

INFORMATION ONLY

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National Spent Nuclear Fuel Program

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

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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

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	9.4369E-12	3.59	7.19	0.00E+00	3.39E-11	6.78E-11	0.0150	2.441E+11
Am-241	1.1078E-01	3.59	7.19	1.50E-01	5.48E-01	9.47E-01	0.0250	3.065E+10
Am-242m	1.7940E-03	3.59	7.19	0.00E+00	6.45E-03	1.29E-02	0.0375	5.783E+10
Am-243	1.0724E-04	3.59	7.19	9.57E+00	9.57E+00	9.57E+00	0.0575	4.042E+10
C-14	2.5942E-05	3.59	7.19	0.00E+00	9.32E-05	1.86E-04	0.0850	2.228E+11
Cl-36	3.4243E-10	3.59	7.19	0.00E+00	1.23E-09	2.46E-09	0.1250	1.312E+10
Cm-243	2.8217E-04	3.59	7.19	0.00E+00	1.01E-03	2.03E-03	0.2250	1.359E+10
Cm-244	7.7027E-04	3.59	7.19	0.00E+00	2.77E-03	5.54E-03	0.3750	5.783E+09
Co-60	1.3011E-04	3.59	7.19	0.00E+00	4.68E-04	9.35E-04	0.5750	2.449E+11
Cs-134	1.2951E-07	3.59	7.19	0.00E+00	4.65E-07	9.31E-07	0.8500	1.280E+09
Cs-135	4.7693E-05	3.59	7.19	0.00E+00	1.71E-04	3.43E-04	1.2500	7.576E+08
Cs-137	9.3351E-01	3.59	7.19	0.00E+00	3.35E+00	6.71E+00	1.7500	3.488E+07
Eu-154	2.6341E-03	3.59	7.19	0.00E+00	9.47E-03	1.89E-02	2.2500	4.208E+03
Eu-155	4.0968E-04	3.59	7.19	0.00E+00	1.47E-03	2.94E-03	2.7500	1.026E+05
Fe-55	2.5543E-07	3.59	7.19	0.00E+00	9.18E-07	1.84E-06	3.5000	6.082E+02
H-3	1.2053E-03	3.59	7.19	0.00E+00	4.33E-03	8.66E-03	5.0000	2.503E+02
I-129	1.2891E-06	3.59	7.19	0.00E+00	4.63E-06	9.26E-06	7.0000	2.760E+01
Kr-85	7.0043E-03	3.59	7.19	0.00E+00	2.52E-02	5.03E-02	11.0000	3.093E+00
Np-237	4.3622E-06	3.59	7.19	0.00E+00	1.57E-05	3.13E-05		
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	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 0733E-09	91,386 55	182,773 11	0 00E+00	9.81E-05	1 96E-04	Avg MeV	-
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	0.0575	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+13
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	Thermal Power	
U-233	2.5856E-08	91,386 55	182,773 11	0 00E+00	2 36E-03	4 73E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	5.2665E-05	91,386 55	182,773 11	0 00E+00	4 81E+00	9 63E+00	1.65E+03	3.31E+03
U-235	-1 4487E-06	91,386 55	0 00	5 00E-02	0 00E+00	5.00E-02	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ZIRC	ZIRC	
	U	U	
	3	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal Bounding	From SFD	Estimated	
	32,848 60 33 041 60	91,386 55 182,773 11	

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

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

1 06

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name 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, Zinc, 0 to 5% U)
²Template Burnup(MWd) 61 92
Template BOL Heavy Metal Mass (MT) 0 00176911
Template Decay Time³ 35 years

Estimated
Canister usage
18"x15"
1 00

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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		
Ti-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	Thermal Power	
U-233	2.5097E-08	10,273 05	10,378 50	0 00E+00	2 58E-04	2 60E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	5 0000E-05	10,273 05	10,378 50	0 00E+00	5 14E-01	5 19E-01	2.36E+02	2.39E+02
U-235	-1 4489E-06	10,273 05	0 00	1.28E-02	0 00E+00	1 28E-02	Total	Total
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		

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 %:	16	0 to 5	
Burnup Summary (MWd) ²			Basis for burnup used in estimate ³
	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			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.79	0.17	
Bounding	0.80	0.33	

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: 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

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches on all parameters except enrichment.
Reactor Moderator: Fuel Cladding: BOL HM Constituents: BOL Enrichment %	From SFD	Used	
	FAST	FAST	
	SST	SST	
	Pu and U	Pu and U	
	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
Nominal	From SFD	Estimated	
	635.816.10	638.157.18	
Bounding	1,362.463.07	1,276.314.37	

Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0.46	1.00	
Bounding	0.92	0.94	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-DFA/TDFA PINS

SNF ID #: 323

Fuel Units & Descr: 2768 - ROD

Heavy Metal Mass BOL= , EOL=443 987kg

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"

41 94

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6 1822E-12	31,146 44	69,045 35	0 00E+00	1 93E-07	4 27E-07	Avg MeV	
Am-241	1 1066E-01	31,146 44	69,045 35	9 16E+02	4 36E+03	8 56E+03	0 0150	2 268E+15
Am-242m	1 9247E-03	31,146 44	69,045 35	0 00E+00	5 99E+01	1 33E+02	0 0250	4 493E+14
Am-243	1 0740E-04	31,146 44	69,045 35	0 00E+00	3 35E+00	7 42E+00	0 0375	5 217E+14
C-14	2 6042E-05	31,146 44	69,045 35	0 00E+00	8 11E-01	1 80E+00	0 0575	5 221E+14
Cl-36	3 4243E-10	31,146 44	69,045 35	0 00E+00	1 07E-05	2 36E-05	0 0850	2 499E+14
Cm-243	4 0629E-04	31,146 44	69,045 35	0 00E+00	1 27E+01	2 81E+01	0 1250	1 759E+14
Cm-244	1 6024E-03	31,146 44	69,045 35	0 00E+00	4 99E+01	1 11E+02	0 2250	2 017E+14
Co-60	3 4275E-03	31,146 44	69,045 35	0 00E+00	1 07E+02	2 37E+02	0 3750	8 742E+13
Cs-134	1 5566E-03	31,146 44	69,045 35	0 00E+00	4 85E+01	1 07E+02	0 5750	3 542E+15
Cs-135	4 7693E-05	31,146 44	69,045 35	0 00E+00	1 49E+00	3 29E+00	0 8500	3 700E+13
Cs-137	1 4007E+00	31,146 44	69,045 35	0 00E+00	4 36E+04	9 67E+04	1 2500	4 429E+13
Eu-154	1 6184E-02	31,146 44	69,045 35	0 00E+00	5 04E+02	1 12E+03	1 7500	1 002E+12
Eu-155	1 3774E-02	31,146 44	69,045 35	0 00E+00	4 29E+02	9 51E+02	2 2500	2 012E+08
Fe-55	3 8028E-04	31,146 44	69,045 35	0 00E+00	1 18E+01	2 63E+01	2 7500	1 144E+09
H-3	3 8454E-03	31,146 44	69,045 35	0 00E+00	1 20E+02	2 66E+02	3 5000	5 753E+06
I-129	1 2891E-06	31,146 44	69,045 35	0 00E+00	4 02E-02	8 90E-02	5 0000	1 985E+06
Kr-85	2 7848E-02	31,146 44	69,045 35	0 00E+00	8 67E+02	1 92E+03	7 0000	2 265E+05
Np-237	3 7516E-06	31,146 44	69,045 35	0 00E+00	1 17E-01	2 59E-01	11 0000	2 590E+04
Pa-231	1 2488E-11	31,146 44	69,045 35	0 00E+00	3 89E-07	8 62E-07		
Pb-210	2 4206E-12	31,146 44	69,045 35	0 00E+00	7 54E-08	1 67E-07		
Pm-147	1 5671E-02	31,146 44	69,045 35	0 00E+00	4 88E+02	1 08E+03		
Pu-238	1 4877E-02	31,146 44	69,045 35	0 00E+00	4 63E+02	1 03E+03		
Pu-239	-3 5520E-02	31,146 44	0 00	7 52E+03	6 41E+03	7 52E+03		
Pu-240	2 0690E-02	31,146 44	69,045 35	3 82E+03	4 47E+03	5 25E+03		
Pu-241	-1 4799E+00	31,146 44	0 00	1 72E+05	1 25E+05	1 72E+05		
Pu-242	1 1252E-05	31,146 44	69,045 35	1 02E+00	1 37E+00	1 80E+00		
Ra-226	7 8524E-12	31,146 44	69,045 35	0 00E+00	2 45E-07	5 42E-07		
Ra-228	2 4086E-16	31,146 44	69,045 35	0 00E+00	7 50E-12	1 66E-11		
Ru-106	1 5066E-05	31,146 44	69,045 35	0 00E+00	4 69E-01	1 04E+00		
Se-79	1 0127E-05	31,146 44	69,045 35	0 00E+00	3 15E-01	6 99E-01		
Sn-126	4 3902E-05	31,146 44	69,045 35	0 00E+00	1 37E+00	3 03E+00		
Sr-90	5 0088E-01	31,146 44	69,045 35	0 00E+00	1 56E+04	3 46E+04		
Tc-99	3 9412E-04	31,146 44	69,045 35	0 00E+00	1 23E+01	2 72E+01		
Th-229	2 7219E-12	31,146 44	69,045 35	0 00E+00	8 48E-08	1 88E-07		
Th-230	1 0441E-09	31,146 44	69,045 35	0 00E+00	3 25E-05	7 21E-05		
Th-232	3 1689E-16	31,146 44	69,045 35	0 00E+00	9 87E-12	2 19E-11		
Ti-208	4 6636E-07	31,146 44	69,045 35	0 00E+00	1 45E-02	3 22E-02		
U-232	1 2638E-06	31,146 44	69,045 35	0 00E+00	3 94E-02	8 73E-02		
U-233	5 7451E-10	31,146 44	69,045 35	0 00E+00	1 79E-05	3 97E-05		
U-234	4 3044E-06	31,146 44	69,045 35	0 00E+00	1 34E-01	2 97E-01		
U-235	-7 7765E-09	31,146 44	0 00	1 54E-03	1 30E-03	1 54E-03		
U-236	1 8050E-07	31,146 44	69,045 35	0 00E+00	5 62E-03	1 25E-02		
U-238	-1 7914E-07	31,146 44	0 00	1 12E-01	1 07E-01	1 12E-01		
Y-90	5 0088E-01	31,146 44	69,045 35	0 00E+00	1 56E+04	3 46E+04		
Other Radionuclides					4 41E+04	9 78E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup taken from SFD and converted to MWd using BOL=475 192kg Bounding burnup taken from SFD and converted to MWd using BOL=475.192kg
Nominal		31,146 44	
Bounding		69 045 35	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0 43		
Bounding	0 95		
			1 00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FFTF-TFA PINS
SNF ID #: 320
Fuel Units & Descr: 1645 - ROD
Heavy Metal Mass: BOL = , EOL=389 701kg
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"
24 92

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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		
Ti-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:
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) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		27,338.13	Nominal burnup taken from SFD and converted to MWd using BOL=417.09kg
Bounding		60 603.11	Bounding burnup taken from SFD and converted to MWd using BOL=417.09kg

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.43		1.00
Bounding	0.95		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FFTF-TFA PINS (AC-3)
 SNF ID # 1046
 Fuel Units & Descr 72 - ROD
 Heavy Metal Mass BOL= , EOL=8 878kg
 ROD Storage Site HANFORD

¹Fuel decay start date 1992
 Estimates as of: 2030
 Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
²Template Burnup(MWd) 5011.2
 Template BOL Heavy Metal Mass (MT): 0.0329181
 Template Decay Time 35 years

Estimated
 Canister usage
 18"x15"
 1.09

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown)
Reactor Moderator	From SFD	Used	
Fuel Cladding	FAST	FAST	
BOL HM Constituents	SST	SST	
BOL Enrichment %	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	
Bounding		787.70	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.44		
Bounding	0.54		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FFTF-TFA-AB-1
SNF ID #: 317
Fuel Units & Descr: 1 - HEX ARRAY 217 ROD
Heavy Metal Mass: BOL = ; EOL=34 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	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-12	251.33	502.65	0.00E+00	1.55E-09	3.11E-09	Avg MeV	
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

	From SFD	Used	Basis for Parameter Differences:
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

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		251.33	Nominal burnup taken from SFD and converted to MWd using BOL=34.907kg Bounding burnup assumed to be twice nominal burnup
Bounding		502.65	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.05		1.00
Bounding	0.09		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FFTF-TFA-ABA-1 THRU 6
SNF ID #: 318
Fuel Units & Descr: 6 - HEX ARRAY 91 ROD
Heavy Metal Mass BOL= , EOL=257 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	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9 6110E-08	5,934 58	8,479 48	0 00E+00	5 70E-04	8 15E-04	Avg. MeV	
Am-241	6 5601E-07	5,934 58	8,479 48	0 00E+00	3 89E-03	5 56E-03	0 0150	5 611E+14
Am-242m	0 0000E+00	5,934 58	8,479 48	0 00E+00	0 00E+00	0 00E+00	0 0250	1 166E+14
Am-243	8 3770E-15	5,934 58	8,479 48	0 00E+00	4 97E-11	7 10E-11	0 0375	1 025E+14
C-14	2 1714E-05	5,934 58	8,479 48	0 00E+00	1 29E-01	1 84E-01	0 0575	1 086E+14
Cl-36	5 5188E-08	5,934 58	8,479 48	0 00E+00	3 28E-04	4 68E-04	0 0850	6 569E+13
Cm-243	1 5496E-14	5,934 58	8,479 48	0 00E+00	9 20E-11	1 31E-10	0 1250	4 255E+13
Cm-244	5 2375E-16	5,934 58	8,479 48	0 00E+00	3 11E-12	4 44E-12	0 2250	5 638E+13
Co-60	2 0947E-03	5,934 58	8,479 48	0 00E+00	1 24E+01	1 78E+01	0 3750	2 457E+13
Cs-134	6 2448E-07	5,934 58	8,479 48	0 00E+00	3 71E-03	5 30E-03	0 5750	4 340E+14
Cs-135	4 4996E-05	5,934 58	8,479 48	0 00E+00	2 67E-01	3 82E-01	0 8500	4 008E+12
Cs-137	1 3775E+00	5,934 58	8,479 48	0 00E+00	8 17E+03	1 17E+04	1 2500	2 659E+12
Eu-154	1 8510E-04	5,934 58	8,479 48	0 00E+00	1 10E+00	1 57E+00	1 7500	1 034E+11
Eu-155	1 4163E-03	5,934 58	8,479 48	0 00E+00	8 41E+00	1 20E+01	2 2500	1 824E+07
Fe-55	1 4179E-05	5,934 58	8,479 48	0 00E+00	8 41E-02	1 20E-01	2 7500	1 758E+06
H-3	3 5383E-03	5,934 58	8,479 48	0 00E+00	2 10E+01	3 00E+01	3 5000	1 785E+03
I-129	1 1426E-06	5,934 58	8,479 48	0 00E+00	6 78E-03	9 69E-03	5 0000	6 231E+02
Kr-85	3 8604E-02	5,934 58	8,479 48	0 00E+00	2 29E+02	3 27E+02	7 0000	5 538E+01
Np-237	3 3099E-06	5,934 58	8,479 48	0 00E+00	1 96E-02	2 81E-02	11 0000	5 281E+00
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		
Ti-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		

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 template is a good approximation since it is a FAST, Uranium fuel
BOL HM Constituents	SST	ZIRC	
BOL Enrichment %	U	U	
		10 to 40	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		5 934 58	Nominal burnup taken from SFD and converted to MWd using BOL=264.158kg Bounding burnup taken from SFD and converted to MWd using BOL=264.158kg
Bounding		8 479 48	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	7 19		1 01
Bounding	10 27		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

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"
0.02

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-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	4.7693E-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		
Ti-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		

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:
Nominal	From SFD	Estimated	
		1.038.59	Nominal burnup taken from SFD and converted to MWd using BOL=15.387kg Bounding burnup assumed to be twice nominal burnup.
Bounding		2.077.18	

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FFTF-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: FFTF (FAST SST 10 to 30%, Pu & U)
²Template Burnup(MWd): 5011.2
Template BOL Heavy Metal Mass (MT): 0.0329181
Template Decay Time: 35 years

Estimated
Canister usage
18"x15"
1.00

II. Estimates							Gamma Sources	
	m	x _n	x _b	b	y _n	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	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-253	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		
Ti-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: 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	
Burnup Summary (MWd) ¹			Basis for burnup used in estimate: Nominal burnup taken from SFD and converted to MWd using BOL=2.744kg Bounding burnup assumed to be twice nominal burnup
	From SFD	Estimated	
Nominal		185.22	
Bounding		370.43	
Checks			Estimated EOL HM/Given EOL HM 1.00
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.44		
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	Thermal Power	
U-233	5.7451E-10	96,319.97	140,074.70	0.00E+00	5.53E-05	8.05E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	4.3044E-06	96,319.97	140,074.70	0.00E+00	4.15E-01	6.03E-01	1.93E+03	2.71E+03
U-235	-7.7765E-09	96,319.97	0.00	2.28E-03	1.53E-03	2.28E-03	Total	Total
U-236	1.8050E-07	96,319.97	140,074.70	0.00E+00	1.74E-02	2.53E-02		
U-238	-1.7914E-07	96,319.97	0.00	1.66E-01	1.49E-01	1.66E-01		
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
SNF ID # 322
Fuel Units & Descr 2 - HEX ARRAY 217 ROD
Heavy Metal Mass BOL= , EOL=69 402kg
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"
0.40

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-12	5,116.34	5,738.65	0.00E+00	3.16E-08	3.55E-08	Avg MeV	
Am-241	1.1066E-01	5,116.34	5,738.65	1.44E+02	7.10E+02	7.79E+02	0.0150	1.921E+14
Am-242m	1.9247E-03	5,116.34	5,738.65	0.00E+00	9.85E+00	1.10E+01	0.0250	3.740E+13
Am-243	1.0740E-04	5,116.34	5,738.65	0.00E+00	5.49E-01	6.16E-01	0.0375	4.337E+13
C-14	2.6042E-05	5,116.34	5,738.65	0.00E+00	1.33E-01	1.49E-01	0.0575	4.433E+13
Cl-36	3.4243E-10	5,116.34	5,738.65	0.00E+00	1.75E-06	1.97E-06	0.0850	2.077E+13
Cm-243	4.0629E-04	5,116.34	5,738.65	0.00E+00	2.08E+00	2.33E+00	0.1250	1.462E+13
Cm-244	1.6024E-03	5,116.34	5,738.65	0.00E+00	8.20E+00	9.20E+00	0.2250	1.676E+13
Co-60	3.4275E-03	5,116.34	5,738.65	0.00E+00	1.75E+01	1.97E+01	0.3750	7.267E+12
Cs-134	1.5566E-03	5,116.34	5,738.65	0.00E+00	7.96E+00	8.93E+00	0.5750	2.944E+12
Cs-135	4.7693E-05	5,116.34	5,738.65	0.00E+00	2.44E-01	2.74E-01	0.8500	3.076E+12
Cs-137	1.4007E+00	5,116.34	5,738.65	0.00E+00	7.17E+03	8.04E+03	1.2500	3.681E+12
Eu-154	1.6184E-02	5,116.34	5,738.65	0.00E+00	8.28E+01	9.29E+01	1.7500	8.327E+10
Eu-155	1.3774E-02	5,116.34	5,738.65	0.00E+00	7.05E+01	7.90E+01	2.2500	1.703E+07
Fe-55	3.8028E-04	5,116.34	5,738.65	0.00E+00	1.95E+00	2.18E+00	2.7500	9.530E+07
H-3	3.8454E-03	5,116.34	5,738.65	0.00E+00	1.97E+01	2.21E+01	3.5000	6.358E+05
I-129	1.2891E-06	5,116.34	5,738.65	0.00E+00	6.60E-03	7.40E-03	5.0000	2.319E+05
Kr-85	2.7848E-02	5,116.34	5,738.65	0.00E+00	1.42E+02	1.60E+02	7.0000	2.644E+04
Np-237	3.7516E-06	5,116.34	5,738.65	0.00E+00	1.92E-02	2.15E-02	11.0000	3.023E+03
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	7.06E+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		
Ti-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	Thermal Power	
U-233	5.7451E-10	5,116.34	5,738.65	0.00E+00	2.94E-06	3.30E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	4.3044E-06	5,116.34	5,738.65	0.00E+00	2.20E-02	2.47E-02	1.33E+02	1.48E+02
U-235	-7.7765E-09	5,116.34	0.00	2.42E-04	2.02E-04	2.42E-04	Total	Total
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:
Reactor Moderator	From SFD	Used	
	FAST	FAST	
Fuel Cladding	SST	SST	
BOL HM Constituents	Pu and U	Pu and U	This template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown)
BOL Enrichment %	10 to 30	10 to 30	

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

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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-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

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup taken from SFD and converted to MWd using BOL=34 611kg Bounding burnup assumed to be twice nominal burnup.
Nominal		3.46	
Bounding		6.92	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 1.00
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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-12	2,694.34	5,388.68	0.00E+00	1.67E-08	3.33E-08	Avg MeV	
Am-241	1.1066E-01	2,694.34	5,388.68	8.73E+01	3.85E+02	6.84E+02	0.0150	1.778E+14
Am-242m	1.9247E-03	2,694.34	5,388.68	0.00E+00	5.19E+00	1.04E+01	0.0250	3.508E+13
Am-243	1.0740E-04	2,694.34	5,388.68	0.00E+00	2.89E-01	5.79E-01	0.0375	4.072E+13
C-14	2.6042E-05	2,694.34	5,388.68	0.00E+00	7.02E-02	1.40E-01	0.0575	4.096E+13
Cl-36	3.4243E-10	2,694.34	5,388.68	0.00E+00	9.23E-07	1.85E-06	0.0850	1.950E+13
Cm-243	4.0629E-04	2,694.34	5,388.68	0.00E+00	1.09E+00	2.19E+00	0.1250	1.373E+13
Cm-244	1.6024E-03	2,694.34	5,388.68	0.00E+00	4.32E+00	8.63E+00	0.2250	1.574E+13
Co-60	3.4275E-03	2,694.34	5,388.68	0.00E+00	9.23E+00	1.85E+01	0.3750	6.823E+12
Cs-134	1.5566E-03	2,694.34	5,388.68	0.00E+00	4.19E+00	8.39E+00	0.5750	2.764E+14
Cs-135	4.7693E-05	2,694.34	5,388.68	0.00E+00	1.29E-01	2.57E-01	0.8500	2.888E+12
Cs-137	1.4007E+00	2,694.34	5,388.68	0.00E+00	3.77E+03	7.55E+03	1.2500	3.457E+12
Eu-154	1.6184E-02	2,694.34	5,388.68	0.00E+00	4.36E+01	8.72E+01	1.7500	7.819E+10
Eu-155	1.3774E-02	2,694.34	5,388.68	0.00E+00	3.71E+01	7.42E+01	2.2500	1.578E+07
Fe-55	3.8028E-04	2,694.34	5,388.68	0.00E+00	1.02E+00	2.05E+00	2.7500	8.936E+07
H-3	3.8454E-03	2,694.34	5,388.68	0.00E+00	1.04E+01	2.07E+01	3.5000	4.859E+05
I-129	1.2891E-06	2,694.34	5,388.68	0.00E+00	3.47E-03	6.95E-03	5.0000	1.706E+05
Kr-85	2.7848E-02	2,694.34	5,388.68	0.00E+00	7.50E+01	1.50E+02	7.0000	1.946E+04
Np-237	3.7516E-06	2,694.34	5,388.68	0.00E+00	1.01E-02	2.02E-02	11.0000	2.225E+03
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		
Ti-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	Thermal Power	
U-233	5.7451E-10	2,694.34	5,388.68	0.00E+00	1.55E-06	3.10E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	4.3044E-06	2,694.34	5,388.68	0.00E+00	1.16E-02	2.32E-02	7.50E+01	1.19E+02
U-235	-7.7765E-09	2,694.34	0.00	1.47E-04	1.26E-04	1.47E-04	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown)
Reactor Moderator	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

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.39		
Bounding	0.78		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name, 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
Template² FFTF (FAST, SST, 10 to 30%, Pu & U)
²Template Burnup(MWd): 5011.2
Template BOL Heavy Metal Mass (MT): 0 0329181
Template Decay Time³: 35 years

Estimated
Canister usage
18"x15"
0 40

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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
Cl-36	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 013E+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		
Ti-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		
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) ⁴		
Nominal	From SFD	Estimated
Bounding	10 382 82	20 765 65

Basis for burnup used in estimate:
Nominal burnup taken from SFD and converted to MWd using BOL=98.509kg
Bounding burnup assumed to be twice nominal burnup

Checks		
Nominal	Burnup Multiplier	Estimated Burnup/ Given Burnup
Bounding	0 69	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 & 5
SNF ID # 333
Fuel Units & Descr 3 - HEX ARRAY 169 ROD
Heavy Metal Mass BOL= ; EOL=131.25kg
ROD Storage Site HANFORD

¹Fuel decay start date 1992
Estimates as of 2030
Template FFTF (FAST, SST, 10 to 30%, Pu & U)
²Template Burnup(MWd) 5011.2
Template BOL Heavy Metal Mass (MT) 0.0329181
Template Decay Time 35 years

Estimated
Canister usage
18"x15"
0.60

II. Estimates							Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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		
Ti-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

Reactor Moderator	From SFD	Used	Basis for Parameter Differences:
	FAST	FAST	
Fuel Cladding	SST	SST	This Template was used for the following reasons: 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

	From SFD	Estimated	Basis for burnup used in estimate:
		10,725.31	
Nominal			Nominal burnup taken from SFD and converted to MWd using BOL=141.995kg
Bounding		11,359.60	Bounding burnup taken from SFD and converted to MWd using BOL=141.995kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
	0.50		
Nominal			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: FFTF (FAST, SST, 10 to 30%, Pu & U)
²Template Burnup(MWd)³: 5011.2
Template BOL Heavy Metal Mass (MT)⁴: 0.0329181
Template Decay Time⁵: 35 years

Estimated
Canister usage
18"x15"
0.40

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-12	3,631.59	3,953.60	0.00E+00	2.25E-08	2.44E-08	Avg. MeV	
Am-241	1.1066E-01	3,631.59	3,953.60	1.72E+02	5.74E+02	6.10E+02	0.0150	1.363E+14
Am-242m	1.9247E-03	3,631.59	3,953.60	0.00E+00	6.99E+00	7.61E+00	0.0250	2.584E+13
Am-243	1.0740E-04	3,631.59	3,953.60	0.00E+00	3.90E-01	4.25E-01	0.0375	2.989E+13
C-14	2.6042E-05	3,631.59	3,953.60	0.00E+00	9.46E-02	1.03E-01	0.0575	3.156E+13
Cf-252	3.4243E-10	3,631.59	3,953.60	0.00E+00	1.24E-06	1.35E-06	0.0850	1.431E+13
Cm-243	4.0629E-04	3,631.59	3,953.60	0.00E+00	1.48E+00	1.61E+00	0.1250	1.007E+13
Cm-244	1.6024E-03	3,631.59	3,953.60	0.00E+00	5.82E+00	6.34E+00	0.2250	1.155E+13
Co-60	3.4275E-03	3,631.59	3,953.60	0.00E+00	1.24E+01	1.36E+01	0.3750	5.008E+12
Cs-134	1.5566E-03	3,631.59	3,953.60	0.00E+00	5.65E+00	6.15E+00	0.5750	2.028E+14
Cs-135	4.7693E-05	3,631.59	3,953.60	0.00E+00	1.73E-01	1.89E-01	0.8500	2.119E+12
Cs-137	1.4007E+00	3,631.59	3,953.60	0.00E+00	5.09E+03	5.54E+03	1.2500	2.536E+12
Eu-154	1.6184E-02	3,631.59	3,953.60	0.00E+00	5.88E+01	6.40E+01	1.7500	5.737E+10
Eu-155	1.3774E-02	3,631.59	3,953.60	0.00E+00	5.00E+01	5.45E+01	2.2500	1.207E+07
Fe-55	3.8028E-04	3,631.59	3,953.60	0.00E+00	1.38E+00	1.50E+00	2.7500	6.585E+07
H-3	3.8454E-03	3,631.59	3,953.60	0.00E+00	1.40E+01	1.52E+01	3.5000	6.094E+05
I-129	1.2891E-06	3,631.59	3,953.60	0.00E+00	4.68E-03	5.10E-03	5.0000	2.326E+05
Kr-85	2.7848E-02	3,631.59	3,953.60	0.00E+00	1.01E+02	1.10E+02	7.0000	2.650E+04
Np-237	3.7516E-06	3,631.59	3,953.60	0.00E+00	1.36E-02	1.48E-02	11.0000	3.030E+03
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		
Ti-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	Thermal Power	
U-233	5.7451E-10	3,631.59	3,953.60	0.00E+00	2.09E-06	2.27E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	4.3044E-06	3,631.59	3,953.60	0.00E+00	1.56E-02	1.70E-02	1.24E+02	1.33E+02
U-235	-7.7765E-09	3,631.59	0.00	2.91E-04	2.62E-04	2.91E-04	Total	Total
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

