
Tc-99	4 4241E-04	4,143 00	8,285 99	0 00E+00	1 83E+00	3 67E+00		
Th-229	3 0962E-10	4,143 00	8,285 99	0 00E+00	1 28E-06	2 57E-06		
Th-230	4 2346E-11	4,143 00	8,285 99	0 00E+00	1 75E-07	3 51E-07		
Th-232	2 5278E-10	4,143 00	8,285 99	0 00E+00	1 05E-06	2 09E-06		
Tl-208	1 5820E-08	4,143 00	8,285 99	0 00E+00	6 55E-05	1 31E-04		
U-232	4 2647E-08	4,143 00	8,285 99	0 00E+00	1 77E-04	3 53E-04		
U-233	1 2211E-07	4,143 00	8,285 99	0 00E+00	5 06E-04	1 01E-03		
U-234	1 9955E-07	4,143 00	8,285 99	0 00E+00	8 27E-04	1 65E-03		
U-235	-2 6194E-06	4,143 00	0 00	2 18E-02	1 10E-02	2 18E-02		
U-236	1 2693E-05	4,143 00	8,285 99	0 00E+00	5 26E-02	1 05E-01		
U-238	-3 6331E-08	4,143 00	0 00	1 35E-02	1 34E-02	1 35E-02		
Y-90	1 8241E+00	4,143 00	8,285 99	0 00E+00	7 56E+03	1 51E+04		
Other Radionuclides					7 98E+03	1 60E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1 04E+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	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20.03968254	10 to 20 1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	475.12	4,143 00	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding		8,285 99	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	2 41	8 72	1 00
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 LEU-II 20/30) PHILIPPINES
 SNF ID # 499
 Fuel Units & Descr 128 - ELEMENT
 Heavy Metal Mass. BOL=105 472kg EOL=105 344kg
 ROD Storage Site: INEEL

¹Fuel decay start date 2010
 Estimates as of: 2030
 Template: TRIGA-SS (LW/U-Zirc, 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"
 1 15

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	2.6436E-09	994.28	1,988.57	0.00E+00	2.63E-06	5.26E-06	0.0150	1.993E+14
Am-241	3.1429E-03	994.28	1,988.57	0.00E+00	3.12E+00	6.25E+00	0.0250	4.148E+13
Am-242m	1.3195E-06	994.28	1,988.57	0.00E+00	1.31E-03	2.62E-03	0.0375	3.594E+13
Am-243	1.4753E-07	994.28	1,988.57	0.00E+00	1.47E-04	2.93E-04	0.0575	3.866E+13
C-14	1.2847E-04	994.28	1,988.57	0.00E+00	1.28E-01	2.55E-01	0.0850	2.334E+13
Cl-36	2.8120E-06	994.28	1,988.57	0.00E+00	2.80E-03	5.59E-03	0.1250	1.525E+13
Cm-243	1.2465E-07	994.28	1,988.57	0.00E+00	1.24E-04	2.48E-04	0.2250	2.004E+13
Cm-244	9.5564E-07	994.28	1,988.57	0.00E+00	9.50E-04	1.90E-03	0.3750	8.784E+12
Co-60	1.7880E-01	994.28	1,988.57	0.00E+00	1.78E+02	3.56E+02	0.5750	1.445E+14
Cs-134	5.8692E-04	994.28	1,988.57	0.00E+00	5.84E-01	1.17E+00	0.8500	1.628E+12
Cs-135	3.2195E-05	994.28	1,988.57	0.00E+00	3.20E-02	6.40E-02	1.2500	2.698E+13
Cs-137	1.9489E+00	994.28	1,988.57	0.00E+00	1.94E+03	3.88E+03	1.7500	4.183E+10
Eu-154	4.5895E-03	994.28	1,988.57	0.00E+00	4.56E+00	9.13E+00	2.2500	1.441E+08
Eu-155	3.6045E-03	994.28	1,988.57	0.00E+00	3.58E+00	7.17E+00	2.7500	1.588E+06
Fe-55	1.4185E-02	994.28	1,988.57	0.00E+00	1.41E+01	2.82E+01	3.5000	8.931E+03
H-3	4.7895E-03	994.28	1,988.57	0.00E+00	4.76E+00	9.52E+00	5.0000	1.099E+03
I-129	7.3684E-07	994.28	1,988.57	0.00E+00	7.33E-04	1.47E-03	7.0000	1.242E+02
Kr-85	9.5820E-02	994.28	1,988.57	0.00E+00	9.53E-01	1.91E+02	11.0000	1.414E+01
Np-237	1.2552E-06	994.28	1,988.57	0.00E+00	1.25E-03	2.50E-03		
Pa-231	7.0406E-09	994.28	1,988.57	0.00E+00	7.00E-06	1.40E-05		
Pb-210	5.8000E-14	994.28	1,988.57	0.00E+00	5.77E-11	1.15E-10		
Pm-147	4.0075E-02	994.28	1,988.57	0.00E+00	3.98E+01	7.97E+01		
Pu-238	9.2256E-04	994.28	1,988.57	0.00E+00	9.17E-01	1.83E+00		
Pu-239	5.5278E-03	994.28	1,988.57	0.00E+00	5.50E+00	1.10E+01		
Pu-240	2.1248E-03	994.28	1,988.57	0.00E+00	2.11E+00	4.23E+00		
Pu-241	4.9549E-02	994.28	1,988.57	0.00E+00	4.93E+01	9.85E+01		
Pu-242	2.3128E-07	994.28	1,988.57	0.00E+00	2.30E-04	4.60E-04		
Ra-226	2.4526E-13	994.28	1,988.57	0.00E+00	2.44E-10	4.88E-10		
Ra-228	2.4015E-10	994.28	1,988.57	0.00E+00	2.39E-07	4.78E-07		
Ru-106	3.0602E-06	994.28	1,988.57	0.00E+00	3.04E-03	6.09E-03		
Se-79	1.3015E-05	994.28	1,988.57	0.00E+00	1.29E-02	2.59E-02		
Sn-126	1.2165E-05	994.28	1,988.57	0.00E+00	1.21E-02	2.42E-02		
Sr-90	1.8226E+00	994.28	1,988.57	0.00E+00	1.81E+03	3.62E+03		
Tc-99	4.4241E-04	994.28	1,988.57	0.00E+00	4.40E-01	8.80E-01		
Th-229	3.0962E-10	994.28	1,988.57	0.00E+00	3.08E-07	6.16E-07		
Th-230	4.2346E-11	994.28	1,988.57	0.00E+00	4.21E-08	8.42E-08		
Th-232	2.5278E-10	994.28	1,988.57	0.00E+00	2.51E-07	5.03E-07		
Ti-208	1.5820E-08	994.28	1,988.57	0.00E+00	1.57E-05	3.15E-05		
U-232	4.2647E-08	994.28	1,988.57	0.00E+00	4.24E-05	8.48E-05		
U-233	1.2211E-07	994.28	1,988.57	0.00E+00	1.21E-04	2.43E-04		
U-234	1.9955E-07	994.28	1,988.57	0.00E+00	1.98E-04	3.97E-04		
U-235	-2.6194E-06	994.28	0.00	4.56E-02	4.30E-02	4.56E-02		
U-236	1.2693E-05	994.28	1,988.57	0.00E+00	1.26E-02	2.52E-02		
U-238	-3.6331E-08	994.28	0.00	2.84E-02	2.83E-02	2.84E-02		
Y-90	1.8241E+00	994.28	1,988.57	0.00E+00	1.81E+03	3.63E+03		
Other Radionuclides					1.91E+03	3.83E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.49E+01	4.98E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20 02427184	10 to 20 1	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	994.28	122.19	Nominal burnup taken directly from SFD (converted to MWd)
Bounding		1,988.57	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.28	0.12	0.99
Bounding	0.55		

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel
³Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP LEU-II 20/30) TAIWAN
 SNF ID #: 498
 Fuel Units & Descr: 144 - ELEMENT
 Heavy Metal Mass: BOL=118 656kg; EOL=118 512kg
 ROD Storage Site: INEEL

Fuel decay start date: 2010
 Estimates as of: 2030
 Template: TRIGA-SS (LWJU-Zrx, SST, 10 to 20% U)
 Template Burnup(MWd): 6.65
 Template BOL Heavy Metal Mass (MT): 0 000195
 Template Decay Time: 20 years

Estimated
 Canister usage
 18"x10"
 1 30

Radionuclide	m		x _a		b		y _a		y _b		Gamma Sources	
	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)	Avg. MeV			
Ac-227	2 6436E-09	1,118 57	2,237 14	0 00E+00	2 96E-06	5 91E-06						
Am-241	3 1429E-03	1,118 57	2,237 14	0 00E+00	3 52E+00	7 03E+00	0 0150	2 242E+14				
Am-242m	1 3195E-06	1,118 57	2,237 14	0 00E+00	1 48E-03	2 95E-03	0 0250	4 667E+13				
Am-243	1 4753E-07	1,118 57	2,237 14	0 00E+00	1 65E-04	3 30E-04	0 0375	4 043E+13				
C-14	1 2847E-04	1,118 57	2,237 14	0 00E+00	1 44E-01	2 87E-01	0 0575	4 349E+13				
Cl-36	2 8120E-06	1,118 57	2,237 14	0 00E+00	3 15E-03	6 29E-03	0 0850	2 626E+13				
Cm-243	1 2465E-07	1,118 57	2,237 14	0 00E+00	1 39E-04	2 79E-04	0 1250	1 716E+13				
Cm-244	9 5564E-07	1,118 57	2,237 14	0 00E+00	1 07E-03	2 14E-03	0 2250	2 255E+13				
Co-60	1 7880E-01	1,118 57	2,237 14	0 00E+00	2 00E+02	4 00E+02	0 3750	9 882E+12				
Cs-134	5 8692E-04	1,118 57	2,237 14	0 00E+00	6 57E-01	1 31E+00	0 5750	1 625E+14				
Cs-135	3 2195E-05	1,118 57	2,237 14	0 00E+00	3 60E-02	7 20E-02	0 8500	1 832E+12				
Cs-137	1 9489E+00	1,118 57	2,237 14	0 00E+00	2 18E+03	4 36E+03	1 2500	3 035E+13				
Eu-154	4 5895E-03	1,118 57	2,237 14	0 00E+00	5 13E+00	1 03E+01	1 7500	4 706E+10				
Eu-155	3 6045E-03	1,118 57	2,237 14	0 00E+00	4 03E+00	8 06E+00	2 2500	1 621E+08				
Fe-55	1 4185E-02	1,118 57	2,237 14	0 00E+00	1 59E+01	3 17E+01	2 7500	1 786E+06				
H-3	4 7895E-03	1,118 57	2,237 14	0 00E+00	5 36E+00	1 07E+01	3 5000	1 005E+04				
I-129	7 3684E-07	1,118 57	2,237 14	0 00E+00	8 24E-04	1 65E-03	5 0000	1 236E+03				
Kr-85	9 5820E-02	1,118 57	2,237 14	0 00E+00	1 07E+02	2 14E+02	7 0000	1 397E+02				
Np-237	1 2552E-06	1,118 57	2,237 14	0 00E+00	1 40E-03	2 81E-03	11 0000	1 591E+01				
Pa-231	7 0406E-09	1,118 57	2,237 14	0 00E+00	7 88E-06	1 58E-05						
Pb-210	5 8000E-14	1,118 57	2,237 14	0 00E+00	6 49E-11	1 30E-10						
Pm-147	4 0075E-02	1,118 57	2,237 14	0 00E+00	4 48E+01	8 97E+01						
Pu-238	9 2256E-04	1,118 57	2,237 14	0 00E+00	1 03E+00	2 06E+00						
Pu-239	5 5278E-03	1,118 57	2,237 14	0 00E+00	6 18E+00	1 24E+01						
Pu-240	2 1248E-03	1,118 57	2,237 14	0 00E+00	2 38E+00	4 75E+00						
Pu-241	4 9549E-02	1,118 57	2,237 14	0 00E+00	5 54E+01	1 11E+02						
Pu-242	2 3128E-07	1,118 57	2,237 14	0 00E+00	2 59E-04	5 17E-04						
Ra-226	2 4526E-13	1,118 57	2,237 14	0 00E+00	2 74E-10	5 49E-10						
Ra-228	2 4015E-10	1,118 57	2,237 14	0 00E+00	2 69E-07	5 37E-07						
Ru-106	3 0602E-06	1,118 57	2,237 14	0 00E+00	3 42E-03	6 85E-03						
Se-79	1 3015E-05	1,118 57	2,237 14	0 00E+00	1 46E-02	2 91E-02						
Sn-126	1 2165E-05	1,118 57	2,237 14	0 00E+00	1 36E-02	2 72E-02						
Sr-90	1 8226E+00	1,118 57	2,237 14	0 00E+00	2 04E+03	4 08E+03						
Tc-99	4 4241E-04	1,118 57	2,237 14	0 00E+00	4 95E-01	9 90E-01						
Th-229	3 0962E-10	1,118 57	2,237 14	0 00E+00	3 46E-07	6 93E-07						
Th-230	4 2346E-11	1,118 57	2,237 14	0 00E+00	4 74E-08	9 47E-08						
Th-232	2 5278E-10	1,118 57	2,237 14	0 00E+00	2 83E-07	5 66E-07						
Tl-208	1 5820E-08	1,118 57	2,237 14	0 00E+00	1 77E-05	3 54E-05						
U-232	4 2647E-08	1,118 57	2,237 14	0 00E+00	4 77E-05	9 54E-05						
U-233	1 2211E-07	1,118 57	2,237 14	0 00E+00	1 37E-04	2 73E-04						
U-234	1 9955E-07	1,118 57	2,237 14	0 00E+00	2 23E-04	4 46E-04						
U-235	-2 6194E-06	1,118 57	0 00	5 13E-02	4 84E-02	5 13E-02						
U-236	1 2693E-05	1,118 57	2,237 14	0 00E+00	1 42E-02	2 84E-02						
U-238	-3 6331E-08	1,118 57	0 00	3 19E-02	3 19E-02	3 19E-02						
Y-90	1 8241E+00	1,118 57	2,237 14	0 00E+00	2 04E+03	4 08E+03						
Other Radionuclides					2 15E+03	4 31E+03						