	From SFD	Used	Basis for Parameter Differences:
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

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

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
 SNF ID # 335
 Fuel Units & Descr 1 - HEX ARRAY 217 ROD
 Heavy Metal Mass BOL= , EOL=35 012kg
 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	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	6.1822E-12	835.27	1,229.60	0.00E+00	5.16E-09	7.60E-09	0.0150	4.323E+13
Am-241	1.1066E-01	835.27	1,229.60	6.91E+01	1.62E+02	2.05E+02	0.0250	8.050E+12
Am-242m	1.9247E-03	835.27	1,229.60	0.00E+00	1.61E+00	2.37E+00	0.0375	9.296E+12
Am-243	1.0740E-04	835.27	1,229.60	0.00E+00	8.97E-02	1.32E-01	0.0675	1.003E+13
C-14	2.6042E-05	835.27	1,229.60	0.00E+00	2.18E-02	3.20E-02	0.0850	4.451E+12
Cl-36	3.4243E-10	835.27	1,229.60	0.00E+00	2.86E-07	4.21E-07	0.1250	3.134E+12
Cm-243	4.0629E-04	835.27	1,229.60	0.00E+00	3.39E-01	5.00E-01	0.2250	3.592E+12
Cm-244	1.6024E-03	835.27	1,229.60	0.00E+00	1.34E+00	1.97E+00	0.3750	1.558E+12
Co-60	3.4275E-03	835.27	1,229.60	0.00E+00	2.86E+00	4.21E+00	0.5750	6.307E+13
Cs-134	1.5566E-03	835.27	1,229.60	0.00E+00	1.30E+00	1.91E+00	0.8500	6.590E+11
Cs-135	4.7693E-05	835.27	1,229.60	0.00E+00	3.98E-02	5.86E-02	1.2500	7.887E+11
Cs-137	1.4007E+00	835.27	1,229.60	0.00E+00	1.17E+03	1.72E+03	1.7500	1.784E+10
Eu-154	1.6184E-02	835.27	1,229.60	0.00E+00	1.35E+01	1.99E+01	2.2500	3.824E+06
Eu-155	1.3774E-02	835.27	1,229.60	0.00E+00	1.15E+01	1.69E+01	2.7500	2.052E+07
Fe-55	3.8028E-04	835.27	1,229.60	0.00E+00	3.18E-01	4.68E-01	3.5000	2.257E+05
H-3	3.8454E-03	835.27	1,229.60	0.00E+00	3.21E+00	4.73E+00	5.0000	8.766E+04
I-129	1.2891E-06	835.27	1,229.60	0.00E+00	1.08E-03	1.59E-03	7.0000	9.988E+03
Kr-85	2.7848E-02	835.27	1,229.60	0.00E+00	2.33E+01	3.42E+01	11.0000	1.142E+03
Np-237	3.7516E-06	835.27	1,229.60	0.00E+00	3.13E-03	4.61E-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		
U-238	-1.7914E-07	835.27	0.00	8.48E-03	8.33E-03	8.48E-03		
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:
	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		835.27	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
Bounding		1,229.60	
Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.15		1.00
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

Fuel decay start date: 1992
 Estimates as of: 2030
 Template: FERMI (Fast, Zirc, 10 to 40%, U)
 Template Burnup(MWd): 58 6725048
 Template BOL Heavy Metal Mass (MT): 0 018774
 Template Decay Time: 35 years

Estimated
 Canister usage
 18"x15"
 0 40

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9 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		
Tc-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		
Ti-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	Thermal Power	
U-233	1 0110E-08	1,204 37	1,348 90	0 00E+00	1 22E-05	1 36E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
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	1.86E+01	2 08E+01
U-236	1 2633E-05	1,204 37	1,348 90	0 00E+00	1 52E-02	1 70E-02	Total	Total
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:
	From SFD	Used	
Reactor Moderator	FAST	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		1,204 37	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
Bounding		1 348 90	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	4 00		1 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
SNF ID # 96
Fuel Units & Descr 22 - CANISTER OF SCRAP
Heavy Metal Mass BOL= , EOL=45.203kg
ROD Storage Site HANFORD

¹Fuel decay start date 1972
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
2.00

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	9.4369E-12	45,119.38	45,119.38	0.00E+00	4.26E-07	4.26E-07	0.0150	9.732E+14
Am-241	1.1078E-01	45,119.38	45,119.38	1.74E+02	5.17E+03	5.17E+03	0.0250	1.917E+14
Am-242m	1.7940E-03	45,119.38	45,119.38	0.00E+00	8.09E+01	8.09E+01	0.0375	2.185E+14
Am-243	1.0724E-04	45,119.38	45,119.38	0.00E+00	4.84E+00	4.84E+00	0.0575	2.428E+14
C-14	2.5942E-05	45,119.38	45,119.38	0.00E+00	1.17E+00	1.17E+00	0.0850	1.026E+14
Cl-36	3.4243E-10	45,119.38	45,119.38	0.00E+00	1.55E-05	1.55E-05	0.1250	6.757E+13
Cm-243	2.8217E-04	45,119.38	45,119.38	0.00E+00	1.27E+01	1.27E+01	0.2250	8.525E+13
Cm-244	7.7027E-04	45,119.38	45,119.38	0.00E+00	3.48E+01	3.48E+01	0.3750	3.629E+13
Co-60	1.3011E-04	45,119.38	45,119.38	0.00E+00	5.87E+00	5.87E+00	0.5750	1.538E+15
Cs-134	1.2951E-07	45,119.38	45,119.38	0.00E+00	5.84E-03	5.84E-03	0.8500	8.034E+12
Cs-135	4.7693E-05	45,119.38	45,119.38	0.00E+00	2.15E+00	2.15E+00	1.2500	4.756E+12
Cs-137	9.3351E-01	45,119.38	45,119.38	0.00E+00	4.21E+04	4.21E+04	1.7500	2.190E+11
Eu-154	2.6341E-03	45,119.38	45,119.38	0.00E+00	1.19E+02	1.19E+02	2.2500	2.164E+07
Eu-155	4.0968E-04	45,119.38	45,119.38	0.00E+00	1.85E-01	1.85E-01	2.7500	6.416E+08
Fe-55	2.5543E-07	45,119.38	45,119.38	0.00E+00	1.15E-02	1.15E-02	3.5000	1.517E+06
H-3	1.2053E-03	45,119.38	45,119.38	0.00E+00	5.44E+01	5.44E+01	5.0000	6.435E+05
I-129	1.2891E-06	45,119.38	45,119.38	0.00E+00	5.82E-02	5.82E-02	7.0000	7.329E+04
Kr-85	7.0043E-03	45,119.38	45,119.38	0.00E+00	3.16E+02	3.16E+02	11.0000	8.374E+03
Np-237	4.3622E-06	45,119.38	45,119.38	0.00E+00	1.97E-01	1.97E-01		
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		
Ti-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		
U-238	-1.7914E-07	45,119.38	0.00	2.14E-02	1.33E-02	2.14E-02		
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

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		45,119.38	Nominal burnup set equal to bounding burnup
Bounding		45,119.38	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	3.28		1.05
Bounding	3.28		

*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: 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	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 7758E-10	60,759 03	60,759 03	0 00E+00	5 33E-05	5 33E-05	Avg MeV	
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+08
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		
Ti-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	Thermal Power	
U-233	2 5097E-08	60,759 03	60,759 03	0 00E+00	1 52E-03	1 52E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	5 0000E-05	60,759 03	60,759 03	0 00E+00	3 04E+00	3 04E+00	1 40E+03	1 40E+03
U-235	-1 4489E-06	60,759 03	0 00	8 84E-03	0 00E+00	8 84E-03	Total	Total
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)
Reactor Moderator	From SFD LIGHT WATER	Used 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.
Nominal	From SFD	Estimated	
Bounding		60 759 03	

Checks			Estimated EOL HM/Given EOL HM 1.58
Nominal	Burnup Multiplier	Estimated Burnup/Given Burnup	
Bounding	13.58	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

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	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
Cl-36	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		
Ti-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	7.61E-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		

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

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	8.7399E-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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	GRAPHITE	GRAPHITE	
BOL HM Constituents:	ZIRC	ZIRC	
BOL Enrichment %:	U	U	
	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	5,718,007.18	5,031,045.62	Bounding burnup taken directly from SFD (converted to MWd).

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

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"
1.50

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-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	Thermal Power	
U-233	2.5097E-08	38,160.90	38,160.90	0.00E+00	9.58E-04	9.58E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	5.0000E-05	38,160.90	38,160.90	0.00E+00	1.91E+00	1.91E+00	8.78E+02	8.78E+02
U-235	1.4489E-06	38,160.90	0.00	6.30E-02	7.76E-03	6.30E-02	Total	Total
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

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %	2.5	0 to 5	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
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

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
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 SHIPPINGPORT 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 Time*: 50 years

Estimated
 Canister usage.
 MCO
 18 00

II. Estimates		m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)	
Ac-227	1 0733E-09	433,632 15	867,264 30	0 00E+00	4 65E-04	9 31E-04	Avg MeV		
Am-241	1 4751E-01	433,632 15	867,264 30	0 00E+00	6 40E+04	1 28E+05	0 0150	3.300E+16	
Am-242m	2 6809E-04	433,632 15	867,264 30	0 00E+00	1 16E+02	2 33E+02	0 0250	6 613E+15	
Am-243	6 2484E-04	433,632 15	867,264 30	0 00E+00	2 71E+02	5 42E+02	0 0375	6.232E+15	
C-14	4 7820E-05	433,632 15	867,264 30	0 00E+00	2 07E+01	4 15E+01	0 0575	7 798E+15	
Cl-36	8 0297E-07	433,632 15	867,264 30	0 00E+00	3 48E-01	6 96E-01	0 0850	3 644E+15	
Cm-243	1 7426E-04	433,632 15	867,264 30	0 00E+00	7 56E+01	1 51E+02	0 1250	2 424E+15	
Cm-244	2 7616E-02	433,632 15	867,264 30	0 00E+00	1.20E+04	2 40E+04	0 2250	3 111E+15	
Co-60	3 5610E-04	433,632 15	867,264 30	0 00E+00	1 54E+02	3 09E+02	0 3750	1 343E+15	
Cs-134	2 6260E-07	433,632 15	867,264 30	0 00E+00	1 14E-01	2 28E-01	0 5750	3 164E+16	
Cs-135	1 4433E-05	433,632 15	867,264 30	0 00E+00	6 26E+00	1 25E+01	0 8500	3 089E+14	
Cs-137	9 8870E-01	433,632 15	867,264 30	0 00E+00	4.29E+05	8 57E+05	1.2500	1 966E+14	
Eu-154	6 0320E-03	433,632 15	867,264 30	0 00E+00	2 62E+03	5 23E+03	1 7500	8 642E+12	
Eu-155	2 1770E-04	433,632 15	867,264 30	0 00E+00	9 44E+01	1 89E+02	2.2500	1 420E+09	
Fe-55	7 9296E-07	433,632 15	867,264 30	0 00E+00	3 44E-01	6 88E-01	2 7500	5 007E+09	
H-3	8 9486E-03	433,632 15	867,264 30	0 00E+00	3 88E+03	7 76E+03	3 5000	3.572E+08	
I-129	9 8288E-07	433,632 15	867,264 30	0 00E+00	4.26E-01	8 52E-01	5 0000	1.527E+08	
Kr-85	1 0707E-02	433,632 15	867,264 30	0 00E+00	4.64E+03	9 29E+03	7 0000	1 759E+07	
Np-237	1 1927E-05	433,632 15	867,264 30	0 00E+00	5.17E+00	1 03E+01	11 0000	2 019E+06	
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			
Ti-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:
Reactor Moderator	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding		ZIRC	
BOL HM Constituents		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	
Bounding	399 405 60	867,264 30	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 76	1 65	
Bounding	1.53	2 17	1 01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name SINGLE PASS REACTOR FUEL
SNF ID # 198
Fuel Units & Descr 835 - TUBE
Heavy Metal Mass BOL=2891 605kg, EOL=2885.844kg
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
0.86

II. Estimates		m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)	Avg MeV
Ac-227	8.7399E-10	6,078.13	12,156.27	0.00E+00	5.31E-06	1.06E-05	0.0150	4.170E+14	0.0150
Am-241	9.9095E-02	6,078.13	12,156.27	0.00E+00	6.02E+02	1.20E+03	0.0250	8.476E+13	0.0250
Am-242m	5.4598E-05	6,078.13	12,156.27	0.00E+00	3.32E-01	6.64E-01	0.0375	7.807E+13	0.0375
Am-243	4.6221E-05	6,078.13	12,156.27	0.00E+00	2.81E-01	5.62E-01	0.0575	9.436E+13	0.0575
C-14	9.1853E-05	6,078.13	12,156.27	0.00E+00	5.58E-01	1.12E+00	0.0850	4.685E+13	0.0850
Cl-36	0.0000E+00	6,078.13	12,156.27	0.00E+00	0.00E+00	0.00E+00	0.1250	3.064E+13	0.1250
Cm-243	0.0000E+00	6,078.13	12,156.27	0.00E+00	0.00E+00	0.00E+00	0.2250	4.012E+13	0.2250
Cm-244	2.5589E-04	6,078.13	12,156.27	0.00E+00	1.56E+00	3.11E+00	0.3750	1.739E+13	0.3750
Co-60	8.8563E-06	6,078.13	12,156.27	0.00E+00	5.38E-02	1.08E-01	0.5750	3.793E+14	0.5750
Cs-134	9.0681E-08	6,078.13	12,156.27	0.00E+00	5.51E-04	1.10E-03	0.8500	3.239E+12	0.8500
Cs-135	1.0066E-05	6,078.13	12,156.27	0.00E+00	6.12E-02	1.22E-01	1.2500	1.414E+12	1.2500
Cs-137	8.4454E-01	6,078.13	12,156.27	0.00E+00	5.13E+03	1.03E+04	1.7500	8.660E+10	1.7500
Eu-154	1.9842E-03	6,078.13	12,156.27	0.00E+00	1.21E+01	2.41E+01	2.2500	8.444E+06	2.2500
Eu-155	3.5690E-05	6,078.13	12,156.27	0.00E+00	2.17E-01	4.34E-01	2.7500	2.507E+05	2.7500
Fe-55	5.2802E-08	6,078.13	12,156.27	0.00E+00	3.21E-04	6.42E-04	3.5000	2.218E+05	3.5000
H-3	9.0776E-04	6,078.13	12,156.27	0.00E+00	5.52E+00	1.10E+01	5.0000	9.346E+04	5.0000
I-129	8.6006E-07	6,078.13	12,156.27	0.00E+00	5.23E-03	1.05E-02	7.0000	1.056E+04	7.0000
Kr-85	1.0138E-02	6,078.13	12,156.27	0.00E+00	6.16E+01	1.23E+02	11.0000	1.202E+03	11.0000
Np-237	9.0345E-06	6,078.13	12,156.27	0.00E+00	5.49E-02	1.10E-01			
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			
Ti-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	Used	This Template was used for the following reasons: This fuel matches on all parameters except cladding	
Fuel Cladding	GRAPHITE	GRAPHITE		
BOL HM Constituents	ALUM	ZIRC		
BOL Enrichment %	U	U		
	0.086	0 to 5		

Burnup Summary (MWd) ²			Basis for burnup used in estimate:	
	From SFD	Estimated	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup	
Nominal	2,891.61	6,078.13		
Bounding		12,156.27		

Checks			Estimated EOL HM/Given EOL HM	
	Burnup Multiplier	Estimated Burnup/Given Burnup	1.00	
Nominal	0.35	2.10		
Bounding	0.70			

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: 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

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

Estimated
Canister usage:
MCO
0.14

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7399E-10	454.58	909.16	0.00E+00	3.97E-07	7.95E-07	Avg MeV	
Am-241	9.9095E-02	454.58	909.16	0.00E+00	4.50E+01	9.01E+01	0.0150	3.119E+13
Am-242m	5.4598E-05	454.58	909.16	0.00E+00	2.48E-02	4.96E-02	0.0250	6.339E+12
Am-243	4.6221E-05	454.58	909.16	0.00E+00	2.10E-02	4.20E-02	0.0375	5.839E+12
C-14	9.1853E-05	454.58	909.16	0.00E+00	4.18E-02	8.35E-02	0.0575	7.057E+12
Cl-36	0.0000E+00	454.58	909.16	0.00E+00	0.00E+00	0.00E+00	0.0850	3.504E+12
Cm-243	0.0000E+00	454.58	909.16	0.00E+00	0.00E+00	0.00E+00	0.1250	2.291E+12
Cm-244	2.5589E-04	454.58	909.16	0.00E+00	1.16E-01	2.33E-01	0.2250	3.001E+12
Co-60	8.8563E-06	454.58	909.16	0.00E+00	4.03E-03	8.05E-03	0.3750	1.301E+12
Cs-134	9.0661E-08	454.58	909.16	0.00E+00	4.12E-05	8.24E-05	0.5750	2.837E+13
Cs-135	1.0066E-05	454.58	909.16	0.00E+00	4.58E-03	9.15E-03	0.8500	2.423E+11
Cs-137	8.4454E-01	454.58	909.16	0.00E+00	3.84E+02	7.68E+02	1.2500	1.057E+11
Eu-154	1.9842E-03	454.58	909.16	0.00E+00	9.02E-01	1.80E+00	1.7500	6.477E+09
Eu-155	3.5690E-05	454.58	909.16	0.00E+00	1.62E-02	3.24E-02	2.2500	6.322E+05
Fe-55	5.2802E-08	454.58	909.16	0.00E+00	2.40E-05	4.80E-05	2.7500	1.912E+04
H-3	9.0776E-04	454.58	909.16	0.00E+00	4.13E-01	8.25E-01	3.5000	1.692E+04
I-129	8.6066E-07	454.58	909.16	0.00E+00	3.91E-04	7.82E-04	5.0000	7.133E+03
Kr-85	1.0138E-02	454.58	909.16	0.00E+00	4.61E+00	9.22E+00	7.0000	8.066E+02
Np-237	9.0345E-06	454.58	909.16	0.00E+00	4.11E-03	8.21E-03	11.0000	9.178E+01
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		
Ti-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	Thermal Power	
U-233	1.5704E-09	454.58	909.16	0.00E+00	7.14E-07	1.43E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	6.6293E-05	454.58	909.16	0.00E+00	3.01E-02	6.03E-02	6.18E+00	1.24E+01
U-235	-1.2930E-06	454.58	0.00	1.10E-02	1.04E-02	1.10E-02	Total	Total
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

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

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	407.44	454.58	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		909.16	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.19	1.12	1.00
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
SNF ID # 777
Fuel Units & Descr 2 - SCRAP
Heavy Metal Mass BOL=2711kg, EOL=2628kg
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
HIC
2 00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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 0675	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
Cm-243	1 5496E-14	73 37	146 73	0 00E+00	1 14E-12	2 27E-12	0 1250	7 362E+11
Cm-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	Thermal Power	
U-233	1 0110E-08	73 37	146 73	0 00E+00	7 42E-07	1 48E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	4 9001E-06	73 37	146 73	0 00E+00	3 59E-04	7 19E-04	1 13E+00	2 26E+00
U-235	-2 3191E-06	73 37	0 00	1 05E-03	8 84E-04	1 05E-03	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons: This template is a good approximation since it is a FAST, Uranium fuel
Reactor Moderator	FAST	FAST	
Fuel Cladding	UNKNOWN	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	18	10 to 40	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Nominal		73 37	
Bounding		146 73	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	8 66		
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 8.5/20 FFCR (DORF)
SNF ID #: 315
Fuel Units & Descr: 2 - ELEMENT
Heavy Metal Mass: BOL=0.384kg; EOL=0.383kg
ROD Storage Site: HANFORD

¹Fuel decay start date: 1989
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: 35 years

Estimated
Canister usage:
18"x10"
0.03

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) 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	3.74	7.48	0.00E+00	2.51E-08	5.02E-08	Avg MeV	
Am-241	3.9068E-03	3.74	7.48	0.00E+00	1.46E-02	2.92E-02	0.0150	5.225E+11
Am-242m	1.2325E-06	3.74	7.48	0.00E+00	4.61E-06	9.23E-06	0.0250	1.086E+11
Am-243	1.4732E-07	3.74	7.48	0.00E+00	5.51E-07	1.10E-06	0.0375	9.431E+10
C-14	1.2824E-04	3.74	7.48	0.00E+00	4.80E-04	9.60E-04	0.0575	1.016E+11
Cl-36	2.8120E-06	3.74	7.48	0.00E+00	1.05E-05	2.10E-05	0.0850	6.114E+10
Cm-243	8.6556E-08	3.74	7.48	0.00E+00	3.24E-07	6.48E-07	0.1250	3.979E+10
Cm-244	5.3835E-07	3.74	7.48	0.00E+00	2.01E-06	4.03E-06	0.2250	5.267E+10
Co-60	2.4887E-02	3.74	7.48	0.00E+00	9.31E-02	1.86E-01	0.3750	2.297E+10
Cs-134	3.8030E-06	3.74	7.48	0.00E+00	1.42E-05	2.85E-05	0.5750	3.841E+11
Cs-135	3.2195E-05	3.74	7.48	0.00E+00	1.20E-04	2.41E-04	0.8500	3.931E+09
Cs-137	1.3788E+00	3.74	7.48	0.00E+00	5.16E+00	1.03E+01	1.2500	1.526E+10
Eu-154	1.3711E-03	3.74	7.48	0.00E+00	5.13E-03	1.03E-02	1.7500	1.020E+08
Eu-155	4.4361E-04	3.74	7.48	0.00E+00	1.66E-03	3.32E-03	2.2500	8.361E+04
Fe-55	2.6075E-04	3.74	7.48	0.00E+00	9.76E-04	1.95E-03	2.7500	3.844E+03
H-3	2.0647E-03	3.74	7.48	0.00E+00	7.73E-03	1.55E-02	3.5000	9.740E+00
I-129	7.3684E-07	3.74	7.48	0.00E+00	2.76E-06	5.52E-06	5.0000	4.104E+00
Kr-85	3.6346E-02	3.74	7.48	0.00E+00	1.36E-01	2.72E-01	7.0000	4.635E-01
Np-237	1.2844E-06	3.74	7.48	0.00E+00	4.81E-06	9.61E-06	11.0000	5.273E-02
Pa-231	1.2352E-08	3.74	7.48	0.00E+00	4.62E-08	9.25E-08		
Pb-210	3.5338E-13	3.74	7.48	0.00E+00	1.32E-12	2.65E-12		
Pm-147	7.6346E-04	3.74	7.48	0.00E+00	2.86E-03	5.71E-03		
Pu-238	8.1970E-04	3.74	7.48	0.00E+00	3.07E-03	6.14E-03		
Pu-239	5.5248E-03	3.74	7.48	0.00E+00	2.07E-02	4.14E-02		
Pu-240	2.1203E-03	3.74	7.48	0.00E+00	7.94E-03	1.59E-02		
Pu-241	2.4075E-02	3.74	7.48	0.00E+00	9.01E-02	1.80E-01		
Pu-242	2.3128E-07	3.74	7.48	0.00E+00	8.66E-07	1.73E-06		
Ra-226	9.6481E-13	3.74	7.48	0.00E+00	3.61E-12	7.22E-12		
Ra-228	2.5188E-10	3.74	7.48	0.00E+00	9.43E-10	1.89E-09		
Ru-106	1.0214E-10	3.74	7.48	0.00E+00	3.82E-10	7.64E-10		
Se-79	1.3014E-05	3.74	7.48	0.00E+00	4.87E-05	9.74E-05		
Sn-126	1.2164E-05	3.74	7.48	0.00E+00	4.55E-05	9.10E-05		
Sr-90	1.2762E+00	3.74	7.48	0.00E+00	4.78E+00	9.55E+00		
Tc-99	4.4241E-04	3.74	7.48	0.00E+00	1.66E-03	3.31E-03		
Th-229	5.9684E-10	3.74	7.48	0.00E+00	2.23E-09	4.47E-09		
Th-230	9.3880E-11	3.74	7.48	0.00E+00	3.51E-10	7.03E-10		
Th-232	2.5278E-10	3.74	7.48	0.00E+00	9.46E-10	1.89E-09		
Ti-208	1.3723E-08	3.74	7.48	0.00E+00	5.14E-08	1.03E-07		
U-232	3.6932E-08	3.74	7.48	0.00E+00	1.38E-07	2.76E-07		
U-233	1.2224E-07	3.74	7.48	0.00E+00	4.57E-07	9.15E-07		
U-234	2.5714E-07	3.74	7.48	0.00E+00	9.62E-07	1.92E-06		
U-235	2.6194E-06	3.74	0.00	1.64E-04	1.54E-04	1.64E-04		
U-236	1.2695E-05	3.74	7.48	0.00E+00	4.75E-05	9.50E-05		
U-238	3.6331E-08	3.74	0.00	1.04E-04	1.03E-04	1.04E-04		
Y-90	1.2765E+00	3.74	7.48	0.00E+00	4.78E+00	9.55E+00		
Other Radionuclides					5.15E+00	1.03E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	LW AND U ZrC HYDRIDE	LW AND U ZrC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	19.792	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	3.74	1.15	
Bounding		7.48	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.29	0.31	
Bounding	0.57		0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD (ALUM) HANFORD
 SNF ID # 314
 Fuel Units & Descr 66 - ELEMENT
 Heavy Metal Mass BOL=12.342kg EOL=12.203kg
 ROD Storage Site HANFORD

¹Fuel decay start date 1987
 Estimates as of 2030
 Template TRIGA-AI (LW/U-Zrx Alum, 10 to 20%, U)
²Template Burnup(MWd) 6.65
 Template BOL Heavy Metal Mass (MT) 0.00018
 Template Decay Time 35 years

Estimated
 Canister usage
 18"x10"
 0.59

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1504E-09	421.00	842.00	0.00E+00	2.59E-06	5.18E-06	Avg MeV	
Am-241	4.8165E-03	421.00	842.00	0.00E+00	2.03E+00	4.06E+00	0.0150	5.939E+13
Am-242m	1.7383E-06	421.00	842.00	0.00E+00	7.32E-04	1.46E-03	0.0250	1.229E+13
Am-243	2.3263E-07	421.00	842.00	0.00E+00	9.79E-05	1.96E-04	0.0375	1.160E+13
C-14	4.3158E-05	421.00	842.00	0.00E+00	1.82E-02	3.63E-02	0.0675	1.169E+13
Cl-36	4.3023E-08	421.00	842.00	0.00E+00	1.81E-05	3.62E-05	0.0850	6.974E+12
Cm-243	1.3229E-07	421.00	842.00	0.00E+00	5.57E-05	1.11E-04	0.1250	6.024E+12
Cm-244	1.0000E-06	421.00	842.00	0.00E+00	4.21E-04	8.42E-04	0.2250	6.231E+12
Co-60	6.0120E-04	421.00	842.00	0.00E+00	2.53E-01	5.06E-01	0.3750	2.645E+12
Cs-134	4.3534E-06	421.00	842.00	0.00E+00	1.83E-03	3.67E-03	0.5750	4.356E+13
Cs-135	3.1549E-05	421.00	842.00	0.00E+00	1.33E-02	2.66E-02	0.8500	2.223E+12
Cs-137	1.3788E+00	421.00	842.00	0.00E+00	5.80E+02	1.16E+03	1.2500	2.181E+12
Eu-154	1.2041E-01	421.00	842.00	0.00E+00	5.07E+01	1.01E+02	1.7500	7.017E+10
Eu-155	6.6451E-03	421.00	842.00	0.00E+00	2.80E+00	5.60E+00	2.2500	1.384E+06
Fe-55	2.9338E-06	421.00	842.00	0.00E+00	1.24E-03	2.47E-03	2.7500	4.683E+05
H-3	2.0075E-03	421.00	842.00	0.00E+00	8.45E-01	1.69E+00	3.5000	1.133E+03
I-129	7.3805E-07	421.00	842.00	0.00E+00	3.11E-04	6.21E-04	5.0000	4.765E+02
Kr-85	3.6301E-02	421.00	842.00	0.00E+00	1.53E+01	3.06E+01	7.0000	5.372E+01
Np-237	1.4977E-06	421.00	842.00	0.00E+00	6.31E-04	1.26E-03	11.0000	6.105E+00
Pa-231	1.1275E-08	421.00	842.00	0.00E+00	4.75E-06	9.49E-06		
Pb-210	3.8932E-13	421.00	842.00	0.00E+00	1.64E-10	3.28E-10		
Pm-147	7.5383E-04	421.00	842.00	0.00E+00	3.17E-01	6.35E-01		
Pu-238	1.0668E-03	421.00	842.00	0.00E+00	4.49E-01	8.98E-01		
Pu-239	5.6902E-03	421.00	842.00	0.00E+00	2.40E+00	4.79E+00		
Pu-240	2.2571E-03	421.00	842.00	0.00E+00	9.50E-01	1.90E+00		
Pu-241	2.9699E-02	421.00	842.00	0.00E+00	1.25E+01	2.50E+01		
Pu-242	3.0602E-07	421.00	842.00	0.00E+00	1.29E-04	2.58E-04		
Ra-226	1.0704E-12	421.00	842.00	0.00E+00	4.51E-10	9.01E-10		
Ra-228	2.3654E-10	421.00	842.00	0.00E+00	9.96E-08	1.99E-07		
Ru-106	1.0444E-10	421.00	842.00	0.00E+00	4.40E-08	8.79E-08		
Se-79	1.2934E-05	421.00	842.00	0.00E+00	5.45E-03	1.09E-02		
Sn-126	1.2236E-05	421.00	842.00	0.00E+00	5.15E-03	1.03E-02		
Sr-90	1.2740E+00	421.00	842.00	0.00E+00	5.36E+02	1.07E+03		
Tc-99	4.4120E-04	421.00	842.00	0.00E+00	1.86E-01	3.71E-01		
Th-229	6.4226E-10	421.00	842.00	0.00E+00	2.70E-07	5.41E-07		
Th-230	1.0594E-10	421.00	842.00	0.00E+00	4.46E-08	8.92E-08		
Th-232	2.3744E-10	421.00	842.00	0.00E+00	1.00E-07	2.00E-07		
Th-208	1.5774E-08	421.00	842.00	0.00E+00	6.64E-06	1.33E-05		
U-232	4.2511E-08	421.00	842.00	0.00E+00	1.79E-05	3.58E-05		
U-233	1.3155E-07	421.00	842.00	0.00E+00	5.54E-05	1.11E-04		
U-234	3.0030E-07	421.00	842.00	0.00E+00	1.26E-04	2.53E-04		
U-235	-2.6144E-06	421.00	0.00	5.28E-03	4.18E-03	5.28E-03		
U-236	1.2720E-05	421.00	842.00	0.00E+00	5.36E-03	1.07E-02		
U-238	-3.8857E-08	421.00	0.00	3.33E-03	3.31E-03	3.33E-03		
Y-90	1.2744E+00	421.00	842.00	0.00E+00	5.37E+02	1.07E+03		
Other Radionuclides					6.41E+02	1.28E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19.786	10 to 20.1	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD 421.00	Estimated 132.30	
Bounding		842.00	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup assumed to be twice nominal burnup
Checks			
Nominal	Burnup Multiplier 0.92	Estimated Burnup/ Given Burnup 0.31	Estimated EOL HM/Given EOL HM 0.98
Bounding	1.85		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 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): 6 65
Template BOL Heavy Metal Mass (MT): 0 000195
Template Decay Time: 35 years

Estimated
Canister usage
18"x10"
0 81

II. Estimates		m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)	Avg. MeV
Ac-227	6 7038E-09	343 66	687 32	0 00E+00	2 30E-06	4 61E-06	0 0150	4 798E+13	0 0150
Am-241	3 9068E-03	343 66	687 32	0 00E+00	1 34E+00	2 69E+00	0 0250	9 969E+12	0 0375
Am-242m	1 2325E-06	343 66	687 32	0 00E+00	4 24E-04	8 47E-04	0 0375	8 660E+12	0 0575
Am-243	1 4732E-07	343 66	687 32	0 00E+00	5 06E-05	1 01E-04	0 0850	5 615E+12	0 1250
C-14	1 2824E-04	343 66	687 32	0 00E+00	4 41E-02	8 81E-02	0 2250	4 836E+12	0 3750
Cl-36	2 8120E-06	343 66	687 32	0 00E+00	9 66E-04	1 93E-03	0 3750	2 109E+12	0 5750
Cm-243	8 6556E-08	343 66	687 32	0 00E+00	2 97E-05	5 95E-05	0 8500	3 610E+11	1 2500
Cm-244	5 3835E-07	343 66	687 32	0 00E+00	1 85E-04	3 70E-04	1 7500	9 369E+09	0 3750
Co-60	2 4887E-02	343 66	687 32	0 00E+00	8 55E+00	1 71E+01	2 2500	7 678E+06	0 5750
Cs-134	3 8030E-06	343 66	687 32	0 00E+00	1 31E-03	2 61E-03	2 7500	3 528E+05	3 5000
Cs-135	3 2195E-05	343 66	687 32	0 00E+00	1 11E-02	2 21E-02	5 0000	3 658E+02	7 0000
Cs-137	1 3788E+00	343 66	687 32	0 00E+00	4 74E+02	9 48E+02	11 0000	4 695E+00	11 0000
Eu-154	1 3711E-03	343 66	687 32	0 00E+00	4 71E-01	9 42E-01			
Eu-155	4 4361E-04	343 66	687 32	0 00E+00	1 52E-01	3 05E-01			
Fe-55	2 6075E-04	343 66	687 32	0 00E+00	8 96E-02	1 79E-01			
H-3	2 0647E-03	343 66	687 32	0 00E+00	7 10E-01	1 42E+00			
I-129	7 3684E-07	343 66	687 32	0 00E+00	2 53E-04	5 06E-04			
Kr-85	3 6346E-02	343 66	687 32	0 00E+00	1 25E+01	2 50E+01			
Np-237	1 2844E-06	343 66	687 32	0 00E+00	4 41E-04	8 83E-04			
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			
Ti-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			

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20 00000115	10 to 20 1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	256 56	343 66	
Bounding		687 32	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 57	1 34	
Bounding	1 15		1 00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA STD 8/5/20 (HANFORD)
 SNF ID # 316
 Fuel Units & Descr 33 - ELEMENT
 Heavy Metal Mass BOL=6.316kg, EOL=6.316kg
 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) 6.65
 Template BOL Heavy Metal Mass (MT) 0.000195
 Template Decay Time 35 years

Estimated
 Canister usage
 18"x10"
 0.30

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.7038E-09	30.88	61.75	0.00E+00	2.07E-07	4.14E-07	Avg MeV	
Am-241	3.9068E-03	30.88	61.75	0.00E+00	1.21E-01	2.41E-01	0.0150	4.310E+12
Am-242m	1.2325E-06	30.88	61.75	0.00E+00	3.81E-05	7.61E-05	0.0250	8.956E+11
Am-243	1.4732E-07	30.88	61.75	0.00E+00	4.55E-06	9.10E-06	0.0375	7.781E+11
C-14	1.2824E-04	30.88	61.75	0.00E+00	3.96E-03	7.92E-03	0.0575	8.383E+11
Cl-36	2.8120E-06	30.88	61.75	0.00E+00	8.68E-05	1.74E-04	0.0850	5.044E+11
Cr-243	8.6556E-08	30.88	61.75	0.00E+00	2.67E-06	5.34E-06	0.1250	3.283E+11
Cr-244	5.3835E-07	30.88	61.75	0.00E+00	1.66E-05	3.32E-05	0.2250	4.345E+11
Co-60	2.4887E-02	30.88	61.75	0.00E+00	7.68E-01	1.54E+00	0.3750	1.895E+11
Cs-134	3.8030E-06	30.88	61.75	0.00E+00	1.17E-04	2.35E-04	0.5750	3.169E+12
Cs-135	3.2195E-05	30.88	61.75	0.00E+00	9.94E-04	1.99E-03	0.8500	3.243E+10
Cs-137	1.3788E+00	30.88	61.75	0.00E+00	4.26E+01	8.51E+01	1.2500	1.259E+11
Eu-154	1.3711E-03	30.88	61.75	0.00E+00	4.23E-02	8.47E-02	1.7500	8.418E+08
Eu-155	4.4361E-04	30.88	61.75	0.00E+00	1.37E-02	2.74E-02	2.2500	6.898E+05
Fe-55	2.6075E-04	30.88	61.75	0.00E+00	8.05E-03	1.61E-02	2.7500	3.172E+04
H-3	2.0647E-03	30.88	61.75	0.00E+00	6.37E-02	1.27E-01	3.5000	8.494E+01
I-129	7.3684E-07	30.88	61.75	0.00E+00	2.28E-05	4.55E-05	5.0000	3.583E+01
Kr-85	3.6346E-02	30.88	61.75	0.00E+00	1.12E+00	2.24E+00	7.0000	4.051E+00
Np-237	1.2844E-06	30.88	61.75	0.00E+00	3.97E-05	7.93E-05	11.0000	4.611E-01
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		
Ti-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		

Photon Energy Group	Total Photons/sec (bounding)
Avg MeV	
0.0150	4.310E+12
0.0250	8.956E+11
0.0375	7.781E+11
0.0575	8.383E+11
0.0850	5.044E+11
0.1250	3.283E+11
0.2250	4.345E+11
0.3750	1.895E+11
0.5750	3.169E+12
0.8500	3.243E+10
1.2500	1.259E+11
1.7500	8.418E+08
2.2500	6.898E+05
2.7500	3.172E+04
3.5000	8.494E+01
5.0000	3.583E+01
7.0000	4.051E+00
11.0000	4.611E-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	
Bounding		61.75	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	0.14	0.61	
Bounding	0.29		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

¹Fuel decay start date: 2035
 Estimates as of: 2030
 Template: Pathfinder (Light Water, SST, 60 to 100%, U)
²Template Burnup(MWd): 6 01
 Template BOL Heavy Metal Mass (MT): 0 00012882
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 2 26

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 9667E-09	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	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	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	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	4,565 72	0 00E+00	5 27E-01	1 05E+00	0 0575	1 718E+14
Ci-36	1 2261E-06	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	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	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	4,565 72	0 00E+00	8 35E+03	1 67E+04	0 3750	4 378E+13
Cs-134	7 2063E-02	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	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	4,565 72	0 00E+00	6 62E+03	1 32E+04	1 2500	1 240E+15
Eu-154	7 6123E-03	2,282 86	4,565 72	0 00E+00	1 71E+01	3 43E+01	1 7500	4 378E+11
Eu-155	4 5025E-02	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	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	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	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	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	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	4,565 72	0 00E+00	2 51E-05	5 02E-05		
Pb-210	8 0782E-15	2,282 86	4,565 72	0 00E+00	1 84E-11	3 69E-11		
Pm-147	3 2097E+00	2,282 86	4,565 72	0 00E+00	7 33E+03	1 47E+04		
Pu-238	3 7404E-04	2,282 86	4,565 72	0 00E+00	8 54E-01	1 71E+00		
Pu-239	6 6839E-04	2,282 86	4,565 72	0 00E+00	1 53E+00	3 05E+00		
Pu-240	8 7121E-05	2,282 86	4,565 72	0 00E+00	1 99E-01	3 98E-01		
Pu-241	3 0283E-03	2,282 86	4,565 72	0 00E+00	6 91E+00	1 38E+01		
Pu-242	1 9717E-09	2,282 86	4,565 72	0 00E+00	4 50E-06	9 00E-06		
Ra-226	7 3527E-14	2,282 86	4,565 72	0 00E+00	1 68E-10	3 36E-10		
Ra-228	6 0965E-12	2,282 86	4,565 72	0 00E+00	1 39E-08	2 78E-08		
Ru-106	1 6531E-01	2,282 86	4,565 72	0 00E+00	3 77E+02	7 55E+02		
Se-79	1 3228E-05	2,282 86	4,565 72	0 00E+00	3 02E-02	6 04E-02		
Sn-126	1 1494E-05	2,282 86	4,565 72	0 00E+00	2 62E-02	5 25E-02		
Sr-90	2 7854E+00	2,282 86	4,565 72	0 00E+00	6 36E+03	1 27E+04		
Tc-99	4 6656E-04	2,282 86	4,565 72	0 00E+00	1 07E+00	2 13E+00		
Th-229	2 9368E-12	2,282 86	4,565 72	0 00E+00	6 70E-09	1 34E-08		
Th-230	3 2662E-11	2,282 86	4,565 72	0 00E+00	7 46E-08	1 49E-07		
Th-232	8 3045E-12	2,282 86	4,565 72	0 00E+00	1 90E-08	3 79E-08		
Ti-208	2 6722E-08	2,282 86	4,565 72	0 00E+00	6 10E-05	1 22E-04		
U-232	7 7720E-08	2,282 86	4,565 72	0 00E+00	1 77E-04	3 55E-04		
U-233	2 9834E-09	2,282 86	4,565 72	0 00E+00	6 81E-06	1 36E-05		
U-234	3 5275E-07	2,282 86	4,565 72	0 00E+00	8 05E-04	1 61E-03		
U-235	-2 7761E-06	2,282 86	0 00	5 51E-02	4 88E-02	5 51E-02		
U-236	1 6190E-05	2,282 86	4,565 72	0 00E+00	3 70E-02	7 39E-02		
U-238	-2 8547E-09	2,282 86	0 00	3 20E-02	3 20E-02	3 20E-02		
Y-90	2 7870E+00	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.
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	SST	SST	
BOL Enrichment %	U	U	
	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		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name ANP
SNF ID # 451
Fuel Units & Descr: 9 - CONCENTRIC TUBES
Heavy Metal Mass BOL=1118kg EOL=1102kg
ROD Storage Site: INEEL

¹Fuel decay start date 1957
Estimates as of 2030
Template Pathfinder (Light Water, SST, 60 to 100% U)
²Template Burnup(MWd) 6.01
Template BOL Heavy Metal Mass (MT) 0.00012882
Template Decay Time 65 years

Estimated
Canister usage:
18"x10"
0.69

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	4.5940E-08	15.30	30.61	0.00E+00	7.03E-07	1.41E-06	0.0150	1.117E+12
Am-241	1.1471E-04	15.30	30.61	0.00E+00	1.76E-03	3.51E-03	0.0250	2.321E+11
Am-242m	7.4210E-09	15.30	30.61	0.00E+00	1.14E-07	2.27E-07	0.0375	2.017E+11
Am-243	9.8236E-10	15.30	30.61	0.00E+00	1.50E-08	3.01E-08	0.0575	2.164E+11
C-14	2.2928E-04	15.30	30.61	0.00E+00	3.51E-03	7.02E-03	0.0850	1.307E+11
Cl-36	1.2260E-06	15.30	30.61	0.00E+00	1.88E-05	3.75E-05	0.1250	8.478E+10
Cm-243	1.2000E-10	15.30	30.61	0.00E+00	1.84E-09	3.67E-09	0.2250	1.127E+11
Cm-244	7.3577E-10	15.30	30.61	0.00E+00	1.13E-08	2.25E-08	0.3750	4.915E+10
Co-60	1.3732E-03	15.30	30.61	0.00E+00	2.10E-02	4.20E-02	0.5750	8.267E+11
Cs-134	1.2709E-10	15.30	30.61	0.00E+00	1.94E-09	3.89E-09	0.8500	8.029E+09
Cs-135	3.0316E-05	15.30	30.61	0.00E+00	4.64E-04	9.28E-04	1.2500	5.811E+09
Cs-137	7.2579E-01	15.30	30.61	0.00E+00	1.11E+01	2.22E+01	1.7500	2.065E+08
Eu-154	5.9750E-05	15.30	30.61	0.00E+00	9.14E-04	1.83E-03	2.2500	3.906E+04
Eu-155	1.0577E-05	15.30	30.61	0.00E+00	1.62E-04	3.24E-04	2.7500	1.749E+04
Fe-55	4.1631E-07	15.30	30.61	0.00E+00	6.37E-06	1.27E-05	3.5000	1.968E+00
H-3	4.6722E-04	15.30	30.61	0.00E+00	7.15E-03	1.43E-02	5.0000	8.142E-01
I-129	7.3195E-07	15.30	30.61	0.00E+00	1.12E-05	2.24E-05	7.0000	9.017E-02
Kr-85	5.9418E-03	15.30	30.61	0.00E+00	9.09E-02	1.82E-01	11.0000	1.014E-02
Np-237	1.1499E-06	15.30	30.61	0.00E+00	1.76E-05	3.52E-05		
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		
Ti-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: This Template was used for the following reasons: This fuel matches on all parameters except cladding (SST is conservative)
Reactor Moderator	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
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: Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
	From SFD	Estimated	
Nominal		15.30	
Bounding		30.61	

Checks			Estimated EOL HM/Given EOL HM 1.00
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.29		
Bounding	0.59		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

Fuel decay start date,

1959

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"x10"

0 08

II. Estimates	m	X _n	X _b	b	Y _n	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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		
Ti-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		

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	
Bounding		57 43	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	2 50		
Bounding	5 00		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 ARKANSAS
SNF ID #: 7
Fuel Units & Descr: 3 - SCRAP
Heavy Metal Mass BOL=12.6kg EOL=11.895kg
ROD Storage Site INEEL

*Fuel decay start date: 1986
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"x10"
0.17

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	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		
Th-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	Thermal Power	
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:
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	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		

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	0.02	0.05	0.00E+00	4.57E-11	9.14E-11	Avg MeV	
Am-241	2.5251E-03	0.02	0.05	0.00E+00	5.75E-05	1.15E-04	0.0150	3.363E+09
Am-242m	3.9624E-07	0.02	0.05	0.00E+00	9.02E-09	1.80E-08	0.0250	6.965E+08
Am-243	1.4880E-06	0.02	0.05	0.00E+00	3.39E-08	6.78E-08	0.0375	6.054E+08
C-14	5.7053E-09	0.02	0.05	0.00E+00	1.30E-10	2.60E-10	0.0575	6.516E+08
Cl-36	1.3124E-32	0.02	0.05	0.00E+00	2.99E-34	5.98E-34	0.0850	3.937E+08
Cm-243	1.1419E-07	0.02	0.05	0.00E+00	2.60E-09	5.20E-09	0.1250	2.616E+08
Cm-244	1.6522E-05	0.02	0.05	0.00E+00	3.76E-07	7.52E-07	0.2250	3.469E+08
Co-60	7.4047E-07	0.02	0.05	0.00E+00	1.69E-08	3.37E-08	0.3750	1.475E+08
Cs-134	2.0455E-05	0.02	0.05	0.00E+00	4.66E-07	9.32E-07	0.5750	2.437E+09
Cs-135	3.4477E-06	0.02	0.05	0.00E+00	7.85E-08	1.57E-07	0.8500	2.977E+07
Cs-137	1.4365E+00	0.02	0.05	0.00E+00	3.27E-02	6.54E-02	1.2500	1.440E+07
Eu-154	7.3230E-03	0.02	0.05	0.00E+00	1.67E-04	3.33E-04	1.7500	8.103E+05
Eu-155	5.9259E-04	0.02	0.05	0.00E+00	1.35E-05	2.70E-05	2.2500	6.783E+01
Fe-55	2.2791E-06	0.02	0.05	0.00E+00	5.19E-08	1.04E-07	2.7500	6.471E+01
H-3	1.9698E-03	0.02	0.05	0.00E+00	4.49E-05	8.97E-05	3.5000	7.945E-02
I-129	7.5300E-07	0.02	0.05	0.00E+00	1.71E-08	3.43E-08	5.0000	3.301E-02
Kr-85	4.1176E-02	0.02	0.05	0.00E+00	9.38E-04	1.88E-03	7.0000	3.675E-03
Np-237	9.5752E-06	0.02	0.05	0.00E+00	2.18E-07	4.36E-07	11.0000	4.142E-04
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 %	91.8333333	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	0.02		
Bounding		0.05	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup assumed to be twice nominal burnup.

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name ARMF/CFRMF MARK I
 SNF ID # 9
 Fuel Units & Descr. 56 - 15 FLAT PLATES
 Heavy Metal Mass: BOL=11.29kg EOL=11.29kg
 ROD Storage Site SRS

¹Fuel decay start date 1991
 Estimates as of 2030
 Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
 Template BOL Heavy Metal Mass (MT) 0.00116689
 Template Decay Time 35 years

Estimated
 Canister usage
 18"x10"
 2.33

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	2.0068E-09	1.30	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
Cl-36	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		

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		

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/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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	0.03	0.29	0.00E+00	5.45E-11	5.76E-10	Avg MeV	
Am-241	2.5251E-03	0.03	0.29	0.00E+00	6.85E-05	7.25E-04	0.0150	2.116E+10
Am-242m	3.9624E-07	0.03	0.29	0.00E+00	1.08E-08	1.14E-07	0.0250	4.393E+09
Am-243	1.4880E-06	0.03	0.29	0.00E+00	4.04E-08	4.27E-07	0.0375	3.818E+09
C-14	5.7053E-09	0.03	0.29	0.00E+00	1.55E-10	1.64E-09	0.0575	4.110E+09
Cl-36	1.3124E-32	0.03	0.29	0.00E+00	3.56E-34	3.77E-33	0.0850	2.478E+09
Cm-243	1.1419E-07	0.03	0.29	0.00E+00	3.10E-09	3.28E-08	0.1250	1.638E+09
Cm-244	1.6522E-05	0.03	0.29	0.00E+00	4.48E-07	4.75E-06	0.2250	2.147E+09
Co-60	7.4047E-07	0.03	0.29	0.00E+00	2.01E-08	2.13E-07	0.3750	9.300E+08
Cs-134	2.0455E-05	0.03	0.29	0.00E+00	5.55E-07	5.87E-06	0.5750	1.537E+10
Cs-135	3.4477E-06	0.03	0.29	0.00E+00	9.36E-08	9.90E-07	0.8500	1.877E+08
Cs-137	1.4365E+00	0.03	0.29	0.00E+00	3.90E-02	4.13E-01	1.2500	9.080E+07
Eu-154	7.3230E-03	0.03	0.29	0.00E+00	1.99E-04	2.10E-03	1.7500	5.111E+06
Eu-155	5.9259E-04	0.03	0.29	0.00E+00	1.61E-05	1.70E-04	2.2500	4.274E+02
Fe-55	2.2791E-06	0.03	0.29	0.00E+00	6.19E-08	6.55E-07	2.7500	4.079E+02
H-3	1.9698E-03	0.03	0.29	0.00E+00	5.35E-05	5.66E-04	3.5000	2.809E-01
I-129	7.5300E-07	0.03	0.29	0.00E+00	2.04E-08	2.16E-07	5.0000	1.153E-01
Kr-85	4.1176E-02	0.03	0.29	0.00E+00	1.12E-03	1.18E-02	7.0000	1.268E-02
Np-237	9.5752E-06	0.03	0.29	0.00E+00	2.60E-07	2.75E-06	11.0000	1.418E-03
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-04	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		
Th-238	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ALUM	ALUM	
	U	U	
	93.22	60 to 100	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal Bounding	From SFD	Estimated	
	0.03 0.29		
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
Nominal Bounding	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0.00 0.00	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/CFRMP MARK II
SNF ID # 11
Fuel Units & Descr 8 - 15 FLAT PLATES
Heavy Metal Mass BOL=1 164kg, EOL=1 164kg
ROD Storage Site SRS

¹Fuel decay start date 1991
Estimates as of 2030
Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0 00116689
Template Decay Time 35 years

Estimated
Canister usage
18"x10"
0.33

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2 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	6 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		
U-236	1 5493E-05	0 13	1 42	0 00E+00	2 07E-06	2 19E-05		
U-238	-4 2851E-09	0 13	0 00	2 69E-05	2 69E-05	2 69E-05		
Y-90	1 3475E+00	0 13	1 42	0 00E+00	1 80E-01	1 91E+00		
Other Radionuclides					1 83E-01	1 94E+00		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate*
Nominal	0 13		
Bounding	1 42		

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-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+09
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		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.90E-04	1.96E-03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %:	U	U	
	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	0.12		Bounding burnup taken directly from SFD (converted to MWd)

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ATR
 SNF ID #: 15
 Fuel Units & Descr: 1576 - 19 CURVED PLATES
 Heavy Metal Mass: BOL=1818 704kg EOL=1313 754kg
 ROD Storage Site: SRS
 Fuel decay start date: 1985
 Estimates as of: 2030
 Template: ATR (Light Water, Alum, 60 to 100%, U)
 Template Burnup (MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x10"
 78 80

II. Estimates							Gamma Sources	
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-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	3.233E+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-06	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	
Bounding		961,559.72	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup assumed to be twice nominal burnup
Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.84	0.99	
Bounding	1.68		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: ATR
SNF ID #: 16
Fuel Units & Descr: 4132 - 19 CURVED PLATES
Heavy Metal Mass: BOL=4768 328kg, EOL=3705 991kg
ROD Storage Site: SRS

¹Fuel decay start date: 2035
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
206 60