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20 024	10 to 20 1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	1,118 57	137 46	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup
Bounding		2,237 14	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
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)	¹ Fuel decay start date	2035	Estimated
SNF ID #	729	Estimates as of	2030	Canister usage
Fuel Units & Descr	111 - ELEMENT	Template	TRIGA-FLIP (LW/U-Zrx SST, 60 to 100%, U)	18"x10"
Heavy Metal Mass	BOL=21 534kg, EOL=16.35kg	² Template Burnup(MWd)	66 52	1 00
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	4,926 69	9,853 39	0 00E+00	1 40E-06	2 81E-06	Avg MeV	
Am-241	7 5767E-03	4,926 69	9,853 39	0 00E+00	3 73E+01	7 47E+01	0 0150	1 590E+15
Am-242m	2 4459E-05	4,926 69	9,853 39	0 00E+00	1 21E-01	2 41E-01	0 0250	3 489E+14
Am-243	3 0983E-05	4,926 69	9,853 39	0 00E+00	1 53E-01	3 05E-01	0 0375	3 086E+14
C-14	1 2590E-04	4,926 69	9,853 39	0 00E+00	6 20E-01	1 24E+00	0 0575	3 080E+14
Cl-36	2 6624E-06	4,926 69	9,853 39	0 00E+00	1 31E-02	2 62E-02	0 0850	1 917E+14
Cm-243	3 8244E-05	4,926 69	9,853 39	0 00E+00	1 88E-01	3 77E-01	0 1250	1 539E+14
Cm-244	4 1010E-03	4,926 69	9,853 39	0 00E+00	2 02E+01	4 04E+01	0 2250	1 629E+14
Co-60	1 2410E+00	4,926 69	9,853 39	0 00E+00	6 11E+03	1 22E+04	0 3750	8 127E+13
Cs-134	6 5454E-01	4,926 69	9,853 39	0 00E+00	3 22E+03	6 45E+03	0 5750	1 345E+15
Cs-135	1 9753E-05	4,926 69	9,853 39	0 00E+00	9 73E-02	1 95E-01	0 8500	2 468E+14
Cs-137	2 7375E+00	4,926 69	9,853 39	0 00E+00	1 35E+04	2 70E+04	1 2500	9 478E+14
Eu-154	1 2324E-01	4,926 69	9,853 39	0 00E+00	6 07E+02	1 21E+03	1 7500	1 268E+12
Eu-155	5 3037E-02	4,926 69	9,853 39	0 00E+00	2 61E+02	5 23E+02	2 2500	9 937E+11
Fe-55	7 9555E-01	4,926 69	9,853 39	0 00E+00	3 92E+03	7 84E+03	2 7500	9 009E+09
H-3	1 0531E-02	4,926 69	9,853 39	0 00E+00	5 19E+01	1 04E+02	3 5000	1 060E+09
I-129	7 1287E-07	4,926 69	9,853 39	0 00E+00	3 51E-03	7 02E-03	5 0000	2 540E+05
Kr-85	2 4955E-01	4,926 69	9,853 39	0 00E+00	1 23E+03	2 46E+03	7 0000	2 923E+04
Np-237	1 2121E-05	4,926 69	9,853 39	0 00E+00	5 97E-02	1 19E-01	11 0000	3 354E+03
Pa-231	1 1230E-09	4,926 69	9,853 39	0 00E+00	5 53E-06	1 11E-05		
Pb-210	6 1636E-14	4,926 69	9,853 39	0 00E+00	3 04E-10	6 07E-10		
Pm-147	1 1302E+00	4,926 69	9,853 39	0 00E+00	5 57E+03	1 11E+04		
Pu-238	5 4826E-02	4,926 69	9,853 39	0 00E+00	2 70E+02	5 40E+02		
Pu-239	1 4056E-03	4,926 69	9,853 39	0 00E+00	6 92E+00	1 38E+01		
Pu-240	1 1536E-03	4,926 69	9,853 39	0 00E+00	5 68E+00	1 14E+01		
Pu-241	4 2995E-01	4,926 69	9,853 39	0 00E+00	2 12E+03	4 24E+03		
Pu-242	4 9910E-06	4,926 69	9,853 39	0 00E+00	2 46E-02	4 92E-02		
Ra-226	2 4008E-13	4,926 69	9,853 39	0 00E+00	1 18E-09	2 37E-09		
Ra-228	1 8220E-11	4,926 69	9,853 39	0 00E+00	8 98E-08	1 80E-07		
Ru-106	1 0343E-01	4,926 69	9,853 39	0 00E+00	5 10E+02	1 02E+03		
Se-79	1 2832E-05	4,926 69	9,853 39	0 00E+00	6 32E-02	1 26E-01		
Sn-126	1 2090E-05	4,926 69	9,853 39	0 00E+00	5 96E-02	1 19E-01		
Sr-90	2 5646E+00	4,926 69	9,853 39	0 00E+00	1 26E+04	2 53E+04		
Tc-99	4 0319E-04	4,926 69	9,853 39	0 00E+00	1 99E+00	3 97E+00		
Th-229	7 7375E-11	4,926 69	9,853 39	0 00E+00	3 81E-07	7 62E-07		
Th-230	1 2211E-10	4,926 69	9,853 39	0 00E+00	6 02E-07	1 20E-06		
Th-232	2 3842E-11	4,926 69	9,853 39	0 00E+00	1 17E-07	2 35E-07		
Ti-208	1 4313E-07	4,926 69	9,853 39	0 00E+00	7 05E-04	1 41E-03		
U-232	4 1927E-07	4,926 69	9,853 39	0 00E+00	2 07E-03	4 13E-03		
U-233	6 8491E-08	4,926 69	9,853 39	0 00E+00	3 37E-04	6 75E-04		
U-234	2 0189E-06	4,926 69	9,853 39	0 00E+00	9 95E-03	1 99E-02		
U-235	-2 6572E-06	4,926 69	0 00	3 26E-02	1 95E-02	3 26E-02		
U-236	1 3575E-05	4,926 69	9,853 39	0 00E+00	6 69E-02	1 34E-01		
U-238	-2 2698E-08	4,926 69	0 00	2 17E-03	2 06E-03	2 17E-03		
Y-90	2 5646E+00	4,926 69	9,853 39	0 00E+00	1 26E+04	2 53E+04		
Other Radionuclides					1 75E+04	3 51E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3 23E+02	6 46E+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	U	
BOL Enrichment %	70 03211513	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	4 697.97	4 926 69	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		9 853 39	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		

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel
²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) ANL-W
 SNF ID #: 354
 Fuel Units & Descr: 6 - ELEMENT
 Heavy Metal Mass: BOL=1 068kg; EOL=0 979kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1994
 Estimates as of: 2030
 Template: TRIGA-FLIP (LW/U-Zr; SST, 60 to 100%, U)
²Template Burnup(MWd): 66.52
 Template BOL Heavy Metal Mass (MT): 0 000196
 Template Decay Time: 35 years