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 4545E-10	1,017,446.76	2,034,893.51	0 00E+00	1 48E-04	2 96E-04	Avg MeV	
Am-241	1 1190E-03	1,017,446.76	2,034,893.51	0 00E+00	1 14E+03	2 28E+03	0 0150	3 926E+17
Am-242m	4 5425E-07	1,017,446.76	2,034,893.51	0 00E+00	4 62E-01	9 24E-01	0 0250	8 458E+16
Am-243	1 4921E-06	1,017,446.76	2,034,893.51	0 00E+00	1 52E+00	3 04E+00	0 0375	7 805E+16
C-14	5.7244E-09	1,017,446.76	2,034,893.51	0 00E+00	5 82E-03	1 16E-02	0 0575	7 674E+16
Cl-36	1 3124E-32	1,017,446.76	2,034,893.51	0 00E+00	1 34E-26	2 67E-26	0 0850	4 892E+16
Cm-243	2 3676E-07	1,017,446.76	2,034,893.51	0 00E+00	2 41E-01	4 82E-01	0 1250	4 237E+16
Cm-244	5 2042E-05	1,017,446.76	2,034,893.51	0 00E+00	5 30E+01	1 06E+02	0 2250	4 147E+16
Co-60	3 8208E-05	1,017,446.76	2,034,893.51	0 00E+00	3 89E+01	7 77E+01	0 3750	2 007E+16
Cs-134	4 8693E-01	1,017,446.76	2,034,893.51	0 00E+00	4 95E+05	9 91E+05	0 5750	2 757E+17
Cs-135	3 4477E-06	1,017,446.76	2,034,893.51	0 00E+00	3 51E+00	7 02E+00	0 8500	3 861E+16
Cs-137	2 8731E+00	1,017,446.76	2,034,893.51	0 00E+00	2 92E+06	5 85E+06	1 2500	7 183E+15
Eu-154	8 2053E-02	1,017,446.76	2,034,893.51	0 00E+00	8 35E+04	1 67E+05	1 7500	3 012E+14
Eu-155	3 9134E-02	1,017,446.76	2,034,893.51	0 00E+00	3 98E+04	7 96E+04	2 2500	6 318E+14
Fe-55	6.7429E-03	1,017,446.76	2,034,893.51	0 00E+00	6 86E+03	1 37E+04	2 7500	3 635E+12
H-3	1 0599E-02	1,017,446.76	2,034,893.51	0 00E+00	1 08E+04	2 16E+04	3 5000	4 031E+11
I-129	7 5300E-07	1,017,446.76	2,034,893.51	0 00E+00	7 66E-01	1 53E+00	5 0000	1 206E+06
Kr-85	2 8595E-01	1,017,446.76	2,034,893.51	0 00E+00	2 91E+05	5 82E+05	7 0000	1 344E+05
Np-237	9 5479E-06	1,017,446.76	2,034,893.51	0 00E+00	9 71E+00	1 94E+01	11 0000	1 515E+04
Pa-231	8 9297E-10	1,017,446.76	2,034,893.51	0 00E+00	9 09E-04	1 82E-03		
Pb-210	3 7609E-12	1,017,446.76	2,034,893.51	0 00E+00	3 83E-06	7 65E-06		
Pm-147	2 5452E+00	1,017,446.76	2,034,893.51	0 00E+00	2 59E+06	5 18E+06		
Pu-238	2 0550E-02	1,017,446.76	2,034,893.51	0 00E+00	2 09E+04	4 18E+04		
Pu-239	4 2838E-04	1,017,446.76	2,034,893.51	0 00E+00	4 36E+02	8 72E+02		
Pu-240	2 4401E-04	1,017,446.76	2,034,893.51	0 00E+00	2 48E+02	4 97E+02		
Pu-241	6 8764E-02	1,017,446.76	2,034,893.51	0 00E+00	7 00E+04	1 40E+05		
Pu-242	3 6329E-07	1,017,446.76	2,034,893.51	0 00E+00	3 70E-01	7 39E-01		
Ra-226	3 8045E-11	1,017,446.76	2,034,893.51	0 00E+00	3 87E-05	7 74E-05		
Ra-228	2 9902E-15	1,017,446.76	2,034,893.51	0 00E+00	3 04E-09	6 08E-09		
Ru-106	1 9055E-01	1,017,446.76	2,034,893.51	0 00E+00	1 94E+05	3 88E+05		
Se-79	1 2936E-05	1,017,446.76	2,034,893.51	0 00E+00	1 32E+01	2 63E+01		
Sn-126	1 1574E-05	1,017,446.76	2,034,893.51	0 00E+00	1 18E+01	2 36E+01		
Sr-90	2 7505E+00	1,017,446.76	2,034,893.51	0 00E+00	2 80E+06	5 60E+06		
Tc-99	4 2239E-04	1,017,446.76	2,034,893.51	0 00E+00	4 30E+02	8 60E+02		
Th-229	1 8848E-12	1,017,446.76	2,034,893.51	0 00E+00	1 92E-06	3 84E-06		
Th-230	1 7042E-08	1,017,446.76	2,034,893.51	0 00E+00	1 73E-02	3 47E-02		
Th-232	7 8132E-15	1,017,446.76	2,034,893.51	0 00E+00	7 95E-09	1 59E-08		
Tl-208	4 4063E-08	1,017,446.76	2,034,893.51	0 00E+00	4 48E-02	8 97E-02		
U-232	1 3151E-07	1,017,446.76	2,034,893.51	0 00E+00	1 34E-01	2 68E-01		
U-233	1 9564E-09	1,017,446.76	2,034,893.51	0 00E+00	1 99E-03	3 98E-03		
U-234	1 8371E-04	1,017,446.76	2,034,893.51	0 00E+00	1 87E+02	3 74E+02		
U-235	-2.7235E-06	1,017,446.76	0 00	9 60E+00	6 83E+00	9 60E+00		
U-236	1 5493E-05	1,017,446.76	2,034,893.51	0 00E+00	1 58E+01	3 15E+01		
U-238	-4.2851E-09	1,017,446.76	0 00	1 10E-01	1 05E-01	1 10E-01		
Y-90	2 7505E+00	1,017,446.76	2,034,893.51	0 00E+00	2 80E+06	5 60E+06		
Other Radionuclides					5.23E+06	1 05E+07		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							5.16E+04	1 03E+05
							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 %	93 154	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	1,017,446.76	1,006 053 94	
Bounding		2,034,893.51	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 68	0.99	
Bounding	1 36		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: ATR
SNF ID #: 843
Fuel Units & Descr 128 - 19 CURVED PLATES
Heavy Metal Mass BOL=147.712kg EOL=99 392kg
ROD Storage Site SRS

¹Fuel decay start date 1985
Estimates as of 2030
Template ATR (Light Water Alum 60 to 100% U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0 00116689
Template Decay Time 35 years

Estimated
Canister usage
18"x10"
6.40

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 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		
Ti-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	Thermal Power	
U-233	3 6275E-09	45,921 00	91,842 00	0 00E+00	1 67E-04	3 33E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
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	7 69E+02	1 54E+03
U-236	1 5493E-05	45,921 00	91,842 00	0 00E+00	7 11E-01	1 42E+00		
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

	From SFD	Used	Basis for Parameter Differences:
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

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	45 921 00	45 759 98	
Bounding		91 842 00	

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0 99	1 00	
Bounding	1 98		

1 03

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name BCD B-17 (TURKEY POINT 3)
SNF ID #: 19
Fuel Units & Descr: 1 - 15 X 15 ROD ARRAY
Heavy Metal Mass BOL=458 98kg; EOL=411 809kg
ROD Storage Site: INEEL

Fuel decay start date: 1975
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

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
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)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 0733E-09	44,857 39	89,714 78	0 00E+00	4 81E-05	9 63E-05	Avg MeV	
Am-241	1 4751E-01	44,857 39	89,714 78	0 00E+00	6 62E+03	1 32E+04	0 0150	3 414E+15
Am-242m	2 6809E-04	44,857 39	89,714 78	0 00E+00	1 20E+01	2 41E+01	0 0250	6 841E+14
Am-243	6 2484E-04	44,857 39	89,714 78	0 00E+00	2 80E+01	5 61E+01	0 0375	6 446E+14
C-14	4 7820E-05	44,857 39	89,714 78	0 00E+00	2 15E+00	4 29E+00	0 0575	8 066E+14
Cl-36	8 0297E-07	44,857 39	89,714 78	0 00E+00	3 60E-02	7 20E-02	0 0850	3 769E+14
Cm-243	1 7426E-04	44,857 39	89,714 78	0 00E+00	7 82E+00	1 56E+01	0 1250	2 508E+14
Cm-244	2 7616E-02	44,857 39	89,714 78	0 00E+00	1 24E+03	2 48E+03	0 2250	3 218E+14
Co-60	3 5610E-04	44,857 39	89,714 78	0 00E+00	1 60E+01	3 19E+01	0 3750	1 390E+14
Cs-134	2 6260E-07	44,857 39	89,714 78	0 00E+00	1 18E-02	2 36E-02	0 5750	3 273E+15
Cs-135	1 4433E-05	44,857 39	89,714 78	0 00E+00	6 47E-01	1 29E+00	0 8500	3 196E+13
Cs-137	9 8870E-01	44,857 39	89,714 78	0 00E+00	4 44E+04	8 87E+04	1 2500	2 033E+13
Eu-154	6 0320E-03	44,857 39	89,714 78	0 00E+00	2 71E+02	5 41E+02	1 7500	8 940E+11
Eu-155	2 1770E-04	44,857 39	89,714 78	0 00E+00	9 77E+00	1 95E+01	2 2500	1 469E+08
Fe-55	7 9296E-07	44,857 39	89,714 78	0 00E+00	3 56E-02	7 11E-02	2 7500	5 179E+08
H-3	8 9486E-03	44,857 39	89,714 78	0 00E+00	4 01E+02	8 03E+02	3 5000	3 695E+07
I-129	9 8288E-07	44,857 39	89,714 78	0 00E+00	4 41E-02	8 82E-02	5 0000	1 579E+07
Kr-85	1 0707E-02	44,857 39	89,714 78	0 00E+00	4 80E+02	9 61E+02	7 0000	1 819E+06
Np-237	1 1927E-05	44,857 39	89,714 78	0 00E+00	5 35E-01	1 07E+00	11 0000	2 089E+05
Pa-231	1 4703E-09	44,857 39	89,714 78	0 00E+00	6 60E-05	1 32E-04		
Pb-210	1 6828E-10	44,857 39	89,714 78	0 00E+00	7 55E-06	1 51E-05		
Pm-147	6 9606E-06	44,857 39	89,714 78	0 00E+00	3 12E-01	6 24E-01		
Pu-238	6 6263E-02	44,857 39	89,714 78	0 00E+00	2 97E+03	5 94E+03		
Pu-239	1 1618E-02	44,857 39	89,714 78	0 00E+00	5 21E+02	1 04E+03		
Pu-240	1 5142E-02	44,857 39	89,714 78	0 00E+00	6 79E+02	1 36E+03		
Pu-241	4 3766E-01	44,857 39	89,714 78	0 00E+00	1 96E+04	3 93E+04		
Pu-242	6 4260E-05	44,857 39	89,714 78	0 00E+00	2 88E+00	5 77E+00		
Ra-226	3 8501E-10	44,857 39	89,714 78	0 00E+00	1 73E-05	3 45E-05		
Ra-228	5 2955E-12	44,857 39	89,714 78	0 00E+00	2 38E-07	4 75E-07		
Ru-106	2 0413E-14	44,857 39	89,714 78	0 00E+00	9 16E-10	1 83E-09		
Se-79	1 2376E-05	44,857 39	89,714 78	0 00E+00	5 55E-01	1 11E+00		
Sn-126	2 5210E-05	44,857 39	89,714 78	0 00E+00	1 13E+00	2 26E+00		
Sr-90	6 4163E-01	44,857 39	89,714 78	0 00E+00	2 88E+04	5 76E+04		
Tc-99	3 9357E-04	44,857 39	89,714 78	0 00E+00	1 77E+01	3 53E+01		
Th-229	1 5644E-10	44,857 39	89,714 78	0 00E+00	7 02E-06	1 40E-05		
Th-230	2 7972E-08	44,857 39	89,714 78	0 00E+00	1 25E-03	2 51E-03		
Th-232	5 3036E-12	44,857 39	89,714 78	0 00E+00	2 38E-07	4 76E-07		
Th-208	1 5136E-07	44,857 39	89,714 78	0 00E+00	6 79E-03	1 36E-02		
U-232	4 1005E-07	44,857 39	89,714 78	0 00E+00	1 84E-02	3 68E-02		
U-233	2 5856E-08	44,857 39	89,714 78	0 00E+00	1 16E-03	2 32E-03		
U-234	5 2665E-05	44,857 39	89,714 78	0 00E+00	2 36E+00	4 72E+00		
U-235	-1 4487E-06	44,857 39	0 00	2 54E-02	0 00E+00	2 54E-02		
U-236	7 5888E-06	44,857 39	89,714 78	0 00E+00	3 40E-01	6 81E-01		
U-238	-2 6129E-07	44,857 39	0 00	1 50E-01	1 39E-01	1 50E-01		
Y-90	6 4180E-01	44,857 39	89,714 78	0 00E+00	2 88E+04	5 76E+04		
Other Radionuclides					4 27E+04	8 55E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ZIRC	ZIRC	
BOL Enrichment %	U	U	
	2.560002614	0 to 5	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	11,779 72	44 857 39	
Bounding		89 714 78	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	2 79	3 81	
Bounding	5 58		1 05

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name BER-II TRIGA (FLIP LEU 45/20) (GERMANY)
 SNF ID # 236
 Fuel Units & Descr 21 - 4 X 4 ROD ARRAY
 Heavy Metal Mass BOL=9 196kg EOL=9 192kg
 ROD Storage Site INEEL

¹Fuel decay start date 1982
 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 35 years

Estimated
 Canister usage
 18"x10"
 2 63

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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-06	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+11
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		
Ti-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		
U-236	1 2695E-05	22 40	9 41	0 00E+00	2 84E-04	1 19E-04		
U-238	3 6331E-08	22 40	0 00	1 73E-03	1 73E-03	1 73E-03		
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

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	This Template was used for the following reasons.
Fuel Cladding	SST	SST	This fuel matches on all parameters except enrichment.
BOL HM Constituents	U	U	
BOL Enrichment %	44 026	10 to 20 1	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	22 40	4 01	Nominal burnup taken directly from SFD (converted to MWd)
Bounding	9 41	8 02	Bounding burnup taken directly from SFD (converted to MWd)

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal	0 07	0 18	1 00
Bounding	0 03	0 85	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BMI (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 usage:
18"x10"
0.15

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5940E-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			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	10.12		1.02
Bounding:	10.12		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name BMI (CPI-38)
 SNF ID # 20
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL= , EOL=1.286kg
 ROD Storage Site: INEEL

¹Fuel decay start date 1961
 Estimates as of 2030
 Template Pathfinder (Light Water, SST, 60 to 100%, U)
²Template Burnup(MWd): 6 01
 Template BOL Heavy Metal Mass (MT) 0 00012882
 Template Decay Time 65 years

Estimated
 Canister usage
 18"x10"
 0 08

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	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	Thermal Power	
U-233	3 3344E-09	1,215 10	1,215 10	0 00E+00	4 05E-06	4 05E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	4 0749E-07	1,215 10	1,215 10	0 00E+00	4 95E-04	4 95E-04	9 89E+00	9 89E+00
U-235	-2 7761E-06	1,215 10	0 00	5 20E-03	1 82E-03	5 20E-03	Total	Total
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

	From SFD	Used	Basis for Parameter Differences
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons
Fuel Cladding	HASTELLOY	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

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		1,215 10	Nominal burnup set equal to bounding burnup
Bounding		1,215 10	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		

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

²Total burnup for all fuel associated with this worksheet must be 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	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4 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		
Se-79	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		
Ti-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		

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	
Bounding		2,230 88	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	1 09		
Bounding	2 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: 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

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	8.7758E-10	465.59	931.17	0.00E+00	4.09E-07	8.17E-07	Avg MeV	
Am-241	1.4352E-01	465.59	931.17	0.00E+00	6.68E+01	1.34E+02	0.0150	5.010E+13
Am-242m	2.8698E-04	465.59	931.17	0.00E+00	1.34E-01	2.67E-01	0.0250	1.010E+13
Am-243	6.2565E-04	465.59	931.17	0.00E+00	2.91E-01	5.83E-01	0.0375	9.636E+12
C-14	4.7901E-05	465.59	931.17	0.00E+00	2.23E-02	4.46E-02	0.0575	1.113E+13
Cl-36	8.0297E-07	465.59	931.17	0.00E+00	3.74E-04	7.48E-04	0.0850	5.606E+12
Cm-243	2.5081E-04	465.59	931.17	0.00E+00	1.17E-01	2.34E-01	0.1250	3.890E+12
Cm-244	4.9015E-02	465.59	931.17	0.00E+00	2.28E+01	4.56E+01	0.2250	4.807E+12
Co-60	2.5581E-03	465.59	931.17	0.00E+00	1.19E+00	2.38E+00	0.3750	2.067E+12
Cs-134	4.0536E-05	465.59	931.17	0.00E+00	1.89E-02	3.77E-02	0.5750	4.808E+13
Cs-135	1.4433E-05	465.59	931.17	0.00E+00	6.72E-03	1.34E-02	0.8500	6.651E+11
Cs-137	1.3979E+00	465.59	931.17	0.00E+00	6.51E+02	1.30E+03	1.2500	6.533E+11
Eu-154	2.0203E-02	465.59	931.17	0.00E+00	9.41E+00	1.88E+01	1.7500	1.957E+10
Eu-155	1.7684E-03	465.59	931.17	0.00E+00	8.23E-01	1.65E+00	2.2500	3.150E+06
Fe-55	4.3136E-05	465.59	931.17	0.00E+00	2.01E-02	4.02E-02	2.7500	6.455E+06
H-3	2.0769E-02	465.59	931.17	0.00E+00	9.67E+00	1.93E+01	3.5000	6.646E+05
I-129	9.8288E-07	465.59	931.17	0.00E+00	4.58E-04	9.15E-04	5.0000	2.842E+05
Kr-85	2.8214E-02	465.59	931.17	0.00E+00	1.31E+01	2.63E+01	7.0000	3.275E+04
Np-237	1.1218E-05	465.59	931.17	0.00E+00	5.22E-03	1.04E-02	11.0000	3.761E+03
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons.
Fuel Cladding	ZIRC	ZIRC	This fuel matches on all parameters except enrichment.
BOL HM Constituents	U	U	
BOL Enrichment %	28.57142857	0 to 5	

Burnup Summary (MWd)²

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	2.38		1.00
Bounding	4.75		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BR-3 FUEL
SNF ID #: 340
Fuel Units & Descr: 16 - ROD
Heavy Metal Mass: BOL=7 536kg; EOL=7 064kg
ROD Storage Site: INEEL

Fuel decay start date: 1994
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"x10"
0 12

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 7758E-10	448 85	897 70	0 00E+00	3 94E-07	7 88E-07	Avg MeV	
Am-241	1 4352E-01	448 85	897 70	0 00E+00	6 44E+01	1 29E+02	0 0150	4 830E+13
Am-242m	2 8698E-04	448 85	897 70	0 00E+00	1 29E-01	2 58E-01	0 0250	9 740E+12
Am-243	6 2565E-04	448 85	897 70	0 00E+00	2 81E-01	5 62E-01	0 0375	9 290E+12
C-14	4 7901E-05	448 85	897 70	0 00E+00	2 15E-02	4 30E-02	0 0575	1 073E+13
Cl-36	8 0297E-07	448 85	897 70	0 00E+00	3 60E-04	7 21E-04	0 0850	5 405E+12
Cm-243	2 5081E-04	448 85	897 70	0 00E+00	1 13E-01	2 25E-01	0 1250	3 750E+12
Cm-244	4 9015E-02	448 85	897 70	0 00E+00	2 20E+01	4 40E+01	0 2250	4 634E+12
Co-60	2 5581E-03	448 85	897 70	0 00E+00	1 15E+00	2 30E+00	0 3750	1 993E+12
Cs-134	4 0536E-05	448 85	897 70	0 00E+00	1 82E-02	3 64E-02	0 5750	4 635E+13
Cs-135	1 4433E-05	448 85	897 70	0 00E+00	6 48E-03	1 30E-02	0 8500	6 412E+11
Cs-137	1 3979E+00	448 85	897 70	0 00E+00	6 27E+02	1 25E+03	1 2500	6 299E+11
Eu-154	2 0203E-02	448 85	897 70	0 00E+00	9 07E+00	1 81E+01	1 7500	1 886E+10
Eu-155	1 7684E-03	448 85	897 70	0 00E+00	7 94E-01	1 59E+00	2 2500	3 037E+06
Fe-55	4 3136E-05	448 85	897 70	0 00E+00	1 94E-02	3 87E-02	2 7500	6 223E+06
H-3	2 0769E-02	448 85	897 70	0 00E+00	9 32E+00	1 86E+01	3 5000	6 407E+05
I-129	9 8288E-07	448 85	897 70	0 00E+00	4 41E-04	8 82E-04	5 0000	2 739E+05
Kr-85	2 8214E-02	448 85	897 70	0 00E+00	1 27E+01	2 53E+01	7 0000	3 157E+04
Np-237	1 1218E-05	448 85	897 70	0 00E+00	5 04E-03	1 01E-02	11 0000	3 626E+03
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		
Ti-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	Thermal Power	
U-234	5 0000E-05	448 85	897 70	0 00E+00	2 24E-02	4 49E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-1 4489E-06	448 85	0 00	1 35E-03	6 98E-04	1 35E-03	1 03E+01	2 06E+01
U-236	7 5824E-06	448 85	897 70	0 00E+00	3 40E-03	6 81E-03	Total	Total
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: This Template was used for the following reasons: This fuel matches PWR Template on all but one parameter (enrichment) making PWR a reasonable match
Reactor Moderator	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	8.280254777	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	293 90	448 85	
Bounding	316 51	897 70	

Checks			Estimated EOL HM/Given EOL HM 1 00
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	1 70	1 53	
Bounding	3 40	2 84	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name BRP-B
 SNF ID # 23
 Fuel Units & Descr. 2 - 11 X 11 ROD ARRAY
 Heavy Metal Mass BOL=262.681kg EOL=250.073kg
 ROD Storage Site INEEL

¹Fuel decay start date 1972
 Estimates as of 2030
 Template PWR (Light Water, Zirc, 0 to 5%, U)
²Template Burnup(MWd) 61.92
 Template BOL Heavy Metal Mass (MT) 0.00176911
 Template Decay Time 50 years

Estimated
 Canister usage:
 Bare Fuel Transfer

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-09	11,990.37	23,980.74	0.00E+00	1.29E-05	2.57E-05	Avg MeV	
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
Cl-36	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		
Ti-208	1.6136E-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:
Reactor Moderator: Fuel Cladding: BOL HM Constituents: BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ZIRC	ZIRC	
	U	U	
	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	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding	5.318.51	23.980.74	
Checks			Estimated EOL HM/Given EOL HM
Nominal Bounding	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	1.30	2.26	
	2.61	4.51	
			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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 0733E-09	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	11,722 29	0 00E+00	1 67E+03	1 73E+03	0 0150	4 460E+14
Am-242m	2 6809E-04	11,298 83	11,722 29	0 00E+00	3 03E+00	3 14E+00	0 0250	8 939E+13
Am-243	6 2484E-04	11,298 83	11,722 29	0 00E+00	7 06E+00	7 32E+00	0 0375	8 423E+13
C-14	4 7820E-05	11,298 83	11,722 29	0 00E+00	5 40E-01	5 61E-01	0 0575	1 054E+14
Cl-36	8 0297E-07	11,298 83	11,722 29	0 00E+00	9 07E-03	9 41E-03	0 0850	4 925E+13
Cm-243	1 7426E-04	11,298 83	11,722 29	0 00E+00	1 97E+00	2 04E+00	0 1250	3 276E+13
Cm-244	2 7616E-02	11,298 83	11,722 29	0 00E+00	3 12E+02	3 24E+02	0 2250	4 205E+13
Co-60	3 5610E-04	11,298 83	11,722 29	0 00E+00	4 02E+00	4 17E+00	0 3750	1 816E+13
Cs-134	2 6260E-07	11,298 83	11,722 29	0 00E+00	2 97E-03	3 08E-03	0 5750	4 276E+14
Cs-135	1 4433E-05	11,298 83	11,722 29	0 00E+00	1 63E-01	1 69E-01	0 8500	4 175E+12
Cs-137	9 8870E-01	11,298 83	11,722 29	0 00E+00	1 12E+04	1 16E+04	1 2500	2 657E+12
Eu-154	6 0320E-03	11,298 83	11,722 29	0 00E+00	6 82E+01	7 07E+01	1 7500	1 168E+11
Eu-155	2 1770E-04	11,298 83	11,722 29	0 00E+00	2 46E+00	2 55E+00	2 2500	1 920E+07
Fe-55	7 9296E-07	11,298 83	11,722 29	0 00E+00	8 96E-03	9 30E-03	2 7500	6 767E+07
H-3	8 9486E-03	11,298 83	11,722 29	0 00E+00	1 01E+02	1 05E+02	3 5000	4 828E+06
I-129	9 8288E-07	11,298 83	11,722 29	0 00E+00	1 11E-02	1 15E-02	5 0000	2 064E+06
Kr-85	1 0707E-02	11,298 83	11,722 29	0 00E+00	1 21E+02	1 26E+02	7 0000	2 377E+05
Np-237	1 1927E-05	11,298 83	11,722 29	0 00E+00	1 35E-01	1 40E-01	11 0000	2 730E+04
Pa-231	1 4703E-09	11,298 83	11,722 29	0 00E+00	1 66E-05	1 72E-05		
Pb-210	1 6828E-10	11,298 83	11,722 29	0 00E+00	1 90E-06	1 97E-06		
Pm-147	6 9606E-06	11,298 83	11,722 29	0 00E+00	7 86E-02	8 16E-02		
Pu-238	6 6263E-02	11,298 83	11,722 29	0 00E+00	7 49E+02	7 77E+02		
Pu-239	1 1618E-02	11,298 83	11,722 29	0 00E+00	1 31E+02	1 36E+02		
Pu-240	1 5142E-02	11,298 83	11,722 29	0 00E+00	1 71E+02	1 78E+02		
Pu-241	4 3766E-01	11,298 83	11,722 29	0 00E+00	4 95E+03	5 13E+03		
Pu-242	6 4260E-05	11,298 83	11,722 29	0 00E+00	7 26E-01	7 53E-01		
Ra-226	3 8501E-10	11,298 83	11,722 29	0 00E+00	4 35E-06	4 51E-06		
Ra-228	5 2955E-12	11,298 83	11,722 29	0 00E+00	5 98E-08	6 21E-08		
Ru-106	2 0413E-14	11,298 83	11,722 29	0 00E+00	2 31E-10	2 39E-10		
Se-79	1 2376E-05	11,298 83	11,722 29	0 00E+00	1 40E-01	1 45E-01		
Sn-126	2 5210E-05	11,298 83	11,722 29	0 00E+00	2 85E-01	2 96E-01		
Sr-90	6 4163E-01	11,298 83	11,722 29	0 00E+00	7 25E+03	7 52E+03		
Tc-99	3 9357E-04	11,298 83	11,722 29	0 00E+00	4 45E+00	4 61E+00		
Th-229	1 5644E-10	11,298 83	11,722 29	0 00E+00	1 77E-06	1 83E-06		
Th-230	2 7972E-08	11,298 83	11,722 29	0 00E+00	3 16E-04	3 28E-04		
Th-232	5 3036E-12	11,298 83	11,722 29	0 00E+00	5 99E-08	6 22E-08		
Ti-208	1 5136E-07	11,298 83	11,722 29	0 00E+00	1 71E-03	1 77E-03		
U-232	4 1005E-07	11,298 83	11,722 29	0 00E+00	4 63E-03	4 81E-03		
U-233	2 5856E-08	11,298 83	11,722 29	0 00E+00	2 92E-04	3 03E-04		
U-234	5 2665E-05	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	11,722 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	11,722 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

	From SFD	Used	Basis for Parameter Differences:
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

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	11,298 83	8 657 09	
Bounding	11 722 29	17,314 19	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0 69	0 77	
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

Fuel decay start date 1968
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

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 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+03	3 63E+03	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		
Ti-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:
Reactor Moderator:	From SFD	Used	
	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

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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		
Ti-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:
Reactor Moderator: Fuel Cladding: BOL HM Constituents: BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ZIRC	ZIRC	
	U	U	
	2 811	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
	1 061 91	15,685.20	
Bounding	1 641 46	31 370 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
Nominal	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	1.92	14 77	
Bounding	3.84	19 11	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-E
SNF ID # 27
Fuel Units & Descr 18 - 9 X 9 ROD ARRAY
Heavy Metal Mass BOL=2443 466kg EOL=2420.588kg
ROD Storage Site INEEL

¹Fuel decay start date 1972
Estimates as of 2030
Template PWR (Light Water, Zirc, 0 to 5%, U)
²Template Burnup(MWd): 61 92
Template BOL Heavy Metal Mass (MT) 0 00176911
Template Decay Time 50 years

Estimated
Canister usage*
Bare Fuel Transfer

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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		
U-236	7 5888E-06	29,160 32	33,700 28	0 00E+00	2 21E-01	2 56E-01		
U-238	-2 6129E-07	29,160 32	0 00	7 97E-01	7 89E-01	7 97E-01		
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*
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ZIRC	ZIRC	
BOL Enrichment %	U	U	
	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	
Bounding	33 700 28	43 511 79	
			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	0.34	0.75	
Bounding	0.39	1.29	
			1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 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		
Ti-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		

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	
	3 513	0 to 5	

Burnup Summary (MWd) ³			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 burnup assumed to be twice nominal burnup
Bounding	83,858 44	280 870 16	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 88	2 31	1 00
Bounding	1 76	3 35	

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-EQF
SNF ID # 1081
Fuel Units & Descr 4 - 9 X 9 ROD ARRAY
Heavy Metal Mass BOL=553.686kg EOL=541 107kg
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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-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
Cl-36	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	7.8296E-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		
Ti-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:
Reactor Moderator	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ZIRC	ZIRC	
	U	U	
BOL HM Constituents	3.478	0 to 5	
BOL Enrichment %			

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
	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
Nominal	Burnup Multiplier	Estimated Burnup/Given Burnup	
	0.62	1.40	
Bounding	1.23	2.79	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: BRP-EP
 SNF ID #: 29
 Fuel Units & Descr: 3 - 9 X 9 ROD ARRAY
 Heavy Metal Mass BOL=369.99kg, EOL=351.853kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1974
 Estimates as of: 2030
 Template: (Worst Case)
²Template Burnup(MWd): 62.5
 Template BOL Heavy Metal Mass (MT): 0.00186865
 Template Decay Time: 50 years

Estimated
 Canister usage:
 Bare Fuel Transfer

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	2.5200E-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-254	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			
Ti-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

	From SFD	Used	Basis for Parameter Differences: This fuel didn't closely match any existing templates, therefore the worst case template was used.
Reactor Moderator:	LIGHT WATER	(Worst Case)	
Fuel Cladding	ZIRC	SST/Inconel	
BOL HM Constituents	Pu and U	U, Th, & Pu	
BOL Enrichment %	0.7	0 to 100	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Nominal	6.607.65	17,236.64	
Bounding	7.131.56	34,473.28	