Estimated
 Canister usage
 18"x10"
 0 05

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CvMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	1 5469E-09	84 97	169 94	0 00E+00	1 31E-07	2 63E-07		
Am-241	1 6326E-02	84 97	169 94	0 00E+00	1 39E+00	2 77E+00	0 0150	1 175E+13
Am-242m	2 1332E-05	84 97	169 94	0 00E+00	1 81E-03	3 63E-03	0 0250	2 431E+12
Am-243	3 0893E-05	84 97	169 94	0 00E+00	2 62E-03	5 25E-03	0 0375	2 128E+12
C-14	1 2544E-04	84 97	169 94	0 00E+00	1 07E-02	2 13E-02	0 0575	2 305E+12
Cl-36	2 6624E-06	84 97	169 94	0 00E+00	2 26E-04	4 52E-04	0 0850	1 368E+12
Cm-243	1 8446E-05	84 97	169 94	0 00E+00	1 57E-03	3 13E-03	0 1250	9 141E+11
Cm-244	1 3020E-03	84 97	169 94	0 00E+00	1 11E-01	2 21E-01	0 2250	1 182E+12
Co-60	2 4053E-02	84 97	169 94	0 00E+00	2 04E+00	4 09E+00	0 3750	5 136E+11
Cs-134	2 7480E-05	84 97	169 94	0 00E+00	2 33E-03	4 67E-03	0 5750	8 664E+12
Cs-135	1 9738E-05	84 97	169 94	0 00E+00	1 68E-03	3 35E-03	0 8500	1 163E+11
Cs-137	1 3692E+00	84 97	169 94	0 00E+00	1 16E+02	2 33E+02	1 2500	3 665E+11
Eu-154	1 1001E-02	84 97	169 94	0 00E+00	9 35E-01	1 87E+00	1 7500	3 235E+09
Eu-155	8 0292E-04	84 97	169 94	0 00E+00	6 82E-02	1 36E-01	2 2500	1 845E+06
Fe-55	2 6894E-04	84 97	169 94	0 00E+00	2 29E-02	4 57E-02	2 7500	7 688E+05
H-3	1 9573E-03	84 97	169 94	0 00E+00	1 66E-01	3 33E-01	3 5000	3 506E+03
I-129	7 1287E-07	84 97	169 94	0 00E+00	6 06E-05	1 21E-04	5 0000	1 491E+03
Kr-85	3 5914E-02	84 97	169 94	0 00E+00	3 05E+00	6 10E+00	7 0000	1 709E+02
Np-237	1 2294E-05	84 97	169 94	0 00E+00	1 04E-03	2 09E-03	11.0000	1 957E+01
Pa-231	2 6383E-09	84 97	169 94	0 00E+00	2 24E-07	4 48E-07		
Pb-210	4 4648E-12	84 97	169 94	0 00E+00	3 79E-10	7 59E-10		
Pm-147	4 1025E-04	84 97	169 94	0 00E+00	3 49E-02	6 97E-02		
Pu-238	4 3265E-02	84 97	169 94	0 00E+00	3 68E+00	7 35E+00		
Pu-239	1 4044E-03	84 97	169 94	0 00E+00	1 19E-01	2 39E-01		
Pu-240	1 1563E-03	84 97	169 94	0 00E+00	9 83E-02	1 97E-01		
Pu-241	1 0156E-01	84 97	169 94	0 00E+00	8 63E+00	1 73E+01		
Pu-242	4 9910E-06	84 97	169 94	0 00E+00	4 24E-04	8 48E-04		
Ra-226	1 4301E-11	84 97	169 94	0 00E+00	1 22E-09	2 43E-09		
Ra-228	2 3767E-11	84 97	169 94	0 00E+00	2 02E-09	4 04E-09		
Ru-106	1 1521E-10	84 97	169 94	0 00E+00	9 79E-09	1 96E-08		
Se-79	1 2828E-05	84 97	169 94	0 00E+00	1 09E-03	2 18E-03		
Sn-126	1 2088E-05	84 97	169 94	0 00E+00	1 03E-03	2 05E-03		
Sr-90	1 2560E+00	84 97	169 94	0 00E+00	1 07E+02	2 13E+02		
Tc-99	4 0319E-04	84 97	169 94	0 00E+00	3 43E-02	6 85E-02		
Th-229	3 3915E-10	84 97	169 94	0 00E+00	2 88E-08	5 76E-08		
Th-230	1 8175E-09	84 97	169 94	0 00E+00	1 54E-07	3 09E-07		
Th-232	2 3873E-11	84 97	169 94	0 00E+00	2 03E-09	4 06E-09		
Ti-208	1 2736E-07	84 97	169 94	0 00E+00	1 08E-05	2 16E-05		
U-232	3 4501E-07	84 97	169 94	0 00E+00	2 93E-05	5 86E-05		
U-233	7 0610E-08	84 97	169 94	0 00E+00	6 00E-06	1 20E-05		
U-234	7 1407E-06	84 97	169 94	0 00E+00	6 07E-04	1 21E-03		
U-235	-2.6572E-06	84 97	0 00	1 62E-03	1 39E-03	1 62E-03		
U-236	1 3576E-05	84 97	169 94	0 00E+00	1 15E-03	2 31E-03		
U-238	-2.2698E-08	84 97	0 00	1 07E-04	1 05E-04	1 07E-04		
Y-90	1.2563E+00	84 97	169 94	0 00E+00	1 07E+02	2 13E+02		
Other Radionuclides					1 15E+02	2 30E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1 50E+00	3 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	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	70.2247191	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	77 67	84 97	
Bounding	43.79	169 94	

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 23	1.09	
Bounding	0 47	3.88	

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) 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: 2030
 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*: 20 years

Estimated
 Canister usage:
 18"x10"
 0 09

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	7 1933E-10	47 51	95 02	0 00E+00	3 42E-08	6 84E-08	Avg MeV	
Am-241	1 3109E-02	47 51	95 02	0 00E+00	6 23E-01	1 25E+00	0 0150	9 433E+12
Am-242m	2 2835E-05	47 51	95 02	0 00E+00	1 08E-03	2 17E-03	0 0250	1 956E+12
Am-243	3 0938E-05	47 51	95 02	0 00E+00	1 47E-03	2 94E-03	0 0375	1 724E+12
C-14	1 2566E-04	47 51	95 02	0 00E+00	5 97E-03	1 19E-02	0 0575	1 840E+12
Cl-36	2 6624E-06	47 51	95 02	0 00E+00	1 26E-04	2 53E-04	0 0850	1 103E+12
Cm-243	2 6563E-05	47 51	95 02	0 00E+00	1 26E-03	2 52E-03	0 1250	7 652E+11
Cm-244	2 3106E-03	47 51	95 02	0 00E+00	1 10E-01	2 20E-01	0 2250	9 521E+11
Co-60	1 7273E-01	47 51	95 02	0 00E+00	8 21E+00	1 64E+01	0 3750	4 140E+11
Cs-134	4 2408E-03	47 51	95 02	0 00E+00	2 01E-01	4 03E-01	0 5750	6 881E+12
Cs-135	1 9753E-05	47 51	95 02	0 00E+00	9 39E-04	1 88E-03	0 8500	1 413E+11
Cs-137	1 9363E+00	47 51	95 02	0 00E+00	9 20E+01	1 84E+02	1 2500	1 306E+12
Eu-154	3 6816E-02	47 51	95 02	0 00E+00	1 75E+00	3 50E+00	1 7500	3 757E+09
Eu-155	6 5259E-03	47 51	95 02	0 00E+00	3 10E-01	6 20E-01	2 2500	6 664E+06
Fe-55	1 4627E-02	47 51	95 02	0 00E+00	6 95E-01	1 39E+00	2 7500	5 116E+05
H-3	4 5400E-03	47 51	95 02	0 00E+00	2 16E-01	4 31E-01	3 5000	3 665E+03
I-129	7 1287E-07	47 51	95 02	0 00E+00	3 39E-05	6 77E-05	5 0000	1 417E+03
Kr-85	9 4663E-02	47 51	95 02	0 00E+00	4 50E+00	9 00E+00	7 0000	1 628E+02
Np-237	1 2172E-05	47 51	95 02	0 00E+00	5 78E-04	1 16E-03	11 0000	1 867E+01
Pa-231	1 6912E-09	47 51	95 02	0 00E+00	8 04E-08	1 61E-07		
Pb-210	4 4242E-13	47 51	95 02	0 00E+00	2 10E-11	4 20E-11		
Pm-147	2 1527E-02	47 51	95 02	0 00E+00	1 02E+00	2 05E+00		
Pu-238	4 8707E-02	47 51	95 02	0 00E+00	2 31E+00	4 63E+00		
Pu-239	1 4050E-03	47 51	95 02	0 00E+00	6 68E-02	1 34E-01		
Pu-240	1 1559E-03	47 51	95 02	0 00E+00	5 49E-02	1 10E-01		
Pu-241	2 0896E-01	47 51	95 02	0 00E+00	9 93E+00	1 99E+01		
Pu-242	4 9910E-06	47 51	95 02	0 00E+00	2 37E-04	4 74E-04		
Ra-226	2 2279E-12	47 51	95 02	0 00E+00	1 06E-10	2 12E-10		
Ra-228	2 2655E-11	47 51	95 02	0 00E+00	1 08E-09	2 15E-09		
Ru-106	3 4516E-06	47 51	95 02	0 00E+00	1 64E-04	3 28E-04		
Se-79	1 2829E-05	47 51	95 02	0 00E+00	6 10E-04	1 22E-03		
Sn-126	1 2088E-05	47 51	95 02	0 00E+00	5 74E-04	1 15E-03		
Sr-90	1 7949E+00	47 51	95 02	0 00E+00	8 53E+01	1 71E+02		
Tc-99	4 0319E-04	47 51	95 02	0 00E+00	1 92E-02	3 83E-02		
Th-229	1 7468E-10	47 51	95 02	0 00E+00	8 30E-09	1 66E-08		
Th-230	5 3984E-10	47 51	95 02	0 00E+00	2 56E-08	5 13E-08		
Th-232	2 3857E-11	47 51	95 02	0 00E+00	1 13E-09	2 27E-09		
Th-208	1 4546E-07	47 51	95 02	0 00E+00	6 91E-06	1 38E-05		
U-232	3 9687E-07	47 51	95 02	0 00E+00	1 89E-05	3 77E-05		
U-233	6 9272E-08	47 51	95 02	0 00E+00	3 29E-06	6 58E-06		
U-234	4 1311E-06	47 51	95 02	0 00E+00	1 96E-04	3 93E-04		
U-235	-2 6572E-06	47 51	0 00	2 96E-03	2 83E-03	2 96E-03		
U-236	1 3576E-05	47 51	95 02	0 00E+00	6 45E-04	1 29E-03		
U-238	-2 2698E-08	47 51	0 00	1 98E-04	1 97E-04	1 98E-04		
Y-90	1 7949E+00	47 51	95 02	0 00E+00	8 53E+01	1 71E+02		
Other Radionuclides					9 02E+01	1 80E+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	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	69 89795918	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	47.51	9 50	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.
Bounding		95.02	

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) FFCR
 SNF ID #: 996
 Fuel Units & Descr: 6 - ELEMENT
 Heavy Metal Mass BOL=0.965kg EOL=0.607kg
 ROD Storage Site INEEL

Fuel decay start date: 2035
 Estimates as of: 2030
 Template: TRIGA-FLIP (LW/U-Zr, SST, 60 to 100% U)
 Template Burnup (MWd): 66.52
 Template BOL Heavy Metal Mass (MT): 0.000196
 Template Decay Time: 5 years

Estimated
 Canister usage
 18"x10"
 0.08

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	2.8488E-10	339.87	679.74	0.00E+00	9.68E-08	1.94E-07	0.0150	1.097E+14	
Am-241	7.5767E-03	339.87	679.74	0.00E+00	2.58E+00	5.15E+00	0.0250	2.407E+13	
Am-242m	2.4459E-05	339.87	679.74	0.00E+00	8.31E-03	1.66E-02	0.0375	2.129E+13	
Am-243	3.0983E-05	339.87	679.74	0.00E+00	1.05E-02	2.11E-02	0.0575	2.125E+13	
C-14	1.2590E-04	339.87	679.74	0.00E+00	4.28E-02	8.56E-02	0.0850	1.322E+13	
Cl-36	2.6624E-06	339.87	679.74	0.00E+00	9.05E-04	1.81E-03	0.1250	1.062E+13	
Cm-243	3.8244E-05	339.87	679.74	0.00E+00	1.39E+00	2.79E+00	0.2250	1.124E+13	
Cm-244	4.1010E-03	339.87	679.74	0.00E+00	1.39E+00	2.79E+00	0.3750	5.606E+12	
Co-60	1.2410E+00	339.87	679.74	0.00E+00	4.22E+02	8.44E+02	0.5750	9.279E+13	
Cs-134	6.5454E-01	339.87	679.74	0.00E+00	2.22E+02	4.45E+02	0.8500	1.702E+13	
Cs-135	1.9753E-05	339.87	679.74	0.00E+00	6.71E-03	1.34E-02	1.2500	6.538E+13	
Cs-137	2.7375E+00	339.87	679.74	0.00E+00	9.30E+02	1.86E+03	3.5000	7.314E+07	
Eu-154	1.2324E-01	339.87	679.74	0.00E+00	4.19E+01	8.38E+01	5.0000	1.752E+04	
Eu-155	5.3037E-02	339.87	679.74	0.00E+00	1.80E+01	3.61E+01	2.2500	6.855E+10	
Fe-55	7.9555E-01	339.87	679.74	0.00E+00	2.70E+02	5.41E+02	2.7500	6.215E+08	
H-3	1.0531E-02	339.87	679.74	0.00E+00	3.58E+00	7.16E+00	3.5000	7.314E+07	
I-129	7.1287E-07	339.87	679.74	0.00E+00	2.42E-04	4.85E-04	5.0000	1.752E+04	
Kr-85	2.4955E-01	339.87	679.74	0.00E+00	8.48E+01	1.70E+02	7.0000	2.016E+03	
Np-237	1.2121E-05	339.87	679.74	0.00E+00	4.12E-03	8.24E-03	11.0000	2.314E+02	
Pa-231	1.1230E-09	339.87	679.74	0.00E+00	3.82E-07	7.63E-07			
Pb-210	6.1636E-14	339.87	679.74	0.00E+00	2.09E-11	4.19E-11			
Pm-147	1.1302E+00	339.87	679.74	0.00E+00	3.84E+02	7.68E+02			
Pu-238	5.4826E-02	339.87	679.74	0.00E+00	1.86E+01	3.73E+01			
Pu-239	1.4056E-03	339.87	679.74	0.00E+00	4.78E-01	9.55E-01			
Pu-240	1.1536E-03	339.87	679.74	0.00E+00	3.92E-01	7.84E-01			
Pu-241	4.2995E-01	339.87	679.74	0.00E+00	1.46E+02	2.92E+02			
Pu-242	4.9910E-06	339.87	679.74	0.00E+00	1.70E-03	3.39E-03			
Ra-226	2.4008E-13	339.87	679.74	0.00E+00	8.16E-11	1.63E-10			
Ra-228	1.8220E-11	339.87	679.74	0.00E+00	6.19E-09	1.24E-08			
Ru-106	1.0343E-01	339.87	679.74	0.00E+00	3.52E+01	7.03E+01			
Se-79	1.2832E-05	339.87	679.74	0.00E+00	4.36E-03	8.72E-03			
Sn-126	1.2090E-06	339.87	679.74	0.00E+00	4.11E-03	8.22E-03			
Sr-90	2.5646E+00	339.87	679.74	0.00E+00	8.72E+02	1.74E+03			
Tc-99	4.0319E-04	339.87	679.74	0.00E+00	1.37E-01	2.74E-01			
Th-229	7.7375E-11	339.87	679.74	0.00E+00	2.63E-08	5.26E-08			
Th-230	1.2211E-10	339.87	679.74	0.00E+00	4.15E-08	8.30E-08			
Th-232	2.3842E-11	339.87	679.74	0.00E+00	8.10E-09	1.62E-08			
Ti-208	1.4313E-07	339.87	679.74	0.00E+00	4.86E-05	9.73E-05			
U-232	4.1927E-07	339.87	679.74	0.00E+00	1.42E-04	2.85E-04			
U-233	6.8491E-08	339.87	679.74	0.00E+00	2.33E-05	4.66E-05			
U-234	2.0189E-06	339.87	679.74	0.00E+00	6.86E-04	1.37E-03			
U-235	-2.6572E-06	339.87	0.00	1.46E-03	5.57E-04	1.46E-03			
U-236	1.3575E-05	339.87	679.74	0.00E+00	4.61E-03	9.23E-03			
U-238	-2.2698E-08	339.87	0.00	9.71E-05	8.94E-05	9.71E-05			
Y-90	2.5646E+00	339.87	679.74	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	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	70.05184872	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal	327.42	339.87	Nominal burnup calculated from the heavy metal mass destroyed
Bounding		679.74	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	1.04	1.04	1.00
Bounding	2.08		

*Reactor shutdown core removal, storage, shipping or other date confirming that irradiation ceased for fuel
²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT)

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA (FLIP) FFCR OSU
 SNF ID # 702
 Fuel Units & Descr: 4 - ELEMENT
 Heavy Metal Mass: BOL=0 64kg; EOL=0 617kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2025
 Estimates as of: 2030
 Template: TRIGA-FLIP (LW/U-Zr, SST, 60 to 100%, U)
²Template Burnup(MWd): 66.52
 Template BOL Heavy Metal Mass (MT): 0.000196
 Template Decay Time: 5 years

Estimated
 Canister usage
 18"x10"
 0.05

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CvMw/d From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8488E-10	21.67	43.34	0.00E+00	6.17E-09	1.23E-08	Avg. MeV	
Am-241	7.5767E-03	21.67	43.34	0.00E+00	1.64E-01	3.28E-01	0.0150	6.993E+12
Am-242m	2.4459E-05	21.67	43.34	0.00E+00	5.30E-04	1.06E-03	0.0250	1.534E+12
Am-243	3.0983E-05	21.67	43.34	0.00E+00	6.71E-04	1.34E-03	0.0375	1.357E+12
C-14	1.2590E-04	21.67	43.34	0.00E+00	2.73E-03	5.46E-03	0.0575	1.355E+12
Cl-36	2.6624E-06	21.67	43.34	0.00E+00	5.77E-05	1.15E-04	0.0850	8.430E+11
Cm-243	3.8244E-05	21.67	43.34	0.00E+00	8.29E-04	1.66E-03	0.1250	6.769E+11
Cm-244	4.1010E-03	21.67	43.34	0.00E+00	8.89E-02	1.78E-01	0.2250	7.164E+11
Co-60	1.2410E+00	21.67	43.34	0.00E+00	2.69E+01	5.38E+01	0.3750	3.575E+11
Cs-134	6.5454E-01	21.67	43.34	0.00E+00	1.42E+01	2.84E+01	0.5750	5.916E+12
Cs-135	1.9753E-05	21.67	43.34	0.00E+00	4.28E-04	8.56E-04	0.8500	1.085E+12
Cs-137	2.7375E+00	21.67	43.34	0.00E+00	5.93E+01	1.19E+02	1.2500	4.169E+12
Eu-154	1.2324E-01	21.67	43.34	0.00E+00	2.67E+00	5.34E+00	1.7500	5.576E+09
Eu-155	5.3037E-02	21.67	43.34	0.00E+00	1.15E+00	2.30E+00	2.2500	4.371E+09
Fe-55	7.9555E-01	21.67	43.34	0.00E+00	1.72E+01	3.45E+01	2.7500	3.962E+07
H-3	1.0531E-02	21.67	43.34	0.00E+00	2.28E-01	4.56E-01	3.5000	4.663E+06
I-129	7.1287E-07	21.67	43.34	0.00E+00	1.54E-05	3.09E-05	5.0000	1.117E+03
Kr-85	2.4955E-01	21.67	43.34	0.00E+00	5.41E+00	1.08E+01	7.0000	1.286E+02
Np-237	1.2121E-05	21.67	43.34	0.00E+00	2.63E-04	5.25E-04	11.0000	1.475E+01
Pa-231	1.1230E-09	21.67	43.34	0.00E+00	2.43E-08	4.87E-08		
Pb-210	6.1636E-14	21.67	43.34	0.00E+00	1.34E-12	2.67E-12		
Pm-147	1.1302E+00	21.67	43.34	0.00E+00	2.45E+01	4.90E+01		
Pu-238	5.4826E-02	21.67	43.34	0.00E+00	1.19E+00	2.38E+00		
Pu-239	1.4056E-03	21.67	43.34	0.00E+00	3.05E-02	6.09E-02		
Pu-240	1.1536E-03	21.67	43.34	0.00E+00	2.50E-02	5.00E-02		
Pu-241	4.2995E-01	21.67	43.34	0.00E+00	9.32E+00	1.86E+01		
Pu-242	4.9910E-06	21.67	43.34	0.00E+00	1.08E-04	2.16E-04		
Ra-226	2.4008E-13	21.67	43.34	0.00E+00	5.20E-12	1.04E-11		
Ra-228	1.8220E-11	21.67	43.34	0.00E+00	3.95E-10	7.90E-10		
Ru-106	1.0343E-01	21.67	43.34	0.00E+00	2.24E+00	4.48E+00		
Se-79	1.2832E-05	21.67	43.34	0.00E+00	2.78E-04	5.56E-04		
Sn-126	1.2090E-05	21.67	43.34	0.00E+00	2.62E-04	5.24E-04		
Sr-90	2.5846E+00	21.67	43.34	0.00E+00	5.56E+01	1.11E+02		
Tc-99	4.0319E-04	21.67	43.34	0.00E+00	8.74E-03	1.75E-02		
Th-229	7.7375E-11	21.67	43.34	0.00E+00	1.68E-09	3.35E-09		
Th-230	1.2211E-10	21.67	43.34	0.00E+00	2.65E-09	5.29E-09		
Th-232	2.3842E-11	21.67	43.34	0.00E+00	5.17E-10	1.03E-09		
Tl-208	1.4313E-07	21.67	43.34	0.00E+00	3.10E-06	6.20E-06		
U-232	4.1927E-07	21.67	43.34	0.00E+00	9.09E-06	1.82E-05		
U-233	6.8491E-08	21.67	43.34	0.00E+00	1.48E-06	2.97E-06		
U-234	2.0189E-06	21.67	43.34	0.00E+00	4.37E-05	8.75E-05		
U-235	-2.6572E-06	21.67	0.00	9.67E-04	9.09E-04	9.67E-04	Nominal Output (Watts)	Bounding Heat Output (Watts)
U-236	1.3575E-05	21.67	43.34	0.00E+00	2.94E-04	5.88E-04	1.42E+00	2.84E+00
U-238	-2.2698E-08	21.67	0.00	6.47E-05	6.43E-05	6.47E-05	Total	Total
Y-90	2.5846E+00	21.67	43.34	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	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	69.9	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate
	From SFD	Estimated	
Nominal:	6.03	21.67	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding:		43.34	

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=0.638kg EOL=0.561kg
 ROD Storage Site INEEL