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name BRP-F
SNF ID # 30
Fuel Units & Descr. 13 - 9 X 9 ROD ARRAY
Heavy Metal Mass BOL=1799 104kg EOL=1756 759kg
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
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	CI/MWd From Template	Nominal 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	40,268 00	80,535 99	0 00E+00	4.32E-05	8 64E-05	0 0150	3 064E+15
Am-241	1.4751E-01	40,268 00	80,535 99	0 00E+00	5 94E+03	1 19E+04	0 0250	6 141E+14
Am-242m	2 6809E-04	40,268 00	80,535 99	0 00E+00	1.08E+01	2 16E+01	0 0375	5 787E+14
Am-243	6.2484E-04	40,268 00	80,535 99	0 00E+00	2.52E+01	5 03E+01	0 0575	7.241E+14
C-14	4 7820E-05	40,268 00	80,535 99	0 00E+00	1.93E+00	3 85E+00	0 0850	3.383E+14
Ct-36	8 0297E-07	40,268 00	80,535 99	0 00E+00	3.23E-02	6.47E-02	0 1250	2.251E+14
Cm-243	1 7426E-04	40,268 00	80,535 99	0 00E+00	7.02E+00	1 40E+01	0.2250	2.889E+14
Cm-244	2 7616E-02	40,268 00	80,535 99	0 00E+00	1 11E+03	2.22E+03	0 3750	1.248E+14
Co-60	3 5610E-04	40,268 00	80,535 99	0 00E+00	1 43E+01	2.87E+01	0 5750	2 938E+15
Cs-134	2 6260E-07	40,268 00	80,535 99	0 00E+00	1 06E-02	2 11E-02	0 8500	2.869E+13
Cs-135	1 4433E-05	40,268 00	80,535 99	0 00E+00	5 81E-01	1.16E+00	1.2500	1.825E+13
Cs-137	9 8870E-01	40,268 00	80,535 99	0 00E+00	3 98E+04	7 96E+04	1.7500	8 025E+11
Eu-154	6 0320E-03	40,268 00	80,535 99	0 00E+00	2 43E+02	4 86E+02	2.2500	1.319E+08
Eu-155	2 1770E-04	40,268 00	80,535 99	0 00E+00	8 77E+00	1 75E+01	2 7500	4 649E+08
Fe-55	7 9296E-07	40,268 00	80,535 99	0 00E+00	3 19E-02	6 39E-02	3 5000	3 317E+07
H-3	8 9486E-03	40,268 00	80,535 99	0 00E+00	3 60E+02	7 21E+02	5 0000	1 418E+07
I-129	9 8288E-07	40,268 00	80,535 99	0 00E+00	3 96E-02	7 92E-02	7 0000	1 633E+06
Kr-85	1 0707E-02	40,268 00	80,535 99	0 00E+00	4 31E+02	8 62E+02	11 0000	1 875E+05
Np-237	1.1927E-05	40,268 00	80,535 99	0 00E+00	4 80E-01	9 61E-01		
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		
Ti-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		
U-235	-1.4487E-06	40,268 00	0 00	1.37E-01	7.83E-02	1.37E-01		
U-236	7 5888E-06	40,268 00	80,535 99	0 00E+00	3 06E-01	6 11E-01		
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
Reactor Moderator	From SFD	Used	
	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	25 797 35	80,535 99	Bounding burnup assumed to be twice nominal burnup
Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 64	2 13	
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

Fuel decay start date: 1974
Estimates as of: 2030
Template: PWR (Light Water, Zinc 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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 0733E-09	5,489 09	10,978 18	0 00E+00	5 89E-06	1 18E-05	Avg MeV	
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 932E+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		
Ti-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		

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	4,193 24	10,978 18	Bounding burnup assumed to be twice nominal burnup

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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.4276E-08	13,290.34	26,580.68	0.00E+00	4.56E-04	9.11E-04	Avg MeV	
Am-241	1.1458E-04	13,290.34	26,580.68	0.00E+00	1.52E+00	3.05E+00	0.0150	1.386E+15
Am-242m	7.9468E-09	13,290.34	26,580.68	0.00E+00	1.06E-04	2.11E-04	0.0250	2.880E+14
Am-243	9.8386E-10	13,290.34	26,580.68	0.00E+00	1.31E-05	2.62E-05	0.0375	2.497E+14
C-14	2.2978E-04	13,290.34	26,580.68	0.00E+00	3.05E+00	6.11E+00	0.0575	2.686E+14
Cl-36	1.2261E-06	13,290.34	26,580.68	0.00E+00	1.63E-02	3.26E-02	0.0850	1.622E+14
Cm-243	1.7271E-10	13,290.34	26,580.68	0.00E+00	2.30E-06	4.59E-06	0.1250	1.053E+14
Cm-244	1.3058E-09	13,290.34	26,580.68	0.00E+00	1.74E-05	3.47E-05	0.2250	1.398E+14
Co-60	9.8636E-03	13,290.34	26,580.68	0.00E+00	1.31E+02	2.62E+02	0.3750	6.099E+13
Cs-134	1.9617E-08	13,290.34	26,580.68	0.00E+00	2.61E-04	5.21E-04	0.5750	1.015E+15
Cs-135	3.0316E-05	13,290.34	26,580.68	0.00E+00	4.03E-01	8.06E-01	0.8500	1.003E+13
Cs-137	1.0263E+00	13,290.34	26,580.68	0.00E+00	1.36E+04	2.73E+04	1.2500	2.283E+13
Eu-154	2.0017E-04	13,290.34	26,580.68	0.00E+00	2.66E+00	5.32E+00	1.7500	2.581E+11
Eu-155	8.5957E-05	13,290.34	26,580.68	0.00E+00	1.14E+00	2.28E+00	2.2500	1.308E+08
Fe-55	2.2646E-05	13,290.34	26,580.68	0.00E+00	3.01E-01	6.02E-01	2.7500	1.782E+07
H-3	1.0835E-03	13,290.34	26,580.68	0.00E+00	1.44E+01	2.88E+01	3.5000	2.250E+03
I-129	7.3195E-07	13,290.34	26,580.68	0.00E+00	9.73E-03	1.95E-02	5.0000	9.405E+02
Kr-85	1.5661E-02	13,290.34	26,580.68	0.00E+00	2.08E+02	4.16E+02	7.0000	1.053E+02
Np-237	1.1494E-06	13,290.34	26,580.68	0.00E+00	1.53E-02	3.06E-02	11.0000	1.191E+01
Pa-231	5.8070E-08	13,290.34	26,580.68	0.00E+00	7.72E-04	1.54E-03		
Pb-210	1.2985E-12	13,290.34	26,580.68	0.00E+00	1.73E-08	3.45E-08		
Pm-147	2.2196E-05	13,290.34	26,580.68	0.00E+00	2.95E-01	5.90E-01		
Pu-238	2.6223E-04	13,290.34	26,580.68	0.00E+00	3.49E+00	6.97E+00		
Pu-239	6.6739E-04	13,290.34	26,580.68	0.00E+00	8.87E+00	1.77E+01		
Pu-240	8.6705E-05	13,290.34	26,580.68	0.00E+00	1.15E+00	2.30E+00		
Pu-241	3.4759E-04	13,290.34	26,580.68	0.00E+00	4.62E+00	9.24E+00		
Pu-242	1.9717E-09	13,290.34	26,580.68	0.00E+00	2.62E-05	5.24E-05		
Ra-226	3.0000E-12	13,290.34	26,580.68	0.00E+00	3.99E-08	7.97E-08		
Ra-228	8.3328E-12	13,290.34	26,580.68	0.00E+00	1.11E-07	2.21E-07		
Ru-106	6.1464E-15	13,290.34	26,580.68	0.00E+00	8.17E-11	1.63E-10		
Se-79	1.3221E-05	13,290.34	26,580.68	0.00E+00	1.76E-01	3.51E-01		
Sn-126	1.1491E-05	13,290.34	26,580.68	0.00E+00	1.53E-01	3.05E-01		
Sr-90	9.5541E-01	13,290.34	26,580.68	0.00E+00	1.27E+04	2.54E+04		
Tc-99	4.6656E-04	13,290.34	26,580.68	0.00E+00	6.20E+00	1.24E+01		
Th-229	1.9085E-11	13,290.34	26,580.68	0.00E+00	2.54E-07	5.07E-07		
Th-230	2.1913E-10	13,290.34	26,580.68	0.00E+00	2.91E-06	5.82E-06		
Th-232	8.3478E-12	13,290.34	26,580.68	0.00E+00	1.11E-07	2.22E-07		
Ti-208	1.8752E-08	13,290.34	26,580.68	0.00E+00	2.49E-04	4.98E-04		
U-232	5.0782E-08	13,290.34	26,580.68	0.00E+00	6.75E-04	1.35E-03		
U-233	3.2596E-09	13,290.34	26,580.68	0.00E+00	4.33E-05	8.66E-05		
U-234	3.9817E-07	13,290.34	26,580.68	0.00E+00	5.29E-03	1.06E-02		
U-235	-2.7761E-06	13,290.34	0.00	3.53E-02	0.00E+00	3.53E-02		
U-236	1.6190E-05	13,290.34	26,580.68	0.00E+00	2.15E-01	4.30E-01		
U-238	-2.8547E-09	13,290.34	0.00	1.32E-01	1.32E-01	1.32E-01		
Y-90	9.5557E-01	13,290.34	26,580.68	0.00E+00	1.27E+04	2.54E+04		
Other Radionuclides					1.62E+04	3.24E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LIGHT WATER	LIGHT WATER
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	4.00000037	60 to 100

Basis for Parameter Differences:

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

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	13,139.89	13,290.34
Bounding		26,580.68

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	0.70	1.01
Bounding	1.40	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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		
Ti-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		
U-234	2.3440E-03	24.54	49.08	0.00E+00	5.75E-02	1.15E-01		
U-235	-2.3296E-06	24.54	0.00	2.47E-03	2.42E-03	2.47E-03		
U-236	2.6620E-05	24.54	49.08	0.00E+00	6.53E-04	1.31E-03		
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)
 SNF ID # 42
 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

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2 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		
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

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	FAST	(Worst Case)	
Fuel Cladding	ALUM	SST/Inconel	This fuel didn't closely match any existing templates, therefore the worst case template was used
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

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	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		
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	
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

*Fuel decay start date 1979
Estimates as of 2030
Template (Worst Case)
*Template Burnup(MWd) 62.5
Template BOL Heavy Metal Mass (MT) 0.00186865
Template Decay Time 50 years

Estimated
Canister usage
18"x10"
0.08

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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		
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:
Reactor Moderator	From SFD	Used	
Fuel Cladding	FAST	(Worst Case)	This fuel didn't closely match any existing templates, therefore the worst case template was used.
BOL HM Constituents	ZIRC	SST/Inconel	
BOL Enrichment %	Other	U, Th, & Pu	
		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		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: DRCT
SNF ID #: 701
Fuel Units & Descr: 2856 - ROD
Heavy Metal Mass: BOL=6338 892kg, EOL=6144 97kg
ROD Storage Site: INEEL

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"
3 50

II. Estimates	c	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)	
Ac-227	8 7758E-10	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:
Reactor Moderator:	From SFD	Used	
	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	
Bounding	224 650 33	368 822 06	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 84	0 99	
Bounding	1 01	1 64	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 DRCY
SNF ID # 756
Fuel Units & Descr 6936 - ROD
Heavy Metal Mass BOL=15512 364kg EOL=15006 036kg
ROD Storage Site INEEL

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"
8 50

II. Estimates							Gamma Sources	
	m	x _n	x _b	b	y _n	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	8 7758E-10	481,493 98	962,987 96	0 00E+00	4 23E-04	8 45E-04	0 0150	5 181E+16
Am-241	1 4352E-01	481,493 98	962,987 96	0 00E+00	6 91E+04	1 38E+05	0 0250	1 045E+16
Am-242m	2 8698E-04	481,493 98	962,987 96	0 00E+00	1 38E+02	2 76E+02	0 0375	9 965E+15
Am-243	6 2565E-04	481,493 98	962,987 96	0 00E+00	3 01E+02	6 02E+02	0 0575	1 151E+16
C-14	4 7901E-05	481,493 98	962,987 96	0 00E+00	2 31E+01	4 61E+01	0 0850	5 798E+15
Cl-36	8 0297E-07	481,493 98	962,987 96	0 00E+00	1 21E+02	2 42E+02	0 1250	4 023E+15
Cm-243	2 5081E-04	481,493 98	962,987 96	0 00E+00	2 36E+04	4 72E+04	0 2250	4 971E+15
Cm-244	4 9015E-02	481,493 98	962,987 96	0 00E+00	1 23E+03	2 46E+03	0 3750	2 138E+15
Co-60	2 5581E-03	481,493 98	962,987 96	0 00E+00	1 95E+01	3 90E+01	0 5750	4 972E+16
Cs-134	4 0536E-05	481,493 98	962,987 96	0 00E+00	6 95E+00	1 39E+01	0 8500	6 879E+14
Cs-135	1 4433E-05	481,493 98	962,987 96	0 00E+00	6 73E+05	1 35E+06	1 2500	6 757E+14
Cs-137	1 3979E+00	481,493 98	962,987 96	0 00E+00	9 73E+03	1 95E+04	1 7500	2 023E+13
Eu-154	2 0203E-02	481,493 98	962,987 96	0 00E+00	8 51E+02	1 70E+03	2 2500	3 258E+09
Eu-155	1 7684E-03	481,493 98	962,987 96	0 00E+00	2 08E+01	4 15E+01	2 7500	6 675E+09
Fe-55	4 3136E-05	481,493 98	962,987 96	0 00E+00	1 00E+04	2 00E+04	3 5000	6 873E+08
H-3	2 0769E-02	481,493 98	962,987 96	0 00E+00	4 73E-01	9 47E-01	5 0000	2 939E+08
I-129	9 8288E-07	481,493 98	962,987 96	0 00E+00	1 36E+04	2 72E+04	7 0000	3 387E+07
Kr-85	2 8214E-02	481,493 98	962,987 96	0 00E+00	5 40E+00	1 08E+01	11 0000	3 890E+06
Np-237	1 1218E-05	481,493 98	962,987 96	0 00E+00	6 28E-04	1 26E-03		
Pa-231	1 3036E-09	481,493 98	962,987 96	0 00E+00	4 10E-05	8 19E-05		
Pb-210	8 5078E-11	481,493 98	962,987 96	0 00E+00	1 76E+02	3 52E+02		
Pm-147	3 6531E-04	481,493 98	962,987 96	0 00E+00	3 59E+04	7 18E+04		
Pu-238	7 4564E-02	481,493 98	962,987 96	0 00E+00	5 60E+03	1 12E+04		
Pu-239	1 1623E-02	481,493 98	962,987 96	0 00E+00	7 29E+03	1 46E+04		
Pu-240	1 5132E-02	481,493 98	962,987 96	0 00E+00	4 34E+05	8 67E+05		
Pu-241	9 0036E-01	481,493 98	962,987 96	0 00E+00	3 09E+01	6 19E+01		
Pu-242	6 4260E-06	481,493 98	962,987 96	0 00E+00	1 10E-04	2 20E-04		
Ra-226	2 2804E-10	481,493 98	962,987 96	0 00E+00	2 54E-06	5 08E-06		
Ra-228	5 2713E-12	481,493 98	962,987 96	0 00E+00	2 94E-04	5 89E-04		
Ru-106	6 1160E-10	481,493 98	962,987 96	0 00E+00	5 96E+00	1 19E+01		
Se-79	1 2377E-05	481,493 98	962,987 96	0 00E+00	1 21E+01	2 43E+01		
Sn-126	2 5210E-05	481,493 98	962,987 96	0 00E+00	4 41E+05	8 83E+05		
Sr-90	9 1667E-01	481,493 98	962,987 96	0 00E+00	1 90E+02	3 79E+02		
Tc-99	3 9357E-04	481,493 98	962,987 96	0 00E+00	5 81E-05	1 16E-04		
Th-229	1 2057E-10	481,493 98	962,987 96	0 00E+00	1 01E-02	2 03E-02		
Th-230	2 1043E-08	481,493 98	962,987 96	0 00E+00	2 55E-06	5 10E-06		
Th-232	5 2972E-12	481,493 98	962,987 96	0 00E+00	8 41E-02	1 68E-01		
Ti-208	1 7474E-07	481,493 98	962,987 96	0 00E+00	2 28E-01	4 56E-01		
U-232	4 7368E-07	481,493 98	962,987 96	0 00E+00	1 21E-02	2 42E-02		
U-233	2 5097E-08	481,493 98	962,987 96	0 00E+00	2 41E+01	4 81E+01		
U-234	5 0000E-05	481,493 98	962,987 96	0 00E+00	2 83E-01	9 81E-01		
U-235	1 4489E-06	481,493 98	0 00	9 81E-01	3 65E+00	7 30E+00		
U-236	7 5824E-06	481,493 98	962,987 96	0 00E+00	4 94E+00	5 06E+00		
U-238	2 6129E-07	481,493 98	0 00	5 06E+00	4 42E+05	8 83E+05		
Y-90	9 1699E-01	481,493 98	962,987 96	0 00E+00	6 46E+05	1 29E+06		

Thermal Power
Nominal Heat Output (Watts)
Bounding Heat Output (Watts)
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 %	2 925317534	0 to 5

Basis for Parameter Differences*

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	454 977 64	481 493 98
Bounding	549 758 18	962 987 96

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 89	1 06
Bounding	1 77	1 75

Estimated EOL HM/Given EOL HM

1 00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator: Fuel Cladding: BOL HM Constituents: BOL Enrichment %:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ZIRC	ZIRC	
	U	U	
	1 50044843	0 to 5	

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

Checks			Estimated EOL HM/Given EOL HM
Nominal Bounding	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0 40	1 02	
	0 80		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 DRESDEN I (UN0064)
SNF ID #: 47
Fuel Units & Descr 1 - 6 X 6 ROD ARRAY
Heavy Metal Mass BOL=58 847kg EOL=57.281kg
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

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	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+13
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	2.968E+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

	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

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	823.86	1,489.19
Bounding		2,978.38

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.72	1.81
Bounding	1.45	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: DRESII HBR, BR-3, BRP, TMI
SNF ID #: 50
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= , EOL=19 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

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 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
Cl-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		
Th-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	Thermal Power	
U-233	2 5856E-08	18,646.28	18,646.28	0 00E+00	4 82E-04	4 82E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	5 2665E-05	18,646.28	18,646.28	0 00E+00	9 82E-01	9 82E-01	3 37E+02	3 37E+02
U-235	-1 4487E-06	18,646.28	0 00	2 71E-03	0 00E+00	2 71E-03	Total	Total
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:
Reactor Moderator	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	Fuel Cladding	ZIRC	
	BOL HM Constituents	U	
BOL Enrichment %		0 to 5	This fuel matches on all parameters except enrichment (unknown)

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
		18 646.28	
Bounding		18 646.28	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	
	13 58		
Bounding	13 58		1 58

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

III. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-12	833.80	1,563.38	0.00E+00	5.15E-09	9.67E-09	Avg MeV	
Am-241	1.1066E-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		
Ti-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	Thermal Power	
U-233	5.7451E-10	833.80	1,563.38	0.00E+00	4.79E-07	8.98E-07	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	4.3044E-06	833.80	1,563.38	0.00E+00	3.59E-03	6.73E-03	2.03E+01	3.24E+01
U-235	-7.7765E-09	833.80	0.00	3.39E-05	2.74E-05	3.39E-05	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
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	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown)

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

Checks			Estimated EOL HM/Grven EOL HM
	Burnup Multiplier	Estimated Burnup/Grven Burnup	
Nominal	0.53		
Bounding	0.99		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 EXPR
SNF ID #: 364
Fuel Units & Descr: 992 - ROD
Heavy Metal Mass: BOL= , EOL=92 454kg
ROD Storage Site: INEEL

Fuel decay start date: 1994
Estimates as of 2030
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
Template Burnup (MWd): 5011.2
Template BOL Heavy Metal Mass (MT): 0 0329181
Template Decay Time 35 years

Estimated
Canister usage:
18"x10"
4 96

II. Estimates	m	x _n	x _o	b	y _n	y _o	Gamma Sources	
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6 1822E-12	8,040 82	20,102 04	0 00E+00	4 97E-08	1 24E-07	Avg MeV	
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 88E-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	2.545E+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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)¹

	From SFD	Estimated	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
Nominal		8,040 82	
Bounding		20 102 04	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 1 00
Nominal	0 53		
Bounding	1 31		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name EBR-II OXIDE FUEL EXPR
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

II. Estimates		m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)	Avg MeV
Ac-227	6.1822E-12	4,956.09	12,390.22	0.00E+00	3.06E-08	7.66E-08	0.0150	4.045E+14	
Am-241	1.1066E-01	4,956.09	12,390.22	1.19E+02	6.68E+02	1.49E+03	0.0250	8.058E+13	
Am-242m	1.9247E-03	4,956.09	12,390.22	0.00E+00	9.54E+00	2.38E+01	0.0375	9.362E+13	
Am-243	1.0740E-04	4,956.09	12,390.22	0.00E+00	5.32E-01	1.33E+00	0.0575	9.306E+13	
C-14	2.6042E-05	4,956.09	12,390.22	0.00E+00	1.29E-01	3.23E-01	0.0850	4.484E+13	
Cl-36	3.4243E-10	4,956.09	12,390.22	0.00E+00	1.70E-06	4.24E-06	0.1250	3.155E+13	
Cm-243	4.0629E-04	4,956.09	12,390.22	0.00E+00	2.01E+00	5.03E+00	0.2250	3.619E+13	
Cm-244	1.6024E-03	4,956.09	12,390.22	0.00E+00	7.94E+00	1.99E+01	0.3750	1.569E+13	
Co-60	3.4275E-03	4,956.09	12,390.22	0.00E+00	1.70E+01	4.25E+01	0.5750	6.355E+14	
Cs-134	1.5566E-03	4,956.09	12,390.22	0.00E+00	7.71E+00	1.93E+01	0.8500	6.640E+12	
Cs-135	4.7693E-05	4,956.09	12,390.22	0.00E+00	2.36E-01	5.91E-01	1.2500	7.948E+12	
Cs-137	1.4007E+00	4,956.09	12,390.22	0.00E+00	6.94E+03	1.74E+04	1.7500	1.798E+11	
Eu-154	1.6184E-02	4,956.09	12,390.22	0.00E+00	8.02E+01	2.01E+02	2.2500	3.591E+07	
Eu-155	1.3774E-02	4,956.09	12,390.22	0.00E+00	6.83E+01	1.71E+02	2.7500	2.053E+08	
Fe-55	3.8028E-04	4,956.09	12,390.22	0.00E+00	1.88E+00	4.71E+00	3.5000	9.275E+05	
H-3	3.8454E-03	4,956.09	12,390.22	0.00E+00	1.91E+01	4.76E+01	5.0000	3.116E+05	
I-129	1.2891E-06	4,956.09	12,390.22	0.00E+00	6.39E-03	1.60E-02	7.0000	3.557E+04	
Kr-85	2.7848E-02	4,956.09	12,390.22	0.00E+00	1.38E+02	3.45E+02	11.0000	4.068E+03	
Np-237	3.7516E-06	4,956.09	12,390.22	0.00E+00	1.86E-02	4.65E-02			
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			
Ti-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

	From SFD	Used	Basis for Parameter Differences:
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

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		4,956.09	Nominal burnup taken from SFD and converted to MWd using BOL=61.951kg
Bounding		12,390.22	Bounding burnup taken from SFD and converted to MWd using BOL=61.951kg

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	3.071.54	6.143.08	0.00E+00	7.09E-03	1.42E-02	Avg MeV	
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		
Ti-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: This fuel didn't closely match any existing templates, therefore the worst case template was used
Reactor Moderator:	From SFD FAST	Used (Worst Case)	
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: Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup.
	From SFD	Estimated	
Nominal	904.40	3.071.54	
Bounding		6.143.08	

Checks			Estimated EOL HM/Given EOL HM 331.43
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	10.15	3.40	
Bounding	20.31		

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

Fuel decay start date: 1985
Estimates as of: 2030
Template: FFTF (FAST, SST 10 to 30%, Pu & U)
Template Burnup (MWd): 5011.2
Template BOL Heavy Metal Mass (MT): 0.0329181
Template Decay Time: 35 years

Estimated
Canister usage
18"x10"
0.85

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Avg MeV	
Ac-227	6.1822E-12	3.998 94	7.997 88	0.00E+00	2.47E-08	4.94E-08	0.0150	2.583E+14
Am-241	1.1066E-01	3.998 94	7.997 88	2.57E+01	4.68E+02	9.11E+02	0.0250	5.197E+13
Am-242m	1.9247E-03	3.998 94	7.997 88	0.00E+00	7.70E+00	1.54E+01	0.0375	6.043E+13
Am-243	1.0740E-04	3.998 94	7.997 88	0.00E+00	4.29E-01	8.59E-01	0.0575	5.936E+13
C-14	2.6042E-05	3.998 94	7.997 88	0.00E+00	1.04E-01	2.08E-01	0.0850	2.895E+13
Cl-36	3.4243E-10	3.998 94	7.997 88	0.00E+00	1.37E-06	2.74E-06	0.1250	2.037E+13
Cm-243	4.0629E-04	3.998 94	7.997 88	0.00E+00	1.62E+00	3.25E+00	0.2250	2.336E+13
Cm-244	1.6024E-03	3.998 94	7.997 88	0.00E+00	6.41E+00	1.28E+01	0.3750	1.012E+13
Co-60	3.4275E-03	3.998 94	7.997 88	0.00E+00	1.37E+01	2.74E+01	0.5750	4.102E+14
Cs-134	1.5566E-03	3.998 94	7.997 88	0.00E+00	6.22E+00	1.24E+01	0.8500	4.286E+12
Cs-135	4.7693E-05	3.998 94	7.997 88	0.00E+00	1.91E-01	3.81E-01	1.2500	5.130E+12
Cs-137	1.4007E+00	3.998 94	7.997 88	0.00E+00	5.60E+03	1.12E+04	1.7500	1.161E+11
Eu-154	1.6184E-02	3.998 94	7.997 88	0.00E+00	6.47E+01	1.29E+02	2.2500	2.294E+07
Eu-155	1.3774E-02	3.998 94	7.997 88	0.00E+00	5.51E+01	1.10E+02	2.7500	1.324E+08
Fe-55	3.8028E-04	3.998 94	7.997 88	0.00E+00	1.52E+00	3.04E+00	3.5000	4.788E+05
H-3	3.8454E-03	3.998 94	7.997 88	0.00E+00	1.54E+01	3.08E+01	5.0000	1.502E+05
I-129	1.2891E-06	3.998 94	7.997 88	0.00E+00	5.16E-03	1.03E-02	7.0000	1.716E+04
Kr-85	2.7848E-02	3.998 94	7.997 88	0.00E+00	1.11E+02	2.23E+02	11.0000	1.963E+03
Np-237	3.7516E-06	3.998 94	7.997 88	0.00E+00	1.50E-02	3.00E-02		
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		
Ti-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	Thermal Power	
U-233	5.7451E-10	3.998 94	7.997 88	0.00E+00	2.30E-06	4.59E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	4.3044E-06	3.998 94	7.997 88	0.00E+00	1.72E-02	3.44E-02	6.75E+01	1.33E+02
U-235	-7.7765E-09	3.998 94	0.00	4.33E-05	1.22E-05	4.33E-05	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Reactor Moderator	From SFD	Used	Basis for Parameter Differences:
	FAST	FAST	
	SST	SST	
	Pu and U	Pu and U	
BOL HM Constituents			This Template was used for the following reasons:
BOL Enrichment %	31.101	10 to 30	This fuel matches on all parameters except enrichment (very close to 30%)

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate
Nominal	3.998 94	2,231.05	Nominal burnup taken directly from SFD (converted to MWd)
Bounding		7,997.88	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal	1.97	0.56	0.83
Bounding	3.94		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FERMI CORE 1 & 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: FERMI (Fast, Zinc, 10 to 40%, U)
²Template Burnup(MWd)³: 58 6725048
Template BOL Heavy Metal Mass (MT): 0.018774
Template Decay Time: 50 years