¹Fuel decay start date: 1997
 Estimates as of: 2030
 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"
 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	1.0386E-09	73.37	146.74	0.00E+00	7.62E-08	1.52E-07	0.0150	1.290E+13
Am-241	1.4973E-02	73.37	146.74	0.00E+00	1.10E+00	2.20E+00	0.0250	2.671E+12
Am-242m	2.2324E-05	73.37	146.74	0.00E+00	1.64E-03	3.28E-03	0.0375	2.347E+12
Am-243	3.0923E-05	73.37	146.74	0.00E+00	2.27E-03	4.54E-03	0.0575	2.522E+12
C-14	1.2559E-04	73.37	146.74	0.00E+00	9.21E-03	1.84E-02	0.0850	1.505E+12
Ci-36	2.6624E-06	73.37	146.74	0.00E+00	1.95E-04	3.91E-04	0.1250	1.028E+12
Cm-243	2.3527E-05	73.37	146.74	0.00E+00	1.73E-03	3.45E-03	0.2250	1.300E+12
Cm-244	1.9092E-03	73.37	146.74	0.00E+00	1.40E-01	2.80E-01	0.3750	5.645E+11
Co-60	8.9552E-02	73.37	146.74	0.00E+00	6.57E+00	1.31E+01	0.5750	9.436E+12
Cs-134	7.9074E-04	73.37	146.74	0.00E+00	5.80E-02	1.16E-01	0.8500	1.586E+11
Cs-135	1.9753E-05	73.37	146.74	0.00E+00	1.45E-03	2.90E-03	1.2500	1.073E+12
Cs-137	1.7243E+00	73.37	146.74	0.00E+00	1.27E+02	2.53E+02	1.7500	4.457E+09
Eu-154	2.4609E-02	73.37	146.74	0.00E+00	1.81E+00	3.61E+00	2.2500	5.421E+06
Eu-155	3.2456E-03	73.37	146.74	0.00E+00	2.38E-01	4.76E-01	2.7500	7.413E+05
Fe-55	3.8605E-03	73.37	146.74	0.00E+00	2.83E-01	5.67E-01	3.5000	4.312E+03
H-3	3.4305E-03	73.37	146.74	0.00E+00	2.52E-01	5.03E-01	5.0000	1.830E+03
I-129	7.1287E-07	73.37	146.74	0.00E+00	5.23E-05	1.05E-04	7.0000	2.101E+02
Kr-85	6.8536E-02	73.37	146.74	0.00E+00	5.03E+00	1.01E+01	11.0000	2.408E+01
Np-237	1.2219E-05	73.37	146.74	0.00E+00	8.97E-04	1.79E-03		
Pa-231	2.0701E-09	73.37	146.74	0.00E+00	1.52E-07	3.04E-07		
Pb-210	1.3279E-12	73.37	146.74	0.00E+00	9.74E-11	1.95E-10		
Pm-147	5.7517E-03	73.37	146.74	0.00E+00	4.22E-01	8.44E-01		
Pu-238	4.6828E-02	73.37	146.74	0.00E+00	3.44E+00	6.87E+00		
Pu-239	1.4048E-03	73.37	146.74	0.00E+00	1.03E-01	2.06E-01		
Pu-240	1.1563E-03	73.37	146.74	0.00E+00	8.48E-02	1.70E-01		
Pu-241	1.6431E-01	73.37	146.74	0.00E+00	1.21E+01	2.41E+01		
Pu-242	4.9910E-06	73.37	146.74	0.00E+00	3.66E-04	7.32E-04		
Ra-226	5.4390E-12	73.37	146.74	0.00E+00	3.99E-10	7.98E-10		
Ra-228	2.3437E-11	73.37	146.74	0.00E+00	1.72E-09	3.44E-09		
Ru-106	1.1115E-07	73.37	146.74	0.00E+00	8.16E-06	1.63E-05		
Se-79	1.2829E-05	73.37	146.74	0.00E+00	9.41E-04	1.88E-03		
Sr-126	1.2088E-05	73.37	146.74	0.00E+00	8.87E-04	1.77E-03		
Sn-90	1.5935E+00	73.37	146.74	0.00E+00	1.17E+02	2.34E+02		
Tc-99	4.0319E-04	73.37	146.74	0.00E+00	2.96E-02	5.92E-02		
Th-229	2.4023E-10	73.37	146.74	0.00E+00	1.76E-08	3.53E-08		
Th-230	9.6948E-10	73.37	146.74	0.00E+00	7.11E-08	1.42E-07		
Th-232	2.3857E-11	73.37	146.74	0.00E+00	1.75E-09	3.50E-09		
Ti-208	1.3982E-07	73.37	146.74	0.00E+00	1.03E-05	2.05E-05		
U-232	3.7943E-07	73.37	146.74	0.00E+00	2.78E-05	5.57E-05		
U-233	6.9814E-08	73.37	146.74	0.00E+00	5.12E-06	1.02E-05		
U-234	5.4059E-06	73.37	146.74	0.00E+00	3.97E-04	7.93E-04		
U-235	-2.6572E-06	73.37	0.00	9.65E-04	7.70E-04	9.65E-04		
U-236	1.3576E-05	73.37	146.74	0.00E+00	9.96E-04	1.99E-03		
U-238	-2.2698E-08	73.37	0.00	6.44E-05	6.27E-05	6.44E-05		
Y-90	1.5935E+00	73.37	146.74	0.00E+00	1.17E+02	2.34E+02		
Other Radionuclides					1.24E+02	2.49E+02		

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.68E+00	3.37E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary		Basis for Parameter Differences ¹
	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	69.98432602	60 to 100

Burnup Summary (MWd) ²		Basis for burnup used in estimate ²
	From SFD	Estimated
Nominal	30.07	73.37
Bounding		146.74

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

Checks		Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.34	2.44
Bounding	0.68	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
 SNF ID #: 493
 Fuel Units & Descr: 35 - ELEMENT
 Heavy Metal Mass: BOL=6.86kg, EOL=6.825kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2010
 Estimates as of: 2030
 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: 20 years

Estimated
 Canister usage
 18"x10"
 0.32

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	7.1933E-10	64.67	129.34	0.00E+00	4.65E-08	9.30E-08	Avg MeV	
Am-241	1.3109E-02	64.67	129.34	0.00E+00	8.48E-01	1.70E+00	0.0150	1.284E+13
Am-242m	2.2835E-05	64.67	129.34	0.00E+00	1.48E-03	2.95E-03	0.0250	2.662E+12
Am-243	3.0938E-05	64.67	129.34	0.00E+00	2.00E-03	4.00E-03	0.0375	2.347E+12
C-14	1.2566E-04	64.67	129.34	0.00E+00	8.13E-03	1.63E-02	0.0575	2.505E+12
Cl-36	2.6624E-06	64.67	129.34	0.00E+00	1.72E-04	3.44E-04	0.0850	1.501E+12
Cm-243	2.6563E-05	64.67	129.34	0.00E+00	1.72E-03	3.44E-03	0.1250	1.042E+12
Cm-244	2.3106E-03	64.67	129.34	0.00E+00	1.49E-01	2.99E-01	0.2250	1.296E+12
Co-60	1.7273E-01	64.67	129.34	0.00E+00	1.12E+01	2.23E+01	0.3750	5.635E+11
Cs-134	4.2408E-03	64.67	129.34	0.00E+00	2.74E-01	5.49E-01	0.5750	9.365E+12
Cs-135	1.9753E-05	64.67	129.34	0.00E+00	1.28E-03	2.55E-03	0.8500	1.923E+11
Cs-137	1.9363E+00	64.67	129.34	0.00E+00	1.25E+02	2.50E+02	1.2500	1.777E+12
Eu-154	3.6816E-02	64.67	129.34	0.00E+00	2.38E+00	4.76E+00	1.7500	5.113E+09
Eu-155	6.5259E-03	64.67	129.34	0.00E+00	4.22E-01	8.44E-01	2.2500	9.070E+06
Fe-55	1.4627E-02	64.67	129.34	0.00E+00	9.46E-01	1.89E+00	2.7500	6.963E+05
H-3	4.5400E-03	64.67	129.34	0.00E+00	2.94E-01	5.87E-01	3.5000	4.990E+03
I-129	7.1287E-07	64.67	129.34	0.00E+00	4.61E-05	9.22E-05	5.0000	1.930E+03
Kr-85	9.4663E-02	64.67	129.34	0.00E+00	6.12E+00	1.22E+01	7.0000	2.217E+02
Np-237	1.2172E-05	64.67	129.34	0.00E+00	7.87E-04	1.57E-03	11.0000	2.542E+01
Pa-231	1.6912E-09	64.67	129.34	0.00E+00	1.09E-07	2.19E-07		
Pb-210	4.4242E-13	64.67	129.34	0.00E+00	2.86E-11	5.72E-11		
Pm-147	2.1527E-02	64.67	129.34	0.00E+00	1.39E+00	2.78E+00		
Pu-238	4.8707E-02	64.67	129.34	0.00E+00	3.15E+00	6.30E+00		
Pu-239	1.4050E-03	64.67	129.34	0.00E+00	9.09E-02	1.82E-01		
Pu-240	1.1559E-03	64.67	129.34	0.00E+00	7.48E-02	1.50E-01		
Pu-241	2.0896E-01	64.67	129.34	0.00E+00	1.35E+01	2.70E+01		
Pu-242	4.9910E-06	64.67	129.34	0.00E+00	3.23E-04	6.46E-04		
Ra-226	2.2279E-12	64.67	129.34	0.00E+00	1.44E-10	2.88E-10		
Ra-228	2.2655E-11	64.67	129.34	0.00E+00	1.47E-09	2.93E-09		
Ru-106	3.4516E-06	64.67	129.34	0.00E+00	2.23E-04	4.46E-04		
Se-79	1.2829E-05	64.67	129.34	0.00E+00	8.30E-04	1.66E-03		
Sn-126	1.2088E-05	64.67	129.34	0.00E+00	7.82E-04	1.56E-03		
Sr-90	1.7949E+00	64.67	129.34	0.00E+00	1.16E+02	2.32E+02		
Tc-99	4.0319E-04	64.67	129.34	0.00E+00	2.61E-02	5.21E-02		
Th-229	1.7468E-10	64.67	129.34	0.00E+00	1.13E-08	2.26E-08		
Th-230	5.3984E-10	64.67	129.34	0.00E+00	3.49E-08	6.98E-08		
Th-232	2.3857E-11	64.67	129.34	0.00E+00	1.54E-09	3.09E-09		
Tl-208	1.4546E-07	64.67	129.34	0.00E+00	9.41E-06	1.88E-05		
U-232	3.9687E-07	64.67	129.34	0.00E+00	2.57E-05	5.13E-05		
U-233	6.9272E-08	64.67	129.34	0.00E+00	4.48E-06	8.96E-06		
U-234	4.1311E-06	64.67	129.34	0.00E+00	2.67E-04	5.34E-04		
U-235	-2.6572E-06	64.67	0.00	1.04E-02	1.02E-02	1.04E-02		
U-236	1.3576E-05	64.67	129.34	0.00E+00	8.78E-04	1.76E-03		
U-238	-2.2698E-08	64.67	0.00	6.94E-04	6.93E-04	6.94E-04		
Y-90	1.7949E+00	64.67	129.34	0.00E+00	1.16E+02	2.32E+02		
Other Radionuclides					1.23E+02	2.46E+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	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	69.89795918	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	64.67	33.26	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.
Bounding		129.34	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.03	0.51	1.00
Bounding	0.06		

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 (FLIP) OSU
 SNF ID # 240
 Fuel Units & Descr 87 - ELEMENT
 Heavy Metal Mass BOL=17.052kg EOL=15.625kg
 ROD Storage Site INEEL

¹Fuel decay start date 2025
 Estimates as of 2030
 Template TRIGA-FLIP (LW/U-Zr² 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"
 078

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	1,356.06	2,712.12	0.00E+00	3.86E-07	7.73E-07	Avg MeV	
Am-241	7.5767E-03	1,356.06	2,712.12	0.00E+00	1.03E+01	2.05E+01	0.0150	4.376E+14
Am-242m	2.4459E-05	1,356.06	2,712.12	0.00E+00	3.32E-02	6.63E-02	0.0250	9.603E+13
Am-243	3.0933E-05	1,356.06	2,712.12	0.00E+00	4.20E-02	8.40E-02	0.0375	8.494E+13
C-14	1.2590E-04	1,356.06	2,712.12	0.00E+00	1.71E-01	3.41E-01	0.0575	8.478E+13
Cl-36	2.6624E-06	1,356.06	2,712.12	0.00E+00	3.61E-03	7.22E-03	0.0850	5.275E+13
Cm-243	3.8244E-06	1,356.06	2,712.12	0.00E+00	5.19E-02	1.04E-01	0.1250	4.236E+13
Cm-244	4.1010E-03	1,356.06	2,712.12	0.00E+00	5.56E+00	1.11E+01	0.2250	4.483E+13
Co-60	1.2410E+00	1,356.06	2,712.12	0.00E+00	1.68E+03	3.37E+03	0.3750	2.237E+13
Cs-134	6.5454E-01	1,356.06	2,712.12	0.00E+00	8.88E+02	1.78E+03	0.5750	3.702E+14
Cs-135	1.9753E-05	1,356.06	2,712.12	0.00E+00	2.68E-02	5.36E-02	0.8500	6.792E+13
Cs-137	2.7375E+00	1,356.06	2,712.12	0.00E+00	3.71E+03	7.42E+03	1.2500	2.609E+14
Eu-154	1.2324E-01	1,356.06	2,712.12	0.00E+00	1.67E+02	3.34E+02	1.7500	3.489E+11
Eu-155	5.3037E-02	1,356.06	2,712.12	0.00E+00	7.19E+01	1.44E+02	2.2500	2.735E+11
Fe-55	7.9555E-01	1,356.06	2,712.12	0.00E+00	1.08E+03	2.16E+03	2.7500	2.480E+09
H-3	1.0631E-02	1,356.06	2,712.12	0.00E+00	1.43E+01	2.86E+01	3.5000	2.918E+08
I-129	7.1287E-07	1,356.06	2,712.12	0.00E+00	9.67E-04	1.93E-03	5.0000	6.991E+04
Kr-85	2.4955E-01	1,356.06	2,712.12	0.00E+00	3.38E+02	6.77E+02	7.0000	8.045E+03
Np-237	1.2121E-05	1,356.06	2,712.12	0.00E+00	1.64E-02	3.29E-02	11.0000	9.233E+02
Pa-231	1.1230E-09	1,356.06	2,712.12	0.00E+00	1.52E-06	3.05E-06		
Pb-210	6.1636E-14	1,356.06	2,712.12	0.00E+00	8.36E-11	1.67E-10		
Pm-147	1.1302E+00	1,356.06	2,712.12	0.00E+00	1.53E+03	3.07E+03		
Pu-238	5.4826E-02	1,356.06	2,712.12	0.00E+00	7.43E+01	1.49E+02		
Pu-239	1.4056E-03	1,356.06	2,712.12	0.00E+00	1.91E+00	3.81E+00		
Pu-240	1.1536E-03	1,356.06	2,712.12	0.00E+00	1.56E+00	3.13E+00		
Pu-241	4.2995E-01	1,356.06	2,712.12	0.00E+00	5.83E+02	1.17E+03		
Pu-242	4.9910E-06	1,356.06	2,712.12	0.00E+00	6.77E-03	1.35E-02		
Ra-226	2.4008E-13	1,356.06	2,712.12	0.00E+00	3.26E-10	6.51E-10		
Ra-228	1.8220E-11	1,356.06	2,712.12	0.00E+00	2.47E-08	4.94E-08		
Ru-106	1.0343E-01	1,356.06	2,712.12	0.00E+00	1.40E+02	2.81E+02		
Se-79	1.2832E-05	1,356.06	2,712.12	0.00E+00	1.74E-02	3.48E-02		
Sn-126	1.2090E-05	1,356.06	2,712.12	0.00E+00	1.64E-02	3.28E-02		
Sr-90	2.5646E+00	1,356.06	2,712.12	0.00E+00	3.48E+03	6.96E+03		
Tc-99	4.0319E-04	1,356.06	2,712.12	0.00E+00	5.47E-01	1.09E+00		
Th-229	7.7375E-11	1,356.06	2,712.12	0.00E+00	1.05E-07	2.10E-07		
Th-230	1.2211E-10	1,356.06	2,712.12	0.00E+00	1.66E-07	3.31E-07		
Th-232	2.3842E-11	1,356.06	2,712.12	0.00E+00	3.23E-08	6.47E-08		
Tl-208	1.4313E-07	1,356.06	2,712.12	0.00E+00	1.94E-04	3.88E-04		
U-232	4.1927E-07	1,356.06	2,712.12	0.00E+00	5.69E-04	1.14E-03		
U-233	6.8491E-08	1,356.06	2,712.12	0.00E+00	9.29E-05	1.86E-04		
U-234	2.0189E-06	1,356.06	2,712.12	0.00E+00	2.74E-03	5.48E-03		
U-235	-2.6572E-06	1,356.06	0.00	2.58E-02	2.22E-02	2.58E-02		
U-236	1.3575E-05	1,356.06	2,712.12	0.00E+00	1.84E-02	3.68E-02		
U-238	-2.2698E-08	1,356.06	0.00	1.73E-03	1.69E-03	1.73E-03		
Y-90	2.5646E+00	1,356.06	2,712.12	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	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	69.89795918	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	482.25	1,356.06	
Bounding		2,712.12	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	2.81
Bounding	0.47	
		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) SLOVENIA
 SNF ID #: 495
 Fuel Units & Descr: 26 - ELEMENT
 Heavy Metal Mass: BOL=4 987kg EOL=4 69kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1999
 Estimates as of: 2030
 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"
 0.23

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	281 70	563 41	0 00E+00	2 93E-07	5 85E-07	Avg MeV	
Am-241	1 4973E-02	281 70	563 41	0 00E+00	4 22E+00	8 44E+00	0 0150	4 952E+13
Am-242m	2 2324E-05	281 70	563 41	0 00E+00	6 29E-03	1 26E-02	0 0250	1 025E+13
Am-243	3 0923E-05	281 70	563 41	0 00E+00	8 71E-03	1 74E-02	0 0375	9 011E+12
C-14	1 2559E-04	281 70	563 41	0 00E+00	3 54E-02	7 08E-02	0 0575	9 682E+12
Cl-36	2 6624E-06	281 70	563 41	0 00E+00	7 50E-04	1 50E-03	0 0850	5 780E+12
Cl-243	2 3527E-05	281 70	563 41	0 00E+00	6 63E-03	1 33E-02	0 1250	3 946E+12
Cl-244	1 9092E-03	281 70	563 41	0 00E+00	5 38E-01	1 08E+00	0 2250	4 993E+12
Co-60	8 9552E-02	281 70	563 41	0 00E+00	2 52E+01	5 05E+01	0 3750	2 167E+12
Cs-134	7 9074E-04	281 70	563 41	0 00E+00	2 23E-01	4 46E-01	0 5750	3 623E+13
Cs-135	1 9753E-05	281 70	563 41	0 00E+00	5 56E-03	1 11E-02	0 8500	6 088E+11
Cs-137	1 7243E+00	281 70	563 41	0 00E+00	4 86E+02	9 71E+02	1 2500	4 121E+12
Eu-154	2 4609E-02	281 70	563 41	0 00E+00	6 93E+00	1 39E+01	1 7500	1 711E+10
Eu-155	3 2456E-03	281 70	563 41	0 00E+00	9 14E-01	1 83E+00	2 2500	2 081E+07
Fe-55	3 8605E-03	281 70	563 41	0 00E+00	1 09E+00	2 18E+00	2 7500	2 846E+06
H-3	3 4305E-03	281 70	563 41	0 00E+00	9 66E-01	1 93E+00	3 5000	1 656E+04
I-129	7 1287E-07	281 70	563 41	0 00E+00	2 01E-04	4 02E-04	5 0000	7 027E+03
Kr-85	6 8536E-02	281 70	563 41	0 00E+00	1 93E+01	3 86E+01	7 0000	8 068E+02
Np-237	1 2219E-05	281 70	563 41	0 00E+00	3 44E-03	6 88E-03	11 0000	9 247E+01
Pa-231	2 0701E-09	281 70	563 41	0 00E+00	5 83E-07	1 17E-06		
Pb-210	1 3279E-12	281 70	563 41	0 00E+00	3 74E-10	7 48E-10		
Pm-147	5 7517E-03	281 70	563 41	0 00E+00	1 62E+00	3 24E+00		
Pu-238	4 6828E-02	281 70	563 41	0 00E+00	1 32E+01	2 64E+01		
Pu-239	1 4048E-03	281 70	563 41	0 00E+00	3 96E-01	7 91E-01		
Pu-240	1 1563E-03	281 70	563 41	0 00E+00	3 26E-01	6 51E-01		
Pu-241	1 6431E-01	281 70	563 41	0 00E+00	4 63E+01	9 26E+01		
Pu-242	4 9910E-06	281 70	563 41	0 00E+00	1 41E-03	2 81E-03		
Ra-226	5 4390E-12	281 70	563 41	0 00E+00	1 53E-09	3 06E-09		
Ra-228	2 3437E-11	281 70	563 41	0 00E+00	6 60E-09	1 32E-08		
Ru-106	1 1115E-07	281 70	563 41	0 00E+00	3 13E-05	6 26E-05		
Se-79	1 2829E-05	281 70	563 41	0 00E+00	3 61E-03	7 23E-03		
Sn-126	1 2088E-05	281 70	563 41	0 00E+00	3 41E-03	6 81E-03		
Sr-90	1 5935E+00	281 70	563 41	0 00E+00	4 49E+02	8 98E+02		
Tc-99	4 0319E-04	281 70	563 41	0 00E+00	1 14E-01	2 27E-01		
Th-229	2 4023E-10	281 70	563 41	0 00E+00	6 77E-08	1 35E-07		
Th-230	9 6948E-10	281 70	563 41	0 00E+00	2 73E-07	5 46E-07		
Th-232	2 3857E-11	281 70	563 41	0 00E+00	6 72E-09	1 34E-08		
Tl-208	1 3982E-07	281 70	563 41	0 00E+00	3 94E-05	7 88E-05		
U-232	3 7943E-07	281 70	563 41	0 00E+00	1 07E-04	2 14E-04		
U-233	6 9814E-08	281 70	563 41	0 00E+00	1 97E-05	3 93E-05		
U-234	5 4059E-06	281 70	563 41	0 00E+00	1 52E-03	3 05E-03		
U-235	-2.6572E-06	281 70	0 00	7 54E-03	6 79E-03	7 54E-03		
U-236	1 3576E-05	281 70	563 41	0 00E+00	3 82E-03	7 65E-03		
U-238	-2.2698E-08	281 70	0 00	5 03E-04	4 97E-04	5 03E-04		
Y-90	1 5935E+00	281 70	563 41	0 00E+00	4 49E+02	8 98E+02		
Other Radionuclides					4 77E+02	9 54E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6 46E+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	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	69 96306689	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	94 02	281 70	
Bounding		563 41	

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		

1 00

¹Reactor shutdown, core removal storage, shipping or other date confirming that radiation ceased for fuel
²Total burnup for all fuel associated with this worksheet must be 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 106kg
 ROD Storage Site INEEL

¹Fuel decay start date 1996
 Estimates as of 2030
 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"
 1 03