Estimated
Canister usage:
18"x10"
0.04

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	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	1.4291E-07	419.74	839.48	0.00E+00	6.00E-05	1.20E-04	Avg. MeV	
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
Cf-252	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	2.941E+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		
Ti-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:
Reactor Moderator	From SFD	Used	
	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	
Bounding	50.35	839.48	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	7.38	14.41	
Bounding	14.75	16.67	1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FERMICORE1&2 (CORE SHIM)
SNF ID # 69
Fuel Units & Descr: 280 - ROD
Heavy Metal Mass: BOL=37.492kg, EOL=36.82kg
ROD Storage Site INEEL

Fuel decay start date 1972
Estimates as of 2030
Template FERMICORE (Fast, Zirc 10 to 40% U)
Template Burnup (MWd) 58.6725048
Template BOL Heavy Metal Mass (MT) 0.018774
Template Decay Time 50 years

Estimated
Canister usage
18"x10"
0.07

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4291E-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		
U-235	-2.3191E-06	592.57	0.00	1.10E-02	9.61E-03	1.10E-02		
U-236	1.2633E-05	592.57	1,185.14	0.00E+00	7.49E-03	1.50E-02		
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	Used		
Fuel Cladding	FAST	FAST		
BOL HM Constituents	ZIRC	ZIRC		
BOL Enrichment %	U	U		
	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	1.00	
Nominal	5.06	9.88		
Bounding	10.11	11.43		

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: 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, Zinc, 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	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 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	3 633E+07
Fe-55	2 5992E-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		
Ti-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:
Reactor Moderator	From SFD	Used	
Fuel Cladding	FAST	FAST	This Template was used for the following reasons:
BOL HM Constituents	NONE	ZIRC	This fuel matches on all parameters except cladding.
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	361 35	34 769 81	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	42.57	83 14	1 04
Bounding	85 13	96 22	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name 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	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4291E-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 4966E-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 23E-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences ¹
	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	209 96	5 444.25	Nominal burnup calculated from the heavy metal mass destroyed
Bounding	362.83	10 888.49	Bounding burnup assumed to be twice nominal burnup
Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	13 28	25.93	1 01
Bounding	26 55	30 01	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FERMI CORE I & 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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/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	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		
Ti-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

	From SFD	Used
Reactor Moderator:	FAST	FAST
Fuel Cladding	ZIRC	ZIRC
BOL HM Constituents	U	U
BOL Enrichment %	25 69081404	10 to 40

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal	89.98	740.71
Bounding	155.50	1 481.43

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	4.21	8.23
Bounding	8.43	9.53

Estimated EOL HM/Given EOL HM
 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FERMI CORE 1 & 2 (STD FUEL SUBASSEMBLY)

SNF ID #: 456

Fuel Units & Descr: 27160 - ROD

Heavy Metal Mass BOL=3636 724kg EOL=3566 106kg

ROD Storage Site INEEL

¹Fuel decay start date 1972
Estimates as of 2030

Template FERMI (Fast Zirc 10 to 40%, U)

²Template Burnup(MWd) 58 6725048

Template BOL Heavy Metal Mass (MT) 0 018774

Template Decay Time 50 years

Estimated
Canister usage
18"x10"
7 07

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 4291E-07	62,269 34	124,538 69	0 00E+00	8 90E-03	1 78E-02	Avg MeV	
Am-241	6 7476E-07	62,269 34	124,538 69	0 00E+00	4 20E-02	8 40E-02	0 0150	5 764E+15
Am-242m	0 0000E+00	62,269 34	124,538 69	0 00E+00	0 00E+00	0 00E+00	0 0250	1 197E+15
Am-243	8 3651E-15	62,269 34	124,538 69	0 00E+00	5 21E-10	1 04E-09	0 0375	1 055E+15
C-14	2 1680E-05	62,269 34	124,538 69	0 00E+00	1 35E+00	2 70E+00	0 0575	1 115E+15
Cl-36	5 5188E-08	62,269 34	124,538 69	0 00E+00	3 44E-03	6 87E-03	0 0850	6 736E+14
Cm-243	1 0760E-14	62,269 34	124,538 69	0 00E+00	6 70E-10	1 34E-09	0 1250	4 963E+14
Cm-244	2 9486E-16	62,269 34	124,538 69	0 00E+00	1 84E-11	3 67E-11	0 2250	5 792E+14
Co-60	2 9128E-04	62,269 34	124,538 69	0 00E+00	1 81E+01	3 63E+01	0 3750	2 524E+14
Cs-134	4 0326E-09	62,269 34	124,538 69	0 00E+00	2 51E-04	5 02E-04	0 5750	4 506E+15
Cs-135	4 4996E-05	62,269 34	124,538 69	0 00E+00	2 80E+00	5 60E+00	0 8500	4 106E+13
Cs-137	9 7388E-01	62,269 34	124,538 69	0 00E+00	6 06E+04	1 21E+05	1 2500	1 632E+13
Eu-154	5 5290E-05	62,269 34	124,538 69	0 00E+00	3 44E+00	6 89E+00	1 7500	1 058E+12
Eu-155	1 7402E-04	62,269 34	124,538 69	0 00E+00	1 08E+01	2 17E+01	2 2500	1 301E+08
Fe-55	2 5992E-04	62,269 34	124,538 69	0 00E+00	1 62E-02	3 24E-02	2 7500	2 213E+07
H-3	1 5242E-03	62,269 34	124,538 69	0 00E+00	9 49E+01	1 90E+02	3 5000	2 578E+04
I-129	1 1426E-06	62,269 34	124,538 69	0 00E+00	7 11E-02	1 42E-01	5 0000	8 981E+03
Kr-85	1 4635E-02	62,269 34	124,538 69	0 00E+00	9 11E-02	1 82E+03	7 0000	7 940E+02
Np-237	3 3099E-06	62,269 34	124,538 69	0 00E+00	2 06E-01	4 12E-01	11 0000	7 534E+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	Thermal Power	
U-233	1 0327E-08	62,269 34	124,538 69	0 00E+00	6 43E-04	1 29E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	4 9103E-06	62,269 34	124,538 69	0 00E+00	3 06E-01	6 12E-01	6 85E+02	1 37E+03
U-235	2 3191E-06	62,269 34	0 00	2 02E+00	1 87E+00	2 02E+00	Total	Total
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

	From SFD	Used
Reactor Moderator	FAST	FAST
Fuel Cladding	ZIRC	ZIRC
BOL HM Constituents	U	U
BOL Enrichment %	25 69081404	10 to 40

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		62,269 34
Bounding	5,818 76	124,538 69

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	5 48	
Bounding	10 96	21 40

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: FFTF CARBIDE FUEL EXPR
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

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ct/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	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+13
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: This Template was used for the following reasons. This fuel matches on all parameters except enrichment (unknown)
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	FAST	FAST	
BOL HM Constituents	SST	SST	
BOL Enrichment %	Pu and U	Pu and U	
		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup taken from SFD and converted to MWd using BOL=7.883kg Bounding burnup taken from SFD and converted to MWd using BOL=7.883kg
	From SFD	Estimated	
Nominal		525.78	
Bounding		652.69	

Checks			Estimated EOL HM/Given EOL HM 1.00
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.44		
Bounding	0.54		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FFTF OXIDE EXPERIMENTS
 SNF ID # 349
 Fuel Units & Descr: 1 - HEX ARRAY 91 ROD
 Heavy Metal Mass BOL= ; EOL=0.249kg
 ROD Storage Site: INEEL

Fuel decay start date 1993
 Estimates as of 2030
 Template FFTF (FAST, SST, 10 to 30% Pu & U)
 *Template Burnup(MWd): 5011.2
 Template BOL Heavy Metal Mass (MT) 0.0329181
 Template Decay Time 35 years

Estimated
 Canister usage
 18"x10"
 0.02

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-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
Cl-36	3.4243E-10	33.98	62.29	0.00E+00	1.16E-08	2.13E-08	0.0850	2.255E+11
Cm-243	4.0629E-04	33.98	62.29	0.00E+00	1.38E-02	2.53E-02	0.1250	1.586E+11
Cm-244	1.6024E-03	33.98	62.29	0.00E+00	5.44E-02	9.98E-02	0.2250	1.819E+11
Co-60	3.4275E-03	33.98	62.29	0.00E+00	1.16E-01	2.14E-01	0.3750	7.886E+10
Cs-134	1.5566E-03	33.98	62.29	0.00E+00	5.29E-02	9.70E-02	0.5750	3.195E+12
Cs-135	4.7693E-05	33.98	62.29	0.00E+00	1.62E-03	2.97E-03	0.8500	3.338E+10
Cs-137	1.4007E+00	33.98	62.29	0.00E+00	4.76E+01	8.72E+01	1.2500	3.996E+10
Eu-154	1.6184E-02	33.98	62.29	0.00E+00	5.50E-01	1.01E+00	1.7500	9.039E+08
Eu-155	1.3774E-02	33.98	62.29	0.00E+00	4.68E-01	8.58E-01	2.2500	1.803E+05
Fe-55	3.8028E-04	33.98	62.29	0.00E+00	1.29E-02	2.37E-02	2.7500	1.032E+06
H-3	3.8454E-03	33.98	62.29	0.00E+00	1.31E-01	2.40E-01	3.5000	4.536E+03
I-129	1.2891E-06	33.98	62.29	0.00E+00	4.38E-05	8.03E-05	5.0000	1.513E+03
Kr-85	2.7848E-02	33.98	62.29	0.00E+00	9.46E-01	1.73E+00	7.0000	1.727E+02
Np-237	3.7516E-06	33.98	62.29	0.00E+00	1.27E-04	2.34E-04	11.0000	1.975E+01
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		
Ti-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	Thermal Power	
U-233	5.7451E-10	33.98	62.29	0.00E+00	1.95E-08	3.58E-08	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	4.3044E-06	33.98	62.29	0.00E+00	1.46E-04	2.68E-04	7.11E-01	1.18E+00
U-235	-7.7765E-09	33.98	0.00	9.20E-07	6.56E-07	9.20E-07	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown)
Reactor Moderator	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

	From SFD	Estimated	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
Nominal		33.98	
Bounding		62.29	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.79		
Bounding	1.45		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

Fuel decay start date: 1989
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: 35 years

Estimated
Canister usage:
18"x15"
292.80

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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	5.098E+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		
Th-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:
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	GRAPHITE	GRAPHITE	
BOL HM Constituents:	GRAPHITE	GRAPHITE	
BOL Enrichment %:	Th and U	Th and U	
	93.15	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		605,875.77	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup taken directly from SFD (converted to MWd).
Bounding	722,229.41	1,211,751.53	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.39		1.00
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

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	4 2062E-06	145,508 60	412,660 86	0 00E+00	6 12E-01	1 74E+00	0.0150	2 031E+16
Am-241	3 2229E-03	145,508 60	412,660 86	0 00E+00	4 69E+02	1 33E+03	0.0250	4 146E+15
Am-242m	2 2381E-06	145,508 60	412,660 86	0 00E+00	3.26E-01	9.24E-01	0.0375	3 600E+15
Am-243	4 6006E-05	145,508 60	412,660 86	0 00E+00	6 69E+00	1.90E+01	0.0575	3.888E+15
C-14	2.3082E-05	145,508 60	412,660 86	0 00E+00	3 36E+00	9.52E+00	0.0850	2.346E+15
Ci-36	1.0667E-06	145,508 60	412,660 86	0 00E+00	1.55E-01	4 40E-01	0.1250	1.544E+15
Cm-243	1.7602E-05	145,508 60	412,660 86	0 00E+00	2.56E+00	7.26E+00	0.2250	2 032E+15
Cm-244	3 6307E-03	145,508 60	412,660 86	0 00E+00	5.28E+02	1 50E+03	0.3750	8.800E+14
Co-60	6.2585E-05	145,508 60	412,660 86	0 00E+00	9 11E+00	2 58E+01	0.5750	1.444E+16
Cs-134	2 4585E-07	145,508 60	412,660 86	0 00E+00	3 58E-02	1 01E-01	0.8500	1 805E+14
Cs-135	2 4711E-05	145,508 60	412,660 86	0 00E+00	3 60E+00	1 02E+01	1.2500	8 715E+13
Cs-137	9 3838E-01	145,508 60	412,660 86	0 00E+00	1 37E+05	3 87E+05	1.7500	5 541E+12
Eu-154	4 6887E-03	145,508 60	412,660 86	0 00E+00	6 82E+02	1 93E+03	2.2500	4 610E+08
Eu-155	1 2793E-04	145,508 60	412,660 86	0 00E+00	1 86E+01	5.28E+01	2.7500	7 466E+12
Fe-55	8 1951E-10	145,508 60	412,660 86	0 00E+00	1.19E-04	3 38E-04	3.5000	2.462E+07
H-3	1 6839E-03	145,508 60	412,660 86	0 00E+00	2 45E+02	6 95E+02	5.0000	1 048E+07
I-129	1.0092E-06	145,508 60	412,660 86	0 00E+00	1 47E-01	4 16E-01	7.0000	1.203E+05
Kr-85	1.4981E-02	145,508 60	412,660 86	0 00E+00	2 18E+03	6 18E+03	11.0000	1.378E+05
Np-237	1.2556E-05	145,508 60	412,660 86	0 00E+00	1 83E+00	5 18E+00		
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
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

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		145,508 60	
Bounding	412 660 86	291,017.20	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup taken directly from SFD (converted to MWd)

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

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	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
Ct-36	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+12
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

	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

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		76.23
Bounding:		152.45

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.35	
Bounding:	0.71	

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: 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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	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		
Ti-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	Thermal Power	
U-233	1.2203E-07	744.21	1,488.42	0 00E+00	9 08E-05	1.82E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.5925E-07	744.21	1,488.42	0 00E+00	1.19E-04	2.37E-04	4.33E+01	8 66E+01
U-235	-2 6194E-06	744.21	0 00	1 65E-03	0 00E+00	1 65E-03	Total	Total
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

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	This Template was used for the following reasons
Fuel Cladding	INCOLOY	SST	This fuel matches on all parameters except cladding (SST is conservative)
BOL HM Constituents	U		
BOL Enrichment %	19 787	10 to 20 %	

Burnup Summary (MWd)²

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
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)

SNF ID #, 94

Fuel Units & Descr: 1 - CANISTER OF SCRAP

Heavy Metal Mass: BOL=0 908kg, EOL=0 908kg

ROD Storage Site: INEEL

¹Fuel decay start date: 1961

Estimates as of: 2030

Template: Pathfinder (Light Water, SST, 60 to 100%, U)

²Template Burnup(MWd): 6 01

Template BOL Heavy Metal Mass (MT): 0 00012882

Template Decay Time: 65 years

Estimated

Canister usage:

18"x10"

0 08

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ³	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	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 36E-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		
Ti-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

	From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons This fuel matches on all parameters except cladding (SST is conservative)
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	NONE	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	93.282	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	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.
Nominal		17 15	
Bounding		34 31	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 0 98
Nominal	0 40		
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 GCRC PELLETS (1B-7T-1)
 SNF ID # 95
 Fuel Units & Descr 1 - CANISTER OF SCRAP
 Heavy Metal Mass BOL=0.074kg, EOL=0.074kg
 ROD Storage Site INEEL

¹Fuel decay start date 1961
 Estimates as of 2030
 Template Pathfinder (Light Water SST 60 to 100% U)
²Template Burnup(MWd) 6.01
 Template BOL Heavy Metal Mass (MT) 0.00012882
 Template Decay Time 65 years

Estimated
 Canister usage
 18"x10"
 0.08

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5940E-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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences*
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons
Fuel Cladding	NONE	SST	This fuel matches on all parameters except cladding (SST is conservative)
BOL HM Constituents	U	U	
BOL Enrichment %	93.1	60 to 100	

Burnup Summary (MWd)²

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

Checks

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

*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: 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

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3 4276E-08	119 03	238 05	0 00E+00	4 08E-06	8 16E-06	Avg. MeV	
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	8 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		
Th-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		

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)
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
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: Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
	From SFD	Estimated	
Nominal		119 03	
Bounding		238 05	

Checks			Estimated EOL HM/Given EOL HM 1 00
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 56		
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

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-09	6,732.94	13,465.87	0.00E+00	7.23E-06	1.45E-05	Avg MeV	
Am-241	1.4751E-01	6,732.94	13,465.87	0.00E+00	9.93E+02	1.99E+03	0.0150	5.124E+14
Am-242m	2.6809E-04	6,732.94	13,465.87	0.00E+00	1.81E+00	3.61E+00	0.0250	1.027E+14
Am-243	6.2484E-04	6,732.94	13,465.87	0.00E+00	4.21E+00	8.41E+00	0.0375	9.676E+13
C-14	4.7820E-05	6,732.94	13,465.87	0.00E+00	3.22E-01	6.44E-01	0.0575	1.211E+14
Cf-252	8.0297E-07	6,732.94	13,465.87	0.00E+00	5.41E-03	1.08E-02	0.0850	5.657E+13
Cm-243	1.7426E-04	6,732.94	13,465.87	0.00E+00	1.17E+00	2.35E+00	0.1250	3.764E+13
Cm-244	2.7616E-02	6,732.94	13,465.87	0.00E+00	1.86E+02	3.72E+02	0.2250	4.830E+13
Co-60	3.5610E-04	6,732.94	13,465.87	0.00E+00	2.40E+00	4.80E+00	0.3750	2.086E+13
Cs-134	2.6260E-07	6,732.94	13,465.87	0.00E+00	1.77E-03	3.54E-03	0.5750	4.912E+14
Cs-135	1.4433E-05	6,732.94	13,465.87	0.00E+00	9.72E-02	1.94E-01	0.8500	4.796E+12
Cs-137	9.8870E-01	6,732.94	13,465.87	0.00E+00	6.66E+03	1.33E+04	1.2500	3.052E+12
Eu-154	6.0320E-03	6,732.94	13,465.87	0.00E+00	4.06E+01	8.12E+01	1.7500	1.342E+11
Eu-155	2.1770E-04	6,732.94	13,465.87	0.00E+00	1.47E+00	2.93E+00	2.2500	2.205E+07
Fe-55	7.9296E-07	6,732.94	13,465.87	0.00E+00	5.34E-03	1.07E-02	2.7500	7.774E+07
H-3	8.9486E-03	6,732.94	13,465.87	0.00E+00	6.03E+01	1.21E+02	3.5000	5.546E+06
I-129	9.8288E-07	6,732.94	13,465.87	0.00E+00	6.62E-03	1.32E-02	5.0000	2.370E+06
Kr-85	1.0707E-02	6,732.94	13,465.87	0.00E+00	7.21E+01	1.44E+02	7.0000	2.731E+05
Np-237	1.1927E-05	6,732.94	13,465.87	0.00E+00	8.03E-02	1.61E-01	11.0000	3.135E+04
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		
Ti-208	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	2.900129144	0 to 5	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	6,617.31	6,732.94	
Bounding		13,465.87	

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	0.81	1.02	
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

Fuel decay start date: 1974
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:
HIC
12 00

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CvMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 0733E-09	4,021 39	8,042.78	0 00E+00	4.32E-06	8.63E-06	Avg MeV	
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	
Bounding		8 042.78	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	4.58	5.72	
Bounding	9.16		1.10

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HFBR
SNF ID #: 102
Fuel Units & Descr: 220 - 18 CURVED PLATES
Heavy Metal Mass: BOL=82 72kg EOL=58 102kg
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"
6.11

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	1.4241E-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-05	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		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		22,675.71	
Bounding		45,351.43	
			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	0.63		
Bounding	1.26		
			1.01

*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

Fuel decay start date: 1977
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum, 40 to 100%, U)
Template Burnup (MWd): 164.6
Template BOL Heavy Metal Mass (MT): 0.000377
Template Decay Time: 50 years

Estimated
Canister usage
18"x10"
0.56

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	1.4241E-09	2.06143	4.12286	0.00E+00	2.94E-06	5.87E-06	Avg MeV	
Am-241	1.0407E-02	2.06143	4.12286	0.00E+00	2.15E+01	4.29E+01	0.0150	2.136E+14
Am-242m	1.1944E-06	2.06143	4.12286	0.00E+00	2.46E-03	4.92E-03	0.0250	4.376E+13
Am-243	3.6933E-05	2.06143	4.12286	0.00E+00	7.63E-02	1.53E-01	0.0375	3.820E+13
C-14	2.6367E-08	2.06143	4.12286	0.00E+00	5.44E-05	1.09E-04	0.0575	4.139E+13
Cl-36	4.4435E-31	2.06143	4.12286	0.00E+00	9.16E-28	1.83E-27	0.0850	2.464E+13
Cm-243	2.7503E-06	2.06143	4.12286	0.00E+00	5.67E-03	1.13E-02	0.1250	1.625E+13
Cm-244	1.4775E-03	2.06143	4.12286	0.00E+00	3.05E+00	6.09E+00	0.2250	2.127E+13
Co-60	9.4350E-07	2.06143	4.12286	0.00E+00	1.94E-03	3.89E-03	0.3750	9.255E+12
Cs-134	4.4666E-07	2.06143	4.12286	0.00E+00	9.21E-04	1.84E-03	0.5750	1.563E+14
Cs-135	4.2564E-06	2.06143	4.12286	0.00E+00	8.77E-03	1.75E-02	0.8500	1.835E+12
Cs-137	1.0182E+00	2.06143	4.12286	0.00E+00	2.10E+03	4.20E+03	1.2500	8.678E+11
Eu-154	4.6373E-03	2.06143	4.12286	0.00E+00	9.56E+00	1.91E+01	1.7500	4.981E+10
Eu-155	2.1646E-04	2.06143	4.12286	0.00E+00	4.46E-01	8.92E-01	2.2500	4.450E+06
Fe-55	4.5838E-07	2.06143	4.12286	0.00E+00	9.45E-04	1.89E-03	2.7500	5.531E+06
H-3	8.5966E-04	2.06143	4.12286	0.00E+00	1.77E+00	3.54E+00	3.5000	1.031E+05
I-129	6.6403E-07	2.06143	4.12286	0.00E+00	1.37E-03	2.74E-03	5.0000	4.368E+04
Kr-85	1.5553E-02	2.06143	4.12286	0.00E+00	3.21E+01	6.41E+01	7.0000	4.983E+03
Np-237	3.1665E-05	2.06143	4.12286	0.00E+00	6.53E-02	1.31E-01	11.0000	5.690E+02
Pa-231	2.4380E-09	2.06143	4.12286	0.00E+00	5.03E-06	1.01E-05		
Pb-210	1.7394E-10	2.06143	4.12286	0.00E+00	3.59E-07	7.17E-07		
Pm-147	8.8578E-06	2.06143	4.12286	0.00E+00	1.83E-02	3.65E-02		
Pu-238	1.2120E-01	2.06143	4.12286	0.00E+00	2.50E+02	5.00E+02		
Pu-239	6.9441E-04	2.06143	4.12286	0.00E+00	1.43E+00	2.86E+00		
Pu-240	3.8299E-04	2.06143	4.12286	0.00E+00	7.90E-01	1.58E+00		
Pu-241	3.1731E-02	2.06143	4.12286	0.00E+00	6.54E+01	1.31E+02		
Pu-242	3.0911E-06	2.06143	4.12286	0.00E+00	6.37E-03	1.27E-02		
Ra-226	4.1239E-10	2.06143	4.12286	0.00E+00	8.50E-07	1.70E-06		
Ra-228	4.5680E-14	2.06143	4.12286	0.00E+00	9.42E-11	1.88E-10		
Ru-106	8.1713E-15	2.06143	4.12286	0.00E+00	1.68E-11	3.37E-11		
Se-79	1.2333E-05	2.06143	4.12286	0.00E+00	2.54E-02	5.08E-02		
Sn-126	1.0194E-05	2.06143	4.12286	0.00E+00	2.10E-02	4.20E-02		
Sr-90	9.3378E-01	2.06143	4.12286	0.00E+00	1.92E+03	3.85E+03		
Tc-99	3.8050E-04	2.06143	4.12286	0.00E+00	7.84E-01	1.57E+00		
Th-229	2.9532E-11	2.06143	4.12286	0.00E+00	6.09E-08	1.22E-07		
Th-230	3.1981E-08	2.06143	4.12286	0.00E+00	6.59E-05	1.32E-04		
Th-232	5.3633E-14	2.06143	4.12286	0.00E+00	1.11E-10	2.21E-10		
Ti-208	3.7406E-08	2.06143	4.12286	0.00E+00	7.71E-05	1.54E-04		
U-232	1.0134E-07	2.06143	4.12286	0.00E+00	2.09E-04	4.18E-04		
U-233	9.2892E-09	2.06143	4.12286	0.00E+00	1.91E-05	3.83E-05		
U-234	6.6403E-05	2.06143	4.12286	0.00E+00	1.37E-01	2.74E-01		
U-235	-2.8661E-06	2.06143	0.00	1.51E-02	9.22E-03	1.51E-02		
U-236	1.6701E-05	2.06143	4.12286	0.00E+00	3.44E-02	6.89E-02		
U-238	-9.4194E-09	2.06143	0.00	1.75E-04	1.55E-04	1.75E-04		
Y-90	9.3439E-01	2.06143	4.12286	0.00E+00	1.93E+03	3.85E+03		
Other Radionuclides					2.02E+03	4.04E+03		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal Bounding	From SFD	Estimated	
		2.06143 4.12286	

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

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

1.01

*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)
SNF ID # 894
Fuel Units & Descr: 1 - UNKNOWN
Heavy Metal Mass BOL= , EOL=24 345kg
ROD Storage Site INEEL

¹Fuel decay start date 1994
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 35 years

Estimated
Canister usage
18"x10"
0 01

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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	Thermal Power	
U-233	1 2224E-07	23,240 11	23,240 11	0 00E+00	2 84E-03	2 84E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	2 5714E-07	23,240 11	23,240 11	0 00E+00	5 98E-03	5 98E-03	3 74E+02	3 74E+02
U-235	-2 6194E-06	23,240 11	0 00	2 10E-02	0 00E+00	2 10E-02	Total	Total
U-236	1 2695E-05	23,240 11	23,240 11	0 00E+00	2 95E-01	2 95E-01		
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

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Nominal		23,240 11	
Bounding		23,240 11	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 1 78
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 HTGR (PEACH BOTTOM SCRAP)
SNF ID #: 935
Fuel Units & Descr: 21 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=18 722kg, EOL=16.34kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1967
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"
1 62

II. Estimates	m	X _n	X _b	b	Y _n	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.2062E-06	2,252.15	4,504.30	0.00E+00	9.47E-03	1.89E-02	Avg. MeV	
Am-241	3.2229E-03	2,252.15	4,504.30	0.00E+00	7.26E+00	1.45E+01	0.0150	2.217E+14
Am-242m	2.2381E-06	2,252.15	4,504.30	0.00E+00	5.04E-03	1.01E-02	0.0250	4.526E+13
Am-243	4.6006E-05	2,252.15	4,504.30	0.00E+00	1.04E-01	2.07E-01	0.0375	3.929E+13
C-14	2.3082E-05	2,252.15	4,504.30	0.00E+00	5.20E-02	1.04E-01	0.0575	4.244E+13
Cl-36	1.0667E-06	2,252.15	4,504.30	0.00E+00	2.40E-03	4.80E-03	0.0850	2.561E+13
Cm-243	1.7602E-05	2,252.15	4,504.30	0.00E+00	3.96E-02	7.93E-02	0.1250	1.685E+13
Cm-244	3.6307E-03	2,252.15	4,504.30	0.00E+00	8.18E+00	1.64E+01	0.2250	2.218E+13
Co-60	6.2585E-05	2,252.15	4,504.30	0.00E+00	1.41E-01	2.82E-01	0.3750	9.605E+12
Cs-134	2.4585E-07	2,252.15	4,504.30	0.00E+00	5.54E-04	1.11E-03	0.5750	1.576E+14
Cs-135	2.4711E-05	2,252.15	4,504.30	0.00E+00	5.57E-02	1.11E-01	0.8500	1.971E+12
Cs-137	9.3838E-01	2,252.15	4,504.30	0.00E+00	2.11E+03	4.23E+03	1.2500	9.513E+11
Eu-154	4.6887E-03	2,252.15	4,504.30	0.00E+00	1.06E+01	2.11E+01	1.7500	6.048E+10
Eu-155	1.2793E-04	2,252.15	4,504.30	0.00E+00	2.88E-01	5.76E-01	2.2500	5.032E+06
Fe-55	8.1951E-10	2,252.15	4,504.30	0.00E+00	1.85E-06	3.69E-06	2.7500	8.149E+10
H-3	1.6839E-03	2,252.15	4,504.30	0.00E+00	3.79E+00	7.58E+00	3.5000	2.688E+05
I-129	1.0092E-06	2,252.15	4,504.30	0.00E+00	2.27E-03	4.55E-03	5.0000	1.144E+05
Kr-85	1.4981E-02	2,252.15	4,504.30	0.00E+00	3.37E+01	6.75E+01	7.0000	1.313E+04
Np-237	1.2556E-05	2,252.15	4,504.30	0.00E+00	2.83E-02	5.66E-02	11.0000	1.504E+03
Pa-231	4.7360E-06	2,252.15	4,504.30	0.00E+00	1.07E-02	2.13E-02		
Pb-210	2.1901E-09	2,252.15	4,504.30	0.00E+00	4.93E-06	9.86E-06		
Pm-147	2.8781E-06	2,252.15	4,504.30	0.00E+00	6.48E-03	1.30E-02		
Pu-238	1.4430E-01	2,252.15	4,504.30	0.00E+00	3.25E+02	6.50E+02		
Pu-239	1.3572E-04	2,252.15	4,504.30	0.00E+00	3.06E-01	6.11E-01		
Pu-240	2.7537E-04	2,252.15	4,504.30	0.00E+00	6.20E-01	1.24E+00		
Pu-241	9.3995E-03	2,252.15	4,504.30	0.00E+00	2.12E+01	4.23E+01		
Pu-242	3.8866E-06	2,252.15	4,504.30	0.00E+00	8.75E-03	1.75E-02		
Ra-226	4.1243E-09	2,252.15	4,504.30	0.00E+00	9.29E-06	1.86E-05		
Ra-228	9.1949E-07	2,252.15	4,504.30	0.00E+00	2.07E-03	4.14E-03		
Ru-106	1.1667E-15	2,252.15	4,504.30	0.00E+00	2.63E-12	5.26E-12		
Se-79	2.1074E-05	2,252.15	4,504.30	0.00E+00	4.75E-02	9.49E-02		
Sn-126	2.2192E-05	2,252.15	4,504.30	0.00E+00	5.00E-02	1.00E-01		
Sr-90	8.8642E-01	2,252.15	4,504.30	0.00E+00	2.00E+03	3.99E+03		
Tc-99	3.3323E-04	2,252.15	4,504.30	0.00E+00	7.50E-01	1.50E+00		
Th-229	1.3517E-05	2,252.15	4,504.30	0.00E+00	3.04E-02	6.09E-02		
Th-230	2.2822E-07	2,252.15	4,504.30	0.00E+00	5.14E-04	1.03E-03		
Th-232	-6.9673E-08	2,252.15	0.00	1.85E-03	1.69E-03	1.85E-03		
Th-208	5.1524E-04	2,252.15	4,504.30	0.00E+00	1.16E+00	2.32E+00		
U-232	1.3950E-03	2,252.15	4,504.30	0.00E+00	3.14E+00	6.28E+00		
U-233	2.0602E-03	2,252.15	4,504.30	0.00E+00	4.64E+00	9.28E+00		
U-234	2.9513E-04	2,252.15	4,504.30	0.00E+00	6.65E-01	1.33E+00		
U-235	-1.7343E-06	2,252.15	0.00	3.70E-03	0.00E+00	3.70E-03		
U-236	8.6281E-06	2,252.15	4,504.30	0.00E+00	1.94E-02	3.89E-02		
U-238	-5.6065E-09	2,252.15	0.00	3.68E-05	2.42E-05	3.68E-05		
Y-90	8.8642E-01	2,252.15	4,504.30	0.00E+00	2.00E+03	3.99E+03		
Other Radionuclides					2.04E+03	4.07E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.60E+01	7.20E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	GRAPHITE	GRAPHITE
Fuel Cladding	GRAPHITE	GRAPHITE
BOL HM Constituents	Th and U	Th and U
BOL Enrichment %	80.231	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	1,239.49	2,252.15
Bounding	1,361.22	4,504.30

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	1.20	1.82
Bounding	2.41	3.31

Estimated EOL HM/Given EOL HM

1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name 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, Zinc, 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	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 0595E-04	27 25	54.50	0 00E+00	2 89E-03	5 77E-03	Avg MeV	
Am-241	2 4968E-04	27 25	54.50	0 00E+00	6 80E-03	1 36E-02	0 0150	3 414E+12
Am-242m	1 3847E-06	27 25	54.50	0 00E+00	3 77E-05	7 55E-05	0 0250	6 486E+11
Am-243	3 1103E-07	27 25	54.50	0 00E+00	8 48E-06	1 70E-05	0 0375	5 567E+11
C-14	9 2267E-05	27 25	54.50	0 00E+00	2 51E-03	5 03E-03	0 0575	6 058E+11
Cl-36	1 8103E-06	27 25	54 50	0 00E+00	4 93E-05	9 87E-05	0 0850	3 929E+11
Cm-243	2 1248E-07	27 25	54.50	0 00E+00	5 79E-06	1 16E-05	0 1250	2 406E+11
Cm-244	7 9666E-06	27 25	54 50	0 00E+00	2 17E-04	4 34E-04	0 2250	3 550E+11
Co-60	1 2143E-04	27 25	54 50	0 00E+00	3 31E-03	6 62E-03	0 3750	1 402E+11
Cs-134	1 6535E-07	27 25	54 50	0 00E+00	4 51E-06	9 01E-06	0 5750	2 152E+12
Cs-135	2 8639E-05	27 25	54 50	0 00E+00	7 80E-04	1 56E-03	0 8500	3 701E+10
Cs-137	1 0449E+00	27 25	54 50	0 00E+00	2 85E+01	5 69E+01	1 2500	1 126E+10
Eu-154	2 5679E-03	27 25	54 50	0 00E+00	7 00E-02	1 40E-01	1 7500	2 946E+09
Eu-155	8 1175E-05	27 25	54 50	0 00E+00	2 21E-03	4 42E-03	2 2500	6 713E+04
Fe-55	4 2194E-08	27 25	54 50	0 00E+00	1 15E-06	2 30E-06	2 7500	2 312E+10
H-3	9 1673E-04	27 25	54 50	0 00E+00	2 50E-02	5 00E-02	3 5000	6 434E+02
I-129	1 5853E-06	27 25	54 50	0 00E+00	4 32E-05	8 64E-05	5 0000	1 931E+02
Kr-85	2 3741E-02	27 25	54 50	0 00E+00	6 47E-01	1 29E+00	7 0000	1 271E+01
Np-237	1 2747E-07	27 25	54 50	0 00E+00	3 47E-06	6 95E-06	11 0000	8 248E-01
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		

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
Reactor Moderator:	From SFD LIGHT WATER	Used LIGHT WATER	
Fuel Cladding:	NONE	ZIRC	
BOL HM Constituents:	Th and U	Th and U	
BOL Enrichment %:	89 895	60 to 100	
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		27 25	
Bounding		54 50	
Checks			Estimated EOL HM/Given EOL HM 1 00
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 01		
Bounding	0 01		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name LOFT CENTER FUEL MODULE (A1,A2,A3 F1)
SNF ID #: 127
Fuel Units & Descr. 4 - 15 X 15 ROD ARRAY
Heavy Metal Mass. BOL=814 001kg; EOL=813.286kg
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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 0733E-09	803 42	1,108 67	0 00E+00	8 62E-07	1.19E-06	Avg MeV	
Am-241	1 4751E-01	803 42	1,108 67	0 00E+00	1 19E+02	1 64E+02	0 0150	4.219E+13
Am-242m	2 6809E-04	803 42	1,108 67	0 00E+00	2 15E-01	2 97E-01	0 0250	8 454E+12
Am-243	6 2484E-04	803 42	1,108 67	0 00E+00	5 02E-01	6.93E-01	0 0375	7 966E+12
C-14	4 7820E-05	803 42	1,108 67	0 00E+00	3 84E-02	5.30E-02	0 0575	9 968E+12
Cl-36	8 0297E-07	803 42	1,108 67	0 00E+00	6 45E-04	8.90E-04	0 0850	4 658E+12
Cm-243	1 7426E-04	803 42	1,108 67	0 00E+00	1 40E-01	1.93E-01	0 1250	3 099E+12
Cm-244	2 7616E-02	803 42	1,108 67	0 00E+00	2 22E+01	3 06E+01	0 2250	3 978E+12
Co-60	3 5610E-04	803 42	1,108 67	0 00E+00	2 86E-01	3.95E-01	0 3750	1 717E+12
Cs-134	2 6260E-07	803 42	1,108 67	0 00E+00	2 11E-04	2 91E-04	0 5750	4 044E+13
Cs-135	1 4433E-05	803 42	1,108 67	0 00E+00	1 16E-02	1 60E-02	0 8500	3 949E+11
Cs-137	9 8870E-01	803 42	1,108 67	0 00E+00	7 94E+02	1 10E+03	1 2500	2.513E+11
Eu-154	6 0320E-03	803 42	1,108 67	0 00E+00	4 85E+00	6 69E+00	1 7500	1 105E+10
Eu-155	2 1770E-04	803 42	1,108 67	0 00E+00	1 75E-01	2 41E-01	2.2500	1 818E+06
Fe-55	7 9296E-07	803 42	1,108 67	0 00E+00	6 37E-04	8 79E-04	2.7500	6 402E+06
H-3	8 9486E-03	803 42	1,108 67	0 00E+00	7 19E+00	9 92E+00	3 5000	4 580E+05
I-129	9 8288E-07	803 42	1,108 67	0 00E+00	7 90E-04	1.09E-03	5 0000	1 957E+05
Kr-85	1 0707E-02	803 42	1,108 67	0 00E+00	8 60E+00	1 19E+01	7 0000	2.255E+04
Np-237	1 1927E-05	803 42	1,108 67	0 00E+00	9 58E-03	1.32E-02	11 0000	2 589E+03
Pa-231	1 4703E-09	803 42	1,108 67	0 00E+00	1 18E-06	1.63E-06		
Pb-210	1 6828E-10	803 42	1,108 67	0 00E+00	1 35E-07	1 87E-07		
Pm-147	6 9606E-06	803 42	1,108 67	0 00E+00	5 59E-03	7.72E-03		
Pu-238	6 6263E-02	803 42	1,108 67	0 00E+00	5 32E+01	7 35E+01		
Pu-239	1 1618E-02	803 42	1,108 67	0 00E+00	9 33E+00	1.29E+01		
Pu-240	1 5142E-02	803 42	1,108 67	0 00E+00	1 22E+01	1 68E+01		
Pu-241	4 3766E-01	803 42	1,108 67	0 00E+00	3 52E+02	4 85E+02		
Pu-242	6 4260E-05	803 42	1,108 67	0 00E+00	5 16E-02	7.12E-02		
Ra-226	3 8501E-10	803 42	1,108 67	0 00E+00	3 09E-07	4.27E-07		
Ra-228	5 2955E-12	803 42	1,108 67	0 00E+00	4.25E-09	5 87E-09		
Ru-106	2 0413E-14	803 42	1,108 67	0 00E+00	1 64E-11	2.26E-11		
Se-79	1 2376E-05	803 42	1,108 67	0 00E+00	9 94E-03	1.37E-02		
Sn-126	2 5210E-05	803 42	1,108 67	0 00E+00	2 03E-02	2.79E-02		
Sr-90	6 4163E-01	803 42	1,108 67	0 00E+00	5 16E+02	7 11E+02		
Tc-99	3 9357E-04	803 42	1,108 67	0 00E+00	3 16E-01	4.36E-01		
Th-229	1 5644E-10	803 42	1,108 67	0 00E+00	1 26E-07	1.73E-07		
Th-230	2 7972E-08	803 42	1,108 67	0 00E+00	2 25E-05	3.10E-05		
Th-232	5 3036E-12	803 42	1,108 67	0 00E+00	4 26E-09	5 88E-09		
Th-208	1 5136E-07	803 42	1,108 67	0 00E+00	1.22E-04	1.68E-04		
U-232	4 1005E-07	803 42	1,108 67	0 00E+00	3.29E-04	4.55E-04		
U-233	2 5856E-08	803 42	1,108 67	0 00E+00	2 08E-05	2 87E-05		
U-234	5 2665E-05	803 42	1,108 67	0 00E+00	4 23E-02	5 84E-02		
U-235	-1 4487E-06	803 42	0 00	7.12E-02	7 00E-02	7.12E-02		
U-236	7 5888E-06	803 42	1,108 67	0 00E+00	6 10E-03	8.41E-03		
U-238	-2 6129E-07	803 42	0 00	2 63E-01	2 62E-01	2 63E-01		
Y-90	6 4180E-01	803 42	1,108 67	0 00E+00	5 16E+02	7 12E+02		
Other Radionuclides					7 66E+02	1 06E+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 046614577	0 to 5	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	803 42	679 36	
Bounding	1,108 67	1,358 72	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 03	0 85	
Bounding	0 04	1 23	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-1)
SNF ID #: 1061
Fuel Units & Descr: 1 - 15 X 15 ROD ARRAY
Heavy Metal Mass BOL=203.5kg EOL=203.322kg
ROD Storage Site INEEL

Fuel decay start date 1975
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"
0.50

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-09	200.85	277.17	0.00E+00	2.16E-07	2.97E-07	Avg MeV	
Am-241	1.4751E-01	200.85	277.17	0.00E+00	2.96E+01	4.09E+01	0.0150	1.055E+13
Am-242m	2.6809E-04	200.85	277.17	0.00E+00	5.38E-02	7.43E-02	0.0250	2.114E+12
Am-243	6.2484E-04	200.85	277.17	0.00E+00	1.26E-01	1.73E-01	0.0375	1.992E+12
C-14	4.7820E-05	200.85	277.17	0.00E+00	9.60E-03	1.33E-02	0.0575	2.492E+12
Cl-36	8.0297E-07	200.85	277.17	0.00E+00	1.61E-04	2.23E-04	0.0850	1.164E+12
Cm-243	1.7426E-04	200.85	277.17	0.00E+00	3.50E-02	4.83E-02	0.1250	7.748E+11
Cm-244	2.7616E-02	200.85	277.17	0.00E+00	5.55E+00	7.65E+00	0.2250	9.945E+11
Co-60	3.5610E-04	200.85	277.17	0.00E+00	7.15E-02	9.87E-02	0.3750	4.294E+11
Cs-134	2.6260E-07	200.85	277.17	0.00E+00	5.27E-05	7.28E-05	0.5750	1.011E+13
Cs-135	1.4433E-05	200.85	277.17	0.00E+00	2.90E-03	4.00E-03	0.8500	9.873E+10
Cs-137	9.8870E-01	200.85	277.17	0.00E+00	1.99E+02	2.74E+02	1.2500	6.282E+10
Eu-154	6.0320E-03	200.85	277.17	0.00E+00	1.21E+00	1.67E+00	1.7500	2.762E+09
Eu-155	2.1770E-04	200.85	277.17	0.00E+00	4.37E-02	6.03E-02	2.2500	4.546E+05
Fe-55	7.9296E-07	200.85	277.17	0.00E+00	1.59E-04	2.20E-04	2.7500	1.600E+06
H-3	8.9486E-03	200.85	277.17	0.00E+00	1.80E+00	2.48E+00	3.5000	1.145E+05
I-129	9.8288E-07	200.85	277.17	0.00E+00	1.97E-04	2.72E-04	5.0000	4.893E+04
Kr-85	1.0707E-02	200.85	277.17	0.00E+00	2.15E+00	2.97E+00	7.0000	5.637E+03
Np-237	1.1927E-05	200.85	277.17	0.00E+00	2.40E-03	3.31E-03	11.0000	6.473E+02
Pa-231	1.4703E-09	200.85	277.17	0.00E+00	2.95E-07	4.08E-07		
Pb-210	1.6828E-10	200.85	277.17	0.00E+00	3.38E-08	4.66E-08		
Pm-147	6.9606E-06	200.85	277.17	0.00E+00	1.40E-03	1.93E-03		
Pu-238	6.6263E-02	200.85	277.17	0.00E+00	1.33E+01	1.84E+01		
Pu-239	1.1618E-02	200.85	277.17	0.00E+00	2.33E+00	3.22E+00		
Pu-240	1.5142E-02	200.85	277.17	0.00E+00	3.04E+00	4.20E+00		
Pu-241	4.3766E-01	200.85	277.17	0.00E+00	8.79E+01	1.21E+02		
Pu-242	6.4260E-05	200.85	277.17	0.00E+00	1.29E-02	1.78E-02		
Ra-226	3.8501E-10	200.85	277.17	0.00E+00	7.73E-08	1.07E-07		
Ra-228	5.2955E-12	200.85	277.17	0.00E+00	1.06E-09	1.47E-09		
Ru-106	2.0413E-14	200.85	277.17	0.00E+00	4.10E-12	5.66E-12		
Se-79	1.2376E-05	200.85	277.17	0.00E+00	2.49E-03	3.43E-03		
Sn-126	2.5210E-05	200.85	277.17	0.00E+00	5.06E-03	6.99E-03		
Sr-90	6.4163E-01	200.85	277.17	0.00E+00	1.29E+02	1.78E+02		
Tc-99	3.9357E-04	200.85	277.17	0.00E+00	7.91E-02	1.09E-01		
Th-229	1.5644E-10	200.85	277.17	0.00E+00	3.14E-08	4.34E-08		
Th-230	2.7972E-08	200.85	277.17	0.00E+00	5.62E-06	7.75E-06		
Th-232	5.3036E-12	200.85	277.17	0.00E+00	1.07E-09	1.47E-09		
Ti-208	1.5136E-07	200.85	277.17	0.00E+00	3.04E-05	4.20E-05		
U-232	4.1005E-07	200.85	277.17	0.00E+00	8.24E-05	1.14E-04		
U-233	2.5856E-08	200.85	277.17	0.00E+00	5.19E-06	7.17E-06		
U-234	5.2665E-05	200.85	277.17	0.00E+00	1.06E-02	1.46E-02		
U-235	-1.4487E-06	200.85	0.00	1.78E-02	1.75E-02	1.78E-02		
U-236	7.5888E-06	200.85	277.17	0.00E+00	1.52E-03	2.10E-03		
U-238	-2.6129E-07	200.85	0.00	6.56E-02	6.56E-02	6.56E-02		
Y-90	6.4180E-01	200.85	277.17	0.00E+00	1.29E+02	1.78E+02		
Other Radionuclides					1.91E+02	2.64E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
	From SFD	Used	
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %:	4.047	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	200.85	169.84	
Bounding	277.17	339.68	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	0.03	0.85	
Bounding	0.04	1.23	1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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 899kg
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	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 0733E-09	49 45	98 90	0 00E+00	5 31E-08	1 06E-07	Avg MeV	
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 4163E-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		
Th-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons: This fuel matches PWR Template on all but one parameter (enrichment) making PWR a reasonable match.
BOL HM Constituents	ZIRC	ZIRC	
BOL Enrichment %	U	U	
	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		

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

²Total burnup for all fuel associated with this worksheet must be 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	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 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	Thermal Power	
U-233	2 5856E-08	780.26	1,560.52	0 00E+00	2 02E-05	4 03E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	5 2665E-05	780.26	1,560.52	0 00E+00	4 11E-02	8 22E-02	1.41E+01	2.82E+01
U-235	-1.4487E-06	780.26	0.00	2 42E-02	2 31E-02	2 42E-02	Total	Total
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 Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ZIRC	ZIRC	
	U	U	
	4 000514536	0 to 5	

Burnup Summary (MWd) ³			Basis for burnup used in estimate ⁴
Nominal Bounding	From SFD	Estimated	
	780.26	771.41	
		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
Nominal Bounding	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0 08	0 99	
	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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 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
Cm-243	1 7426E-04	11 83	23 65	0 00E+00	2 06E-03	4 12E-03	0 1250	6 611E+10
Cm-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
Cs-154	6 0320E-03	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
Eu-155	7 9296E-07	11 83	23 65	0 00E+00	9.38E-06	1 88E-05	2.7500	1.365E+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 0900	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	Thermal Power	
U-233	2 5856E-08	11 83	23 65	0.00E+00	3 06E-07	6.12E-07	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	5 2665E-05	11 83	23 65	0 00E+00	6 23E-04	1.25E-03	2.14E-01	4.28E-01
U-235	-1 4487E-06	11 83	0 00	1.32E-04	1.15E-04	1.32E-04	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		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

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0 18		1 00
Bounding	0 35		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name LOFT SQUARE FUEL MODULE
SNF ID # 129
Fuel Units & Descr. 4 - 15 X 15 ROD ARRAY
Heavy Metal Mass BOL=815 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

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 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		
Ti-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	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding		ZIRC	
BOL HM Constituents		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

¹Fuel decay start date: 1983
 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:
 18"x15"
 1 00

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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		
Th-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		
U-234	3 8769E-07	293,891.20	293,891.20	0 00E+00	1 14E-01	1 14E-01		
U-235	-2 7761E-06	293,891.20	0 00	1 26E+00	4 41E-01	1 26E+00		
U-236	1 6190E-05	293,891.20	293,891.20	0 00E+00	4 76E+00	4 76E+00		
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: 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	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	UNKNOWN	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
	From SFD	Estimated	
Nominal		293,891.20	
Bounding		293,891.20	

Checks			Estimated EOL HM/Given EOL HM 1 02
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	10 12		
Bounding	10 12		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name LWR SNF SCRAP (ZR/SST)
SNF ID # 940
Fuel Units & Descr: 9 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=161 862kg EOL=154.224kg
ROD Storage Site: INEEL

¹Fuel decay start date 1983
Estimates as of 2030
Template PWR (Light Water, Zirc 0 to 5%, U)
²Template Burnup(MWd)- 61.92
Template BOL Heavy Metal Mass (MT) 0.00176911
Template Decay Time 35 years

Estimated
Canister usage:
18"x10"
0.69

II. Estimates							Gamma Sources	
	m	X _n	X _b	b	Y _n	Y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	8.7758E-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
Cl-36	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+13
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		
Th-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:
Reactor Moderator Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ZIRC OR SST	ZIRC	
	U	U	This fuel matches on all parameters except possibly cladding
	3.923	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal Bounding	From SFD	Estimated	
		7,263.66	
		14,527.32	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: MISCELLANEOUS RSWF FUEL
SNF ID #: 366
Fuel Units & Descr: 1 - UNKNOWN
Heavy Metal Mass: BOL = 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

II. Estimates							Gamma Sources	
	m	x _n	x _b	b	y _n	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	6.1822E-12	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		

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 BOL heavy metal (it is mostly U with a little Pu)
Fuel Cladding	SST	SST	
BOL HM Constituents	UNKNOWN	Pu and U	
BOL Enrichment %		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		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
Bounding		28,967.98	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.02		1.00
Bounding	0.05		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name MISCELLANEOUS TREAT FUEL (MOX)
SNF ID # 369
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 (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 01

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	2 3072E-06	114 14	114 14	0 00E+00	2.63E-04	2.63E-04	0 0150	1 399E+14
Am-241	8 4448E+00	114 14	114 14	0 00E+00	9 64E+02	9 64E+02	0 0250	2 783E+13
Am-242m	1 6848E-02	114 14	114 14	0 00E+00	1 92E+00	1.92E+00	0 0375	2 431E+13
Am-243	1 6320E-02	114 14	114 14	0 00E+00	1.86E+00	1.86E+00	0 0575	3 826E+13
C-14	1 2090E-01	114 14	114 14	0 00E+00	1.38E+01	1.38E+01	0 0850	1 493E+13
Cl-36	2 2849E-03	114 14	114 14	0 00E+00	2 61E-01	2 61E-01	0 1250	1 170E+13
Cm-243	8 6624E-04	114 14	114 14	0 00E+00	9 89E-02	9 89E-02	0 2250	1 294E+12
Cm-244	1 6848E-01	114 14	114 14	0 00E+00	1 92E+01	1 92E+01	0 3750	5 533E+12
Co-60	2 8086E+01	114 14	114 14	0 00E+00	3.21E+03	3.21E+03	0 5750	8 997E+13
Cs-134	3 4148E-04	114 14	114 14	0 00E+00	3 90E-02	3 90E-02	0 8500	3 438E+12
Cs-135	4 3976E-04	114 14	114 14	0 00E+00	5 02E-02	5 02E-02	1 2500	2 403E+14
Cs-137	2 1049E+01	114 14	114 14	0 00E+00	2 40E+03	2 40E+03	1 7500	1 063E+11
Eu-154	1 2500E+00	114 14	114 14	0 00E+00	1 43E+02	1 43E+02	2 2500	1 260E+09
Eu-155	6 8986E-02	114 14	114 14	0 00E+00	7 87E+00	7 87E+00	2 7500	3 552E+08
Fe-55	2 9308E-01	114 14	114 14	0 00E+00	3 35E+01	3 35E+01	3 5000	2 842E+05
H-3	2 4311E-01	114 14	114 14	0 00E+00	2 77E+01	2 77E+01	5 0000	1 207E+05
I-129	1 0618E-05	114 14	114 14	0 00E+00	1 21E-03	1 21E-03	7 0000	1 382E+04
Kr-85	5 9882E-01	114 14	114 14	0 00E+00	6 83E+01	6 83E+01	11.0000	1 582E+03
Np-237	1 5668E-04	114 14	114 14	0 00E+00	1.79E-02	1.79E-02		
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

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate
Nominal		114 14	
Bounding		114 14	Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	14.21		
Bounding	14.21		591 64

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CvMWd 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	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	5.595E+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		
Th-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		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.16E+00	2.16E+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	GRAPHITE	GRAPHITE	This Template was used for the following reasons: This fuel matches on all parameters except cladding (unknown) and enrichment (unknown)
BOL HM Constituents	UNKNOWN	ZIRC	
BOL Enrichment %	U	U	
		0 to 5	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate ²
Nominal	From SFD	Estimated	
Bounding	126.70	126.70	Nominal burnup set equal to bounding burnup.
		126.70	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	87.91		1.83
	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
SNF ID #: 1062
Fuel Units & Descr: 105 - CANISTER OF SCRAP
Heavy Metal Mass BOL = EOL=265 975kg
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
HIC
105.00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-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
Cl-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	8.66E-02		
Y-90	6.4180E-01	266.26	532.51	0.00E+00	1.71E+02	3.42E+02		
Other Radionuclides					2.54E+02	5.07E+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)
Reactor Moderator	From SFD LIGHT WATER	- Used 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 taken from SFD and converted to MWd using BOL=266.255kg Bounding burnup assumed to be twice nominal burnup
Nominal	From SFD 266.26	Estimated 532.51	
Bounding			
Checks			Estimated EOL HM/Given EOL HM 1.00
Nominal	Burnup Multiplier 0.03	Estimated Burnup/ Given Burnup	
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

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	4.521 60	9.043 20	0.00E+00	9.07E-06	1.81E-05	Avg. MeV	
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
Cl-36	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

	From SFD	Used	Basis for Parameter Differences:
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

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	4,521 60	3,215.32	
Bounding		9 043.20	

Nominal burnup taken directly from SFD (converted to MWd)

Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.57	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

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	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	4.1176E-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	
Bounding		6,782.40	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.57	0.71	
Bounding	1.14		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: 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"x10"
0 78

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	6.863 03	13,726 05	0 00E+00	6 02E-06	1.20E-05	Avg. MeV	
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:
Reactor Moderator:	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ZIRC	ZIRC	
BOL Enrichment %	U	U	
	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	
Bounding	1.960 00	13,726.05	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	5.00	5 17	
Bounding	10.00	7 00	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: ORR
SNF ID #: 461
Fuel Units & Descr: 17 - 19 CURVED PLATES
Heavy Metal Mass: BOL=4 981kg EOL=3.252kg
ROD Storage Site: SRS
Fuel decay start date: 1985
Estimates as of: 2030
Template: ATR (Light Water Alum, 60 to 100% U)
Template Burnup (MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated
Canister usage:
18"x10"
0.47

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	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*
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ALUM	ALUM	
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		3,274.60	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	1.04	3.46010	1.03
Bounding	2.09		

*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: 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	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3 4276E-08	1,824 78	3 649 55	0 00E+00	6 25E-05	1 25E-04	Avg MeV	
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		
Ti-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		

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 14242653	60 to 100	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		1 824 78	
Bounding		3 649 55	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 72		
Bounding	1 43		1 00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name PATHFINDER (SUPERHEATER)
SNF ID #: 814
Fuel Units & Descr: 6 - ROD
Heavy Metal Mass BOL=0.796kg EOL=0.796kg
ROD Storage Site INEEL