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	1 0386E-09	2,426 99	4,853 99	0 00E+00	2 52E-06	5 04E-06	0 0150	4 267E+14
Am-241	1 4973E-02	2,426 99	4,853 99	0 00E+00	3 63E+01	7 27E+01	0 0250	8 834E+13
Am-242m	2 2324E-05	2,426 99	4,853 99	0 00E+00	5 42E-02	1 08E-01	0 0375	7 764E+13
Am-243	3 0952E-05	2,426 99	4,853 99	0 00E+00	7 50E-02	1 50E-01	0 0575	8 341E+13
C-14	1 2559E-04	2,426 99	4,853 99	0 00E+00	3 05E-01	6 10E-01	0 0850	4 979E+13
Cl-36	2 6624E-06	2,426 99	4,853 99	0 00E+00	6 46E-03	1 29E-02	0 1250	3 400E+13
Cm-243	2 3527E-05	2,426 99	4,853 99	0 00E+00	5 71E-02	1 14E-01	0 2250	4 302E+13
Cm-244	1 9092E-03	2,426 99	4,853 99	0 00E+00	4 63E+00	9 27E+00	0 3750	1 867E+13
Co-60	8 9552E-02	2,426 99	4,853 99	0 00E+00	2 17E+02	4 35E+02	0 5750	3 121E+14
Cs-134	7 9074E-04	2,426 99	4,853 99	0 00E+00	1 92E+00	3 84E+00	0 8500	5 245E+12
Cs-135	1 9753E-05	2,426 99	4,853 99	0 00E+00	4 79E-02	9 59E-02	1 2500	3 551E+13
Cs-137	1 7243E+00	2,426 99	4,853 99	0 00E+00	4 18E+03	8 37E+03	1 7500	1 474E+11
Eu-154	2 4609E-02	2,426 99	4,853 99	0 00E+00	5 97E+01	1 19E+02	2 2500	1 793E+08
Eu-155	3 2456E-03	2,426 99	4,853 99	0 00E+00	7 88E+00	1 58E+01	2 7500	2 452E+07
Fe-55	3 8605E-03	2,426 99	4,853 99	0 00E+00	9 37E+00	1 87E+01	3 5000	1 426E+05
H-3	3 4305E-03	2,426 99	4,853 99	0 00E+00	8 33E+00	1 67E+01	5 0000	6 054E+04
I-129	7 1287E-07	2,426 99	4,853 99	0 00E+00	1 73E-03	3 46E-03	7 0000	6 951E+03
Kr-85	6 8536E-02	2,426 99	4,853 99	0 00E+00	1 66E+02	3 33E+02	11 0000	7 966E+02
Np-237	1 2219E-05	2,426 99	4,853 99	0 00E+00	2 97E-02	5 93E-02		
Pa-231	2 0701E-09	2,426 99	4,853 99	0 00E+00	5 02E-06	1 00E-05		
Pb-210	1 3279E-12	2,426 99	4,853 99	0 00E+00	3 22E-09	6 45E-09		
Pm-147	5 7517E-03	2,426 99	4,853 99	0 00E+00	1 40E+01	2 79E+01		
Pu-238	4 6828E-02	2,426 99	4,853 99	0 00E+00	1 14E+02	2 27E+02		
Pu-239	1 4048E-03	2,426 99	4,853 99	0 00E+00	3 41E+00	6 82E+00		
Pu-240	1 1563E-03	2,426 99	4,853 99	0 00E+00	2 81E+00	5 61E+00		
Pu-241	1 6431E-01	2,426 99	4,853 99	0 00E+00	3 99E+02	7 98E+02		
Pu-242	4 9910E-06	2,426 99	4,853 99	0 00E+00	1 21E-02	2 42E-02		
Ra-226	5 4390E-12	2,426 99	4,853 99	0 00E+00	1 32E-08	2 64E-08		
Ra-228	2 3437E-11	2,426 99	4,853 99	0 00E+00	5 69E-08	1 14E-07		
Ru-106	1 1115E-07	2,426 99	4,853 99	0 00E+00	2 70E-04	5 40E-04		
Se-79	1 2829E-05	2,426 99	4,853 99	0 00E+00	2 70E-04	5 40E-04		
Sn-126	1 2088E-05	2,426 99	4,853 99	0 00E+00	3 11E-02	6 23E-02		
Sr-90	1 5935E+00	2,426 99	4,853 99	0 00E+00	2 93E-02	5 87E-02		
Tc-99	4 0319E-04	2,426 99	4,853 99	0 00E+00	3 87E+03	7 73E+03		
Th-229	2 4023E-10	2,426 99	4,853 99	0 00E+00	9 79E-01	1 96E+00		
Th-230	9 6948E-10	2,426 99	4,853 99	0 00E+00	5 83E-07	1 17E-06		
Th-232	2 3857E-11	2,426 99	4,853 99	0 00E+00	2 35E-06	4 71E-06		
Ti-208	1 3982E-07	2,426 99	4,853 99	0 00E+00	5 79E-08	1 16E-07		
U-232	3 7943E-07	2,426 99	4,853 99	0 00E+00	3 39E-04	6 79E-04		
U-233	6 9814E-08	2,426 99	4,853 99	0 00E+00	9 21E-04	1 84E-03		
U-234	5 4059E-06	2,426 99	4,853 99	0 00E+00	1 69E-04	3 39E-04		
U-235	-2 6572E-06	2,426 99	0 00	3 28E-02	1 31E-02	2 62E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1 3576E-05	2,426 99	4,853 99	0 00E+00	2 63E-02	3 28E-02	5.57E+01	1 11E+02
U-238	-2 2698E-08	2,426 99	0 00	2 18E-03	3 29E-02	6 59E-02	Total	Total
Y-90	1 5935E+00	2,426 99	4,853 99	0 00E+00	2 13E-03	2 18E-03		
					3 87E+03	7 73E+03		
					4 11E+03	8 22E+03		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	70	60 to 100	
Burnup Summary (MWd)²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal	816 76	2 426 99	
Bounding		4,853 99	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0 33	2 97	1 00
Bounding	0 66		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA (FLIP) TEXAS A&M

SNF ID #: 239

Fuel Units & Descr: 7 - ELEMENT

Heavy Metal Mass: BOL=1.372kg EOL=1 182kg
ROD Storage Srs. INEEL

¹Fuel decay start date: 1976

Estimates as of: 2030

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: 50 years

Estimated
Canister usage:
18"x10"
0 06

II. Estimates

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 0776E-09	180 29	360 59	0 00E+00	3 75E-07	7 49E-07	Avg MeV	
Am-241	1 6777E-02	180 29	360 59	0 00E+00	3 02E+00	6 05E+00	0 0150	1 746E+13
Am-242m	1 9919E-05	180 29	360 59	0 00E+00	3 59E-03	7 18E-03	0 0250	3 606E+12
Am-243	3 0848E-05	180 29	360 59	0 00E+00	5 56E-03	1 11E-02	0 0375	3 150E+12
C-14	1 2521E-04	180 29	360 59	0 00E+00	2 26E-02	4 51E-02	0 0575	3 442E+12
Cl-36	2 6624E-06	180 29	360 59	0 00E+00	4 80E-04	9 60E-04	0 0850	2 028E+12
Cm-243	1 2813E-05	180 29	360 59	0 00E+00	2 31E-03	4 62E-03	0 1250	1 332E+12
Cm-244	7 3361E-04	180 29	360 59	0 00E+00	1 32E-01	2 65E-01	0 2250	1 750E+12
Co-60	3 3494E-03	180 29	360 59	0 00E+00	6 04E-01	1 21E+00	0 3750	7 617E+11
Cs-134	1 7799E-07	180 29	360 59	0 00E+00	3 21E-05	6 42E-05	0 5750	1 299E+13
Cs-135	1 9738E-05	180 29	360 59	0 00E+00	3 56E-03	7 12E-03	0 8500	1 445E+11
Cs-137	9 6843E-01	180 29	360 59	0 00E+00	1 75E+02	3 49E+02	1 2500	1 534E+11
Eu-154	3 2877E-03	180 29	360 59	0 00E+00	5 93E-01	1 19E+00	1 7500	3 873E+09
Eu-155	9 8812E-05	180 29	360 59	0 00E+00	1 78E-02	3 56E-02	2 2500	8 320E+05
Fe-55	4 9444E-06	180 29	360 59	0 00E+00	8 91E-04	1 78E-03	2 7500	1 403E+06
H-3	8 4381E-04	180 29	360 59	0 00E+00	1 52E-01	3 04E-01	3 5000	4 505E+03
I-129	7 1287E-07	180 29	360 59	0 00E+00	1 29E-04	2 57E-04	5 0000	1 911E+03
Kr-85	1 3624E-02	180 29	360 59	0 00E+00	2 46E+00	4 91E+00	7 0000	2 183E+02
Np-237	1 2375E-05	180 29	360 59	0 00E+00	2 23E-03	4 46E-03	11 0000	2 495E+01
Pa-231	3 2066E-09	180 29	360 59	0 00E+00	5 78E-07	1 16E-06		
Pb-210	1 0925E-11	180 29	360 59	0 00E+00	1 97E-09	3 94E-09		
Pm-147	7 8187E-06	180 29	360 59	0 00E+00	1 41E-03	2 82E-03		
Pu-238	3 8440E-02	180 29	360 59	0 00E+00	6 93E+00	1 39E+01		
Pu-239	1 4038E-03	180 29	360 59	0 00E+00	2 53E-01	5 06E-01		
Pu-240	1 1560E-03	180 29	360 59	0 00E+00	2 08E-01	4 17E-01		
Pu-241	4 9354E-02	180 29	360 59	0 00E+00	8 90E+00	1 78E+01		
Pu-242	4 9910E-06	180 29	360 59	0 00E+00	9 00E-04	1 80E-03		
Ra-226	2 9330E-11	180 29	360 59	0 00E+00	5 29E-09	1 06E-08		
Ra-228	2 3857E-11	180 29	360 59	0 00E+00	4 30E-09	8 60E-09		
Ru-106	3 8455E-15	180 29	360 59	0 00E+00	6 93E-13	1 39E-12		
Se-79	1 2826E-05	180 29	360 59	0 00E+00	2 31E-03	4 62E-03		
Sn-126	1 2087E-05	180 29	360 59	0 00E+00	2 18E-03	4 36E-03		
Sr-90	8 7913E-01	180 29	360 59	0 00E+00	1 59E+02	3 17E+02		
Tc-99	4 0304E-04	180 29	360 59	0 00E+00	7 27E-02	1 45E-01		
Th-229	4 3912E-10	180 29	360 59	0 00E+00	7 92E-08	1 58E-07		
Th-230	2 8879E-09	180 29	360 59	0 00E+00	5 21E-07	1 04E-06		
Th-232	2 3888E-11	180 29	360 59	0 00E+00	4 31E-09	8 61E-09		
Tl-208	1 1027E-07	180 29	360 59	0 00E+00	1 99E-05	3 98E-05		
U-232	2 9871E-07	180 29	360 59	0 00E+00	5 39E-05	1 08E-04		
U-233	7 1407E-08	180 29	360 59	0 00E+00	1 29E-05	2 57E-05		
U-234	8 6801E-06	180 29	360 59	0 00E+00	1 56E-03	3 13E-03		
U-235	-2 6572E-06	180 29	0 00	2 07E-03	1 59E-03	2 07E-03		
U-236	1 3576E-05	180 29	360 59	0 00E+00	2 45E-03	4 90E-03		
U-238	-2 2698E-08	180 29	0 00	1 39E-04	1 35E-04	1 39E-04		
Y-90	8 7928E-01	180 29	360 59	0 00E+00	1 59E+02	3 17E+02		
Other Radionuclides					1 74E+02	3 49E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2 28E+00	4 55E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	69 89795918	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	38.80	180 29
Bounding		360 59

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 39	4 65
Bounding	0 77	

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) TEXAS A&M
 SNF ID # 241
 Fuel Units & Descr 96 - ELEMENT
 Heavy Metal Mass BOL=16.819kg, EOL=14 63kg
 ROD Storage Site INEEL

¹Fuel decay start date 2035
 Estimates as of 2030
 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

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 Inventones(Ci)	Bounding Fuel Inventones(Ci)		
Ac-227	2 8488E-10	2,080.28	4,160.56	0 00E+00	5 93E-07	1 19E-06	Avg MeV	
Am-241	7.5767E-03	2,080.28	4,160.56	0 00E+00	1 58E+01	3 15E+01	0 0150	6 713E+14
Am-242m	2 4459E-05	2,080.28	4,160.56	0 00E+00	5 09E-02	1 02E-01	0 0250	1.473E+14
Am-243	3 0983E-05	2,080.28	4,160.56	0 00E+00	6 45E-02	1 29E-01	0 0375	1.303E+14
C-14	1.2590E-04	2,080.28	4,160.56	0 00E+00	2 62E-01	5 24E-01	0 0575	1.301E+14
Cl-36	2 6624E-06	2,080.28	4,160.56	0 00E+00	5 54E-03	1 11E-02	0.0850	8 093E+13
Cm-243	3 8244E-05	2,080.28	4,160.56	0 00E+00	7 96E-02	1 59E-01	0 1250	6 498E+13
Cm-244	4 1010E-03	2,080.28	4,160.56	0 00E+00	8 53E+00	1 71E+01	0.2250	6.877E+13
Co-60	1.2410E+00	2,080.28	4,160.56	0 00E+00	2 58E+03	5 16E+03	0.3750	3 432E+13
Cs-134	6 5454E-01	2,080.28	4,160.56	0 00E+00	1.36E+03	2 72E+03	0.5750	5 680E+14
Cs-135	1.9753E-05	2,080.28	4,160.56	0 00E+00	4.11E-02	8.22E-02	0 8500	1 042E+14
Cs-137	2 7375E+00	2,080.28	4,160.56	0 00E+00	5 69E+03	1 14E+04	1.2500	4 002E+14
Eu-154	1.2324E-01	2,080.28	4,160.56	0 00E+00	2 56E+02	5 13E+02	1 7500	5.353E+11
Eu-155	5 3037E-02	2,080.28	4,160.56	0 00E+00	1 10E+02	2 21E+02	2.2500	4 196E+11
Fe-55	7.9555E-01	2,080.28	4,160.56	0 00E+00	1 65E+03	3 31E+03	2.7500	3.804E+09
H-3	1.0531E-02	2,080.28	4,160.56	0 00E+00	2 19E+01	4 38E+01	3.5000	4 477E+08
I-129	7.1287E-07	2,080.28	4,160.56	0 00E+00	1.48E-03	2 97E-03	5 0000	1 072E+05
Kr-85	2.4955E-01	2,080.28	4,160.56	0 00E+00	5 19E+02	1 04E+03	7.0000	1.234E+04
Np-237	1.2121E-05	2,080.28	4,160.56	0 00E+00	2.52E-02	5 04E-02	11 0000	1 416E+03
Pa-231	1.1230E-09	2,080.28	4,160.56	0 00E+00	2.34E-06	4 67E-06		
Pb-210	6.1636E-14	2,080.28	4,160.56	0 00E+00	1.28E-10	2.56E-10		
Pm-147	1.1302E+00	2,080.28	4,160.56	0 00E+00	2.35E+03	4 70E+03		
Pu-238	5 4826E-02	2,080.28	4,160.56	0 00E+00	1.14E+02	2.28E+02		
Pu-239	1 4056E-03	2,080.28	4,160.56	0 00E+00	2 92E+00	5 85E+00		
Pu-240	1 1536E-03	2,080.28	4,160.56	0 00E+00	2.40E+00	4 80E+00		
Pu-241	4.2995E-01	2,080.28	4,160.56	0 00E+00	8 94E+02	1.79E+03		
Pu-242	4 9910E-06	2,080.28	4,160.56	0 00E+00	1 04E-02	2 08E-02		
Ra-226	2 4008E-13	2,080.28	4,160.56	0 00E+00	4 99E-10	9 99E-10		
Ra-228	1.8220E-11	2,080.28	4,160.56	0 00E+00	3 79E-08	7.58E-08		
Ru-106	1 0343E-01	2,080.28	4,160.56	0 00E+00	2.15E+02	4.30E+02		
Se-79	1.2832E-05	2,080.28	4,160.56	0 00E+00	2 67E-02	5 34E-02		
Sn-126	1.2090E-05	2,080.28	4,160.56	0 00E+00	2 51E-02	5 03E-02		
Sr-90	2.5646E+00	2,080.28	4,160.56	0 00E+00	5.34E+03	1.07E+04		
Tc-99	4 0319E-04	2,080.28	4,160.56	0 00E+00	8 39E-01	1.68E+00		
Th-229	7.7375E-11	2,080.28	4,160.56	0 00E+00	1 61E-07	3.22E-07		
Th-230	1.2211E-10	2,080.28	4,160.56	0 00E+00	2 54E-07	5 08E-07		
Th-232	2.3842E-11	2,080.28	4,160.56	0 00E+00	4 96E-08	9 92E-08		
Tl-208	1.4313E-07	2,080.28	4,160.56	0.00E+00	2 98E-04	5 96E-04		
U-232	4 1927E-07	2,080.28	4,160.56	0 00E+00	8 72E-04	1 74E-03		
U-233	6 8491E-08	2,080.28	4,160.56	0 00E+00	1 42E-04	2 85E-04		
U-234	2 0189E-06	2,080.28	4,160.56	0 00E+00	4 20E-03	8 40E-03		
U-235	-2 6572E-06	2,080.28	0 00	2 54E-02	1 99E-02	2 54E-02		
U-236	1.3575E-05	2,080.28	4,160.56	0 00E+00	2 82E-02	5 65E-02		
U-238	-2 2698E-08	2,080.28	0 00	1 70E-03	1 65E-03	1 70E-03		
Y-90	2 5646E+00	2,080.28	4,160.56	0 00E+00	5 34E+03	1 07E+04		
Other Radionuclides					7 41E+03	1 48E+04		

Thermal Power
 Nominal Heat Output (Watts) 1.36E+02
 Bounding Heat Output (Watts) 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	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	70 00179205	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal	792.76	2 080.28	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding		4,160.56	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.36	2 62	1 00
Bounding	0.73		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) TEXAS A&M - DAMAGED
 SNF ID #: 844
 Fuel Units & Descr: 5 - ELEMENT
 Heavy Metal Mass: BOL=0.879kg EOL=0.812kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 Estimates as of: 2030
 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

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	63.68	127.36	0.00E+00	1.81E-08	3.63E-08	0.0150	2.055E+13
Am-241	7.5767E-03	63.68	127.36	0.00E+00	4.82E-01	9.65E-01	0.0250	4.509E+12
Am-242m	2.4459E-05	63.68	127.36	0.00E+00	1.56E-03	3.11E-03	0.0375	3.989E+12
Am-243	3.0983E-05	63.68	127.36	0.00E+00	1.97E-03	3.95E-03	0.0575	3.981E+12
C-14	1.2590E-04	63.68	127.36	0.00E+00	8.02E-03	1.60E-02	0.0850	2.477E+12
Cl-36	2.6624E-06	63.68	127.36	0.00E+00	1.70E-04	3.39E-04	0.1250	1.989E+12
Cm-243	3.8244E-05	63.68	127.36	0.00E+00	2.44E-03	4.87E-03	0.2250	2.105E+12
Cm-244	4.1010E-03	63.68	127.36	0.00E+00	2.61E-01	5.22E-01	0.3750	1.050E+12
Co-60	1.2410E+00	63.68	127.36	0.00E+00	7.90E+01	1.58E+02	0.5750	1.739E+13
Cs-134	6.5454E-01	63.68	127.36	0.00E+00	4.17E+01	8.34E+01	0.8500	3.189E+12
Cs-135	1.9753E-05	63.68	127.36	0.00E+00	1.26E-03	2.52E-03	1.2500	1.225E+13
Cs-137	2.7375E+00	63.68	127.36	0.00E+00	1.74E+02	3.49E+02	1.7500	1.639E+10
Eu-154	1.2324E-01	63.68	127.36	0.00E+00	7.85E+00	1.57E+01	2.2500	1.284E+10
Eu-155	5.9037E-02	63.68	127.36	0.00E+00	3.38E+00	6.75E+00	2.7500	1.164E+08
Fe-55	7.9555E-01	63.68	127.36	0.00E+00	5.07E+01	1.01E+02	3.5000	1.370E+07
H-3	1.0531E-02	63.68	127.36	0.00E+00	6.71E-01	1.34E+00	5.0000	3.283E+03
I-129	7.1287E-07	63.68	127.36	0.00E+00	4.54E-05	9.08E-05	7.0000	3.778E+02
Kr-85	2.4955E-01	63.68	127.36	0.00E+00	1.59E+01	3.18E+01	11.0000	4.336E+01
Np-237	1.2121E-05	63.68	127.36	0.00E+00	7.72E-04	1.54E-03		
Pa-231	1.1230E-09	63.68	127.36	0.00E+00	7.15E-08	1.43E-07		
Pb-210	6.1636E-14	63.68	127.36	0.00E+00	3.92E-12	7.85E-12		
Pm-147	1.1302E+00	63.68	127.36	0.00E+00	7.20E+01	1.44E+02		
Pu-238	5.4826E-02	63.68	127.36	0.00E+00	3.49E+00	6.98E+00		
Pu-239	1.4056E-03	63.68	127.36	0.00E+00	8.95E-02	1.79E-01		
Pu-240	1.1536E-03	63.68	127.36	0.00E+00	7.35E-02	1.47E-01		
Pu-241	4.2995E-01	63.68	127.36	0.00E+00	2.74E+01	5.48E+01		
Pu-242	4.9910E-06	63.68	127.36	0.00E+00	3.18E-04	6.36E-04		
Ra-226	2.4008E-13	63.68	127.36	0.00E+00	1.53E-11	3.06E-11		
Ra-228	1.8220E-11	63.68	127.36	0.00E+00	1.16E-09	2.32E-09		
Ru-106	1.0343E-01	63.68	127.36	0.00E+00	6.59E+00	1.32E+01		
Se-79	1.2832E-05	63.68	127.36	0.00E+00	8.17E-04	1.63E-03		
Sn-126	1.2090E-05	63.68	127.36	0.00E+00	7.70E-04	1.54E-03		
Sr-90	2.5646E+00	63.68	127.36	0.00E+00	1.63E+02	3.27E+02		
Tc-99	4.0319E-04	63.68	127.36	0.00E+00	2.57E-02	5.13E-02		
Th-229	7.7375E-11	63.68	127.36	0.00E+00	4.93E-09	9.85E-09		
Th-230	1.2211E-10	63.68	127.36	0.00E+00	7.78E-09	1.56E-08		
Th-232	2.3842E-11	63.68	127.36	0.00E+00	1.52E-09	3.04E-09		
Th-208	1.4313E-07	63.68	127.36	0.00E+00	9.11E-06	1.82E-05		
U-232	4.1927E-07	63.68	127.36	0.00E+00	2.67E-05	5.34E-05		
U-233	6.8491E-08	63.68	127.36	0.00E+00	4.36E-06	8.72E-06		
U-234	2.0189E-06	63.68	127.36	0.00E+00	1.29E-04	2.57E-04		
U-235	-2.6572E-06	63.68	0.00	1.33E-03	1.16E-03	1.33E-03		
U-236	1.3575E-05	63.68	127.36	0.00E+00	8.64E-04	1.73E-03		
U-238	-2.2698E-08	63.68	0.00	8.87E-05	8.73E-05	8.87E-05		
Y-90	2.5646E+00	63.68	127.36	0.00E+00	1.63E+02	3.27E+02		
Other Radionuclides					2.27E+02	4.54E+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	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	69.96587031	60 to 100	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	24.86	63.68	Nominal burnup calculated from the heavy metal mass destroyed
Bounding		127.36	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)