Fuel decay start date 1967
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
18"x10"
0.05

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.4276E-08	15.04	30.09	0.00E+00	5.16E-07	1.03E-06	Avg MeV	
Am-241	1.1458E-04	15.04	30.09	0.00E+00	1.72E-03	3.45E-03	0.0150	1.569E+12
Am-242m	7.9468E-09	15.04	30.09	0.00E+00	1.20E-07	2.39E-07	0.0250	3.260E+11
Am-243	9.8386E-10	15.04	30.09	0.00E+00	1.48E-08	2.96E-08	0.0375	2.826E+11
C-14	2.2978E-04	15.04	30.09	0.00E+00	3.46E-03	6.91E-03	0.0575	3.040E+11
Cf-252	1.2261E-06	15.04	30.09	0.00E+00	1.84E-05	3.69E-05	0.0850	1.836E+11
Cm-243	1.7271E-10	15.04	30.09	0.00E+00	2.60E-09	5.20E-09	0.1250	1.191E+11
Cm-244	1.3058E-09	15.04	30.09	0.00E+00	1.96E-08	3.93E-08	0.2250	1.583E+11
Co-60	9.8636E-03	15.04	30.09	0.00E+00	1.48E-01	2.97E-01	0.3750	6.903E+10
Cs-134	1.9617E-08	15.04	30.09	0.00E+00	2.95E-07	5.90E-07	0.5750	1.149E+12
Cs-135	3.0316E-05	15.04	30.09	0.00E+00	4.56E-04	9.12E-04	0.8500	1.135E+10
Cs-137	1.0263E+00	15.04	30.09	0.00E+00	1.54E+01	3.09E+01	1.2500	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	2.38E-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		
Ti-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) 1.76E-01
Bounding Heat Output (Watts) 3.51E-01
Total Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	SST	SST	
	U	U	
	93.14242815	60 to 100	
Burnup Summary (MWd) ²			Basis for burnup used in estimate*
Nominal Bounding	From SFD	Estimated	
		15.04	
		30.09	
Checks			Estimated EOL HM/Given EOL HM
Nominal Bounding	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0.40		
	0.81		
			0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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	1.2261E-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		
Se-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		
Ti-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	Thermal Power	
U-233	3.1847E-09	9,621.24	19,242.47	0.00E+00	3.06E-05	6.13E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	3.8769E-07	9,621.24	19,242.47	0.00E+00	3.73E-03	7.46E-03	1.68E+02	3.36E+02
U-235	-2.7761E-06	9,621.24	0.00	2.28E-01	2.02E-01	2.28E-01	Total	Total
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			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.36	32.36	1.00
Bounding	0.72	30.87	

*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 PEACH BOTTOM (ASSEMBLY)
 SNF ID # 385
 Fuel Units & Descr: 2 - 7 X 7 ROD ARRAY
 Heavy Metal Mass: BOL=288.335kg EOL=285.305kg
 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
 18"x15"
 1.00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-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
Cm-243	1.7426E-04	2,881.39	5,762.77	0.00E+00	5.02E-01	1.00E+00	0.1250	1.611E+13
Cm-244	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	2.053E+12
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	2.429812544	0 to 5	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	2,476.80	2,881.39	
Bounding	2,479.97	5,762.77	

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

Checks

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

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-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		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
	809.75	7.493.51	
Nominal			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	
	2.71	9.25	
Nominal			
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 1 CORE 1
SNF ID #: 169
Fuel Units & Descr: 2 - SCRAP
Heavy Metal Mass BOL=3 746kg EOL=3.56kg
ROD Storage Site INEEL

Fuel decay start date 1969
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 50 years

Estimated
Canister usage:
18"x15"
0 15

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.2062E-06	176.28	352.57	0.00E+00	7.41E-04	1.48E-03	Avg MeV	
Am-241	3.2229E-03	176.28	352.57	0.00E+00	5.68E-01	1.14E+00	0.0150	1.735E+13
Am-242m	2.2381E-06	176.28	352.57	0.00E+00	3.95E-04	7.89E-04	0.0250	3.543E+12
Am-243	4.6006E-05	176.28	352.57	0.00E+00	8.11E-03	1.62E-02	0.0375	3.075E+12
C-14	2.3082E-05	176.28	352.57	0.00E+00	4.07E-03	8.14E-03	0.0575	3.322E+12
Cl-36	1.0667E-06	176.28	352.57	0.00E+00	1.88E-04	3.76E-04	0.0850	2.005E+12
Cm-243	1.7602E-05	176.28	352.57	0.00E+00	3.10E-03	6.21E-03	0.1250	1.319E+12
Cm-244	3.6307E-03	176.28	352.57	0.00E+00	6.40E-01	1.28E+00	0.2250	1.736E+12
Co-60	6.2585E-05	176.28	352.57	0.00E+00	1.10E-02	2.21E-02	0.3750	7.518E+11
Cs-134	2.4585E-07	176.28	352.57	0.00E+00	4.33E-05	8.67E-05	0.5750	1.234E+13
Cs-135	2.4711E-05	176.28	352.57	0.00E+00	4.36E-03	8.71E-03	0.8500	1.542E+11
Cs-137	9.3838E-01	176.28	352.57	0.00E+00	1.65E+02	3.31E+02	1.2500	7.446E+10
Eu-154	4.6887E-03	176.28	352.57	0.00E+00	8.27E-01	1.65E+00	1.7500	4.734E+09
Eu-155	1.2793E-04	176.28	352.57	0.00E+00	2.26E-02	4.51E-02	2.2500	3.939E+05
Fe-55	8.1951E-10	176.28	352.57	0.00E+00	1.44E-07	2.89E-07	2.7500	6.379E+09
H-3	1.6839E-03	176.28	352.57	0.00E+00	2.97E-01	5.94E-01	3.5000	2.104E+04
I-129	1.0092E-06	176.28	352.57	0.00E+00	1.78E-04	3.56E-04	5.0000	8.956E+03
Kr-85	1.4981E-02	176.28	352.57	0.00E+00	2.64E+00	5.28E+00	7.0000	1.027E+03
Np-237	1.2556E-05	176.28	352.57	0.00E+00	2.21E-03	4.43E-03	11.0000	1.177E+02
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		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences*
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

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		176.28	
Bounding	115.37	352.57	

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	0.47		
Bounding	0.94	3.06	

*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: 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

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.2062E-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
Cl-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+15
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	1.338E+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		
Ti-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		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							7.13E+02	8.40E+02
							Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		44,649.60
Bounding	52,578.31	89,299.20

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup taken directly from SFD (converted to MWd)

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.26	
Bounding	0.31	1.70

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name PEACH BOTTOM UNIT 1 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

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	4.2062E-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		
Other Radionuclides					8.49E+04	9.13E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	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	
Bounding:	101,007.91	188.006.68	

Nominal burnup calculated from the heavy metal mass destroyed
Bounding burnup taken directly from SFD (converted to MWd)

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.68		
Bounding:	0.73	1.86	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4 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		
Ti-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 64E+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	867 05	-98 73	Bounding burnup taken directly from SFD (converted to MWd).

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

¹Fuel decay start date 1983
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
18"x15"
0 07

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2 3344E-08	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		
Ti-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		

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	NONE	SST	This Template was used for the following reasons: This fuel matches on all parameters except cladding (SST is conservative) and enrichment (unknown)
BOL HM Constituents	U	U	
BOL Enrichment %		60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
Bounding		22,320 13	Nominal burnup set equal to bounding burnup
		22,320 13	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	10 12	10 12	1.02

*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: 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

¹Fuel decay start date: 1984
 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.
 18"x15"
 0 07

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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		
Th-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons
Fuel Cladding	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

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		19 489 03	Nominal burnup set equal to bounding burnup
Bounding		19 489 03	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		

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

²Total burnup for all fuel associated with this worksheet must be 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

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	2.3344E-08	19,237.75	19,237.75	0.00E+00	4.49E-04	4.49E-04	0.0150	1.436E+15
Am-241	1.1135E-04	19,237.75	19,237.75	0.00E+00	2.14E+00	2.14E+00	0.0250	2.984E+14
Am-242m	8.5075E-09	19,237.75	19,237.75	0.00E+00	1.64E-04	1.64E-04	0.0375	2.581E+14
Am-243	9.8519E-10	19,237.75	19,237.75	0.00E+00	1.90E-05	1.90E-05	0.0575	2.782E+14
C-14	2.3012E-04	19,237.75	19,237.75	0.00E+00	4.43E+00	4.43E+00	0.0850	1.681E+14
Cl-36	1.2261E-06	19,237.75	19,237.75	0.00E+00	2.36E-02	2.36E-02	0.1250	1.091E+14
Cm-243	2.4875E-10	19,237.75	19,237.75	0.00E+00	4.79E-06	4.79E-06	0.2250	1.447E+14
Cm-244	2.3178E-09	19,237.75	19,237.75	0.00E+00	4.46E-05	4.46E-05	0.3750	6.311E+13
Co-60	7.0849E-02	19,237.75	19,237.75	0.00E+00	1.36E+03	1.36E+03	0.5750	1.040E+15
Cs-134	3.0266E-06	19,237.75	19,237.75	0.00E+00	5.82E-02	5.82E-02	0.8500	1.052E+13
Cs-135	3.0316E-05	19,237.75	19,237.75	0.00E+00	5.83E-01	5.83E-01	1.2500	1.046E+14
Cs-137	1.4511E+00	19,237.75	19,237.75	0.00E+00	2.79E+04	2.79E+04	1.7500	2.714E+11
Eu-154	6.6955E-04	19,237.75	19,237.75	0.00E+00	1.29E+01	1.29E+01	2.2500	5.635E+08
Eu-155	6.9850E-04	19,237.75	19,237.75	0.00E+00	1.34E+01	1.34E+01	2.7500	1.629E+07
Fe-55	1.2318E-03	19,237.75	19,237.75	0.00E+00	2.37E+01	2.37E+01	3.5000	1.149E+03
H-3	2.5141E-03	19,237.75	19,237.75	0.00E+00	4.84E+01	4.84E+01	5.0000	4.724E+02
I-129	7.3195E-07	19,237.75	19,237.75	0.00E+00	1.41E-02	1.41E-02	7.0000	5.216E+01
Kr-85	4.1281E-02	19,237.75	19,237.75	0.00E+00	7.94E+02	7.94E+02	11.0000	5.853E+00
Np-237	1.1489E-06	19,237.75	19,237.75	0.00E+00	2.21E-02	2.21E-02		
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		
U-235	-2.7761E-06	19,237.75	0.00	8.23E-02	2.89E-02	8.23E-02		
U-236	1.6190E-05	19,237.75	19,237.75	0.00E+00	3.11E-01	3.11E-01		
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					3.18E+04	3.18E+04		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Reactor Moderator: Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	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)
	LIGHT WATER	LIGHT WATER	
	NONE	SST	
	U	U	
		60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
		19,237.75	
Nominal		19,237.75	
Bounding		19,237.75	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
	10 12		
Nominal	10 12		1.02
Bounding	10 12		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PNL 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 _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-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	Thermal Power	
U-233	3.6128E-04	218.58	218.58	0.00E+00	7.90E-02	7.90E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.2788E-02	218.58	218.58	0.00E+00	2.80E+00	2.80E+00	2.15E+02	2.18E+02
U-235	5.7486E-04	218.58	218.58	1.98E-04	1.26E-01	1.26E-01	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
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

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		218.58	Nominal burnup set equal to bounding burnup.
Bounding		218.58	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name PNL MOX FUEL
SNF ID # 415
Fuel Units & Descr. 7 - FUEL MELTED IN EXP
Heavy Metal Mass BOL= , EOL=0.01kg
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"
0.51

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	9.31	9.31	0.00E+00	2.15E-05	2.15E-05	Avg MeV	
Am-241	8.4448E+00	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	0.00E+00	1.57E-01	1.57E-01	0.0250	2.271E+12
Am-243	1.6320E-02	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	0.00E+00	1.13E+00	1.13E+00	0.0575	3.122E+12
Cl-36	2.2849E-03	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	0.00E+00	8.07E-03	8.07E-03	0.1250	9.549E+11
Cm-244	1.6848E-01	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	0.00E+00	2.62E+02	2.62E+02	0.3750	4.515E+11
Cs-134	3.4148E-04	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	0.00E+00	4.10E-03	4.10E-03	0.8500	2.806E+11
Cs-137	2.1049E+01	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	0.00E+00	1.16E+01	1.16E+01	1.7500	8.675E+09
Eu-155	6.8986E-02	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	0.00E+00	2.73E+00	2.73E+00	2.7500	2.898E+07
H-3	2.4311E-01	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	0.00E+00	9.89E-05	9.89E-05	5.0000	9.850E+03
Kr-85	5.9882E-01	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	0.00E+00	1.46E-03	1.46E-03	11.0000	1.291E+02
Pa-231	2.8656E-06	9.31	9.31	0.00E+00	2.67E-05	2.67E-05		
Pb-210	2.3918E-08	9.31	9.31	0.00E+00	2.23E-07	2.23E-07		
Pm-147	1.6900E-02	9.31	9.31	0.00E+00	1.57E-01	1.57E-01		
Pu-238	-8.6120E-01	9.31	0.00	2.52E+00	0.00E+00	2.52E+00		
Pu-239	-4.8440E-02	9.31	0.00	3.05E-01	0.00E+00	3.05E-01		
Pu-240	-3.0095E-01	9.31	0.00	3.89E-01	0.00E+00	3.89E-01		
Pu-241	-1.0411E+02	9.31	0.00	1.00E+02	0.00E+00	1.00E+02		
Pu-242	-1.1381E-04	9.31	0.00	1.68E-03	6.25E-04	1.68E-03		
Ra-226	6.4400E-08	9.31	9.31	0.00E+00	6.00E-07	6.00E-07		
Ra-228	5.9952E-07	9.31	9.31	0.00E+00	5.58E-06	5.58E-06		
Ru-106	8.5526E-07	9.31	9.31	0.00E+00	7.97E-06	7.97E-06		
Se-79	1.9181E-04	9.31	9.31	0.00E+00	1.79E-03	1.79E-03		
Sn-126	1.6671E-04	9.31	9.31	0.00E+00	1.55E-03	1.55E-03		
Sr-90	1.9799E+01	9.31	9.31	0.00E+00	1.84E+02	1.84E+02		
Tc-99	6.7678E-03	9.31	9.31	0.00E+00	6.30E-02	6.30E-02		
Th-229	1.7488E-06	9.31	9.31	0.00E+00	1.63E-05	1.63E-05		
Th-230	5.8704E-06	9.31	9.31	0.00E+00	5.47E-05	5.47E-05		
Th-232	6.0208E-07	9.31	9.31	0.00E+00	5.61E-06	5.61E-06		
Th-208	8.7573E-05	9.31	9.31	0.00E+00	8.16E-04	8.16E-04		
U-232	2.3706E-04	9.31	9.31	0.00E+00	2.21E-03	2.21E-03		
U-233	3.6128E-04	9.31	9.31	0.00E+00	3.36E-03	3.36E-03		
U-234	1.2788E-02	9.31	9.31	0.00E+00	1.19E-01	1.19E-01		
U-235	5.7486E-04	9.31	9.31	8.43E-06	5.36E-03	5.36E-03		
U-236	2.3485E-04	9.31	9.31	0.00E+00	2.19E-03	2.19E-03		
U-238	1.1581E-04	9.31	9.31	1.05E-06	1.08E-03	1.08E-03		
Y-90	1.9804E+01	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: This fuel didn't closely match any existing templates, therefore the worst case template was used.
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 %		0 to 100	

Burnup Summary (MWd) ²		Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL
	From SFD	
Nominal	9.31	
Bounding	9.31	

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PNL MOX FUEL 7055
SNF ID #: 416
Fuel Units & 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"
0.88

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	54.74	54.74	0.00E+00	1.26E-04	1.26E-04	Avg MeV	
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		
Th-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		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.39E+01	5.46E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL
Nominal Bounding	From SFD	Estimated	
		54.74	
		54.74	

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PNL MOX FUEL 7057
 SNF ID #: 417
 Fuel Units & Descr: 4 - SCRAP
 Heavy Metal Mass: BOL= , EOL=2.44kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1988
 Estimates as of: 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		
Se-79	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:
Reactor Moderator	From SFD	Used	
	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		2,318.86	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 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 _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-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
Ck-36	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		
Ti-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	Thermal Power	
U-234	1.2788E-02	614.88	614.88	0.00E+00	7.86E+00	7.86E+00	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	5.7486E-04	614.88	614.88	5.57E-04	3.54E-01	3.54E-01	6.06E+02	6.13E+02
U-236	2.3485E-04	614.88	614.88	0.00E+00	1.44E-01	1.44E-01	Total	Total
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:
Nominal	From SFD	Estimated	
Bounding		614.88	Nominal burnup set equal to bounding burnup
		614.88	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		591.64
	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 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	
Radionuclide	CI/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	4.75	4.75	0.00E+00	1.10E-05	1.10E-05	Avg. MeV	
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	Thermal Power	
U-233	3.6128E-04	4.75	4.75	0.00E+00	1.72E-03	1.72E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.2788E-02	4.75	4.75	0.00E+00	6.08E-02	6.08E-02	4.68E+00	4.74E+00
U-235	5.7486E-04	4.75	4.75	4.30E-06	2.74E-03	2.74E-03	Total	Total
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		

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		

*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 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	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	52.27	52.27	0.00E+00	1.21E-04	1.21E-04	Avg MeV	
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		
Ti-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:
	From SFD	Used	
Reactor Moderator	LIGHT WATER	(Worst Case)	
Fuel Cladding	SST	SST/Inconel	
BOL HM Constituents	Pu and U	U, Th, & Pu	
BOL Enrichment %		0 to 100	

This fuel didn't closely match any existing templates, therefore the worst case template was used

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		52.27	Nominal burnup set equal to bounding burnup
Bounding		52.27	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 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

II. Estimates							Gamma Sources	
	m	x _n	x _b	b	y _n	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	2.3072E-06	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		
Ti-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	Thermal Power	
U-233	3.6128E-04	57.02	57.02	0.00E+00	2.06E-02	2.06E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.2788E-02	57.02	57.02	0.00E+00	7.29E-01	7.29E-01	5.62E+01	5.69E+01
U-235	5.7486E-04	57.02	57.02	5.16E-05	3.28E-02	3.28E-02	Total	Total
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		
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: This fuel didn't closely match any existing templates, therefore the worst case template was used.
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 %		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
	From SFD	Estimated	
Nominal:		57.02	
Bounding:		57.02	

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PNL 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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CvMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2 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
Cf-252	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		
Ti-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		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.30E+02	1.32E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL
Nominal		132.10	
Bounding		132.10	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 591 64
Nominal	14.21		
Bounding	14.21		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name PNL MOX 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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-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	2.74E+00	0.00E+00	2.74E+00		
Pu-241	-1.0411E+02	65.57	0.00	7.05E+02	0.00E+00	7.05E+02		
Pu-242	-1.1381E-04	65.57	0.00	1.19E-02	4.40E-03	1.19E-02		
Ra-226	6.4400E-08	65.57	65.57	0.00E+00	4.22E-06	4.22E-06		
Ra-228	5.9952E-07	65.57	65.57	0.00E+00	3.93E-05	3.93E-05		
Ru-106	8.5526E-07	65.57	65.57	0.00E+00	5.61E-05	5.61E-05		
Se-79	1.9181E-04	65.57	65.57	0.00E+00	1.26E-02	1.26E-02		
Sn-126	1.6671E-04	65.57	65.57	0.00E+00	1.09E-02	1.09E-02		
Sr-90	1.9799E+01	65.57	65.57	0.00E+00	1.30E+03	1.30E+03		
Tc-99	6.7678E-03	65.57	65.57	0.00E+00	4.44E-01	4.44E-01		
Th-229	1.7488E-06	65.57	65.57	0.00E+00	1.15E-04	1.15E-04		
Th-230	5.8704E-06	65.57	65.57	0.00E+00	3.85E-04	3.85E-04		
Th-232	6.0208E-07	65.57	65.57	0.00E+00	3.95E-05	3.95E-05		
Th-208	8.7573E-05	65.57	65.57	0.00E+00	5.74E-03	5.74E-03		
U-232	2.3706E-04	65.57	65.57	0.00E+00	1.55E-02	1.55E-02	Thermal Power	
U-233	3.6128E-04	65.57	65.57	0.00E+00	2.37E-02	2.37E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.2788E-02	65.57	65.57	0.00E+00	8.39E-01	8.39E-01	6.46E+01	6.54E+01
U-235	5.7486E-04	65.57	65.57	5.94E-05	3.78E-02	3.78E-02	Total	Total
U-236	2.3485E-04	65.57	65.57	0.00E+00	1.54E-02	1.54E-02		
U-238	1.1581E-04	65.57	65.57	7.39E-06	7.60E-03	7.60E-03		
Y-90	1.9804E+01	65.57	65.57	0.00E+00	1.30E+03	1.30E+03		
Other Radionuclides					4.04E+03	4.04E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences ¹
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

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		65.57	Nominal burnup set equal to bounding burnup
Bounding		65.57	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PNL MOX STAR 7

SNF ID #: 422

Fuel Units & Descr.: 1 - SCRAP

Heavy Metal Mass: BOL = ; EOL = 0.348kg

ROD Storage Site: INEEL

Fuel decay start date: 1985

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

	m	X _m	X _b	b	Y _m	Y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	330.72	330.72	0.00E+00	7.63E-04	7.63E-04	Avg MeV	
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	1.109E+14
Ct-36	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		
Ti-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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	(Worst Case)
Fuel Cladding	SST	SST/Inconel
BOL HM Constituents	Pu and U	U, Th, & Pu
BOL Enrichment %		0 to 100

Basis for Parameter Differences:

This fuel didn't closely match any existing templates, therefore the worst case template was used.

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		330.72
Bounding		330.72

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	14.21	
Bounding	14.21	

Estimated EOL HM/Given EOL HM

591.64

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name PNL-3
SNF ID #: 420
Fuel Units & Descr: 6 - ROD
Heavy Metal Mass: BOL = ; EOL=0.064kg
ROD Storage Site INEEL

Fuel decay start date 1969
Estimates as of 2030
Template (Worst Case)
Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT) 0.00186865
Template Decay Time 50 years

Estimated
Canister usage
18"x15"
0.44

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	2.5200E-06	61.01	61.01	0.00E+00	1.54E-04	1.54E-04	Avg MeV	
Am-241	8.6432E+00	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	0.00E+00	9.60E-01	9.60E-01	0.0250	1.021E+13
Am-243	1.6288E-02	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	0.00E+00	7.36E+00	7.36E+00	0.0575	1.631E+13
Cl-36	2.2849E-03	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	0.00E+00	3.67E-02	3.67E-02	0.1250	3.868E+12
Cm-244	9.4880E-02	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	0.00E+00	2.38E+02	2.38E+02	0.3750	2.048E+12
Cs-134	2.2139E-06	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	0.00E+00	2.68E-02	2.68E-02	0.8500	7.423E+11
Cs-137	1.4887E+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	0.00E+00	2.28E+01	2.28E+01	1.7500	2.187E+10
Eu-155	8.4893E-03	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	0.00E+00	3.28E-01	3.28E-01	2.7500	1.628E+08
H-3	1.0472E-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	0.00E+00	6.48E-04	6.48E-04	5.0000	3.745E+04
Kr-85	2.2717E-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	0.00E+00	1.00E-02	1.00E-02	11.0000	4.865E+02
Pa-231	2.8688E-06	61.01	61.01	0.00E+00	1.75E-04	1.75E-04		
Pb-210	4.7312E-08	61.01	61.01	0.00E+00	2.89E-06	2.89E-06		
Pm-147	3.2198E-04	61.01	61.01	0.00E+00	1.96E-02	1.96E-02		
Pu-238	-1.1924E+00	61.01	0.00	1.65E+01	0.00E+00	1.65E+01		
Pu-239	-4.8600E-02	61.01	0.00	2.00E+00	0.00E+00	2.00E+00		
Pu-240	-3.0127E-01	61.01	0.00	2.55E+00	0.00E+00	2.55E+00		
Pu-241	-1.2917E+02	61.01	0.00	6.56E+02	0.00E+00	6.56E+02		
Pu-242	-1.1381E-04	61.01	0.00	1.10E-02	4.09E-03	1.10E-02		
Ra-226	1.0760E-07	61.01	61.01	0.00E+00	6.56E-06	6.56E-06		
Ra-228	6.0160E-07	61.01	61.01	0.00E+00	3.67E-05	3.67E-05		
Ru-106	1.3388E-13	61.01	61.01	0.00E+00	8.17E-12	8.17E-12		
Se-79	1.9179E-04	61.01	61.01	0.00E+00	1.17E-02	1.17E-02		
Sn-126	1.6669E-04	61.01	61.01	0.00E+00	1.02E-02	1.02E-02		
Sr-90	1.3859E+01	61.01	61.01	0.00E+00	8.46E+02	8.46E+02		
Tc-99	6.7678E-03	61.01	61.01	0.00E+00	4.13E-01	4.13E-01		
Th-229	2.2592E-06	61.01	61.01	0.00E+00	1.38E-04	1.38E-04		
Th-230	7.5955E-06	61.01	61.01	0.00E+00	4.63E-04	4.63E-04		
Th-232	6.0208E-07	61.01	61.01	0.00E+00	3.67E-05	3.67E-05		
Ti-208	7.5795E-05	61.01	61.01	0.00E+00	4.62E-03	4.62E-03		
U-232	2.0521E-04	61.01	61.01	0.00E+00	1.25E-02	1.25E-02	Thermal Power	
U-233	3.6128E-04	61.01	61.01	0.00E+00	2.20E-02	2.20E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.2788E-02	61.01	61.01	0.00E+00	7.80E-01	7.80E-01	3.27E+01	3.34E+01
U-235	5.7486E-04	61.01	61.01	5.52E-05	3.51E-02	3.51E-02	Total	Total
U-236	2.3485E-04	61.01	61.01	0.00E+00	1.43E-02	1.43E-02		
U-238	1.1581E-04	61.01	61.01	6.87E-06	7.07E-03	7.07E-03		
Y-90	1.3861E+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

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

Burnup Summary (MWd)²

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

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
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)	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
Cf-252	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		
Ti-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

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding	ZIRC	ZIRC	This fuel matches PWR Template on all but one parameter (enrichment) making PWR a reasonable match.
BOL HM Constituents	U	U	
BOL Enrichment %	5 996	0 to 5	

Burnup Summary (MWd)²

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
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-N C STATE UNIV (4% ASSEMBLIES)
 SNF ID #: 175
 Fuel Units & Descr: 25 - 5 X 5 ROD ARRAY
 Heavy Metal Mass: BOL=316 87kg, EOL=315 902kg
 ROD Storage Site: INEEL

Fuel decay start date: 2035
 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: 5 years

Estimated
 Canister usage
 18"x10"
 1 25

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	2 3547E-10	920 05	1,840 09	0 00E+00	2 17E-07	4 33E-07	0 0150	2 626E+14
Am-241	6 5811E-02	920 05	1,840 09	0 00E+00	6 05E+01	1 21E+02	0 0250	6 048E+13
Am-242m	3 2913E-04	920 05	1,840 09	0 00E+00	3 03E-01	6 06E-01	0 0375	5 662E+13
Am-243	6 2742E-04	920 05	1,840 09	0 00E+00	5 77E-01	1 15E+00	0 0575	5 276E+13
C-14	4 8078E-05	920 05	1,840 09	0 00E+00	4 42E-02	8 85E-02	0 0850	3 332E+13
Cl-36	8 0313E-07	920 05	1,840 09	0 00E+00	7 39E-04	1 48E-03	0 1250	3 016E+13
Cm-243	5 2003E-04	920 05	1,840 09	0 00E+00	4 78E-01	9 57E-01	0 2250	2 835E+13
Cm-244	1 5441E-01	920 05	1,840 09	0 00E+00	1 42E+02	2 84E+02	0 3750	1 591E+13
Co-60	1 3196E-01	920 05	1,840 09	0 00E+00	1 21E+02	2 43E+02	0 5750	2 933E+14
Cs-134	9 6528E-01	920 05	1,840 09	0 00E+00	8 88E+02	1 78E+03	0 8500	6 786E+13
Cs-135	1 4433E-05	920 05	1,840 09	0 00E+00	1 33E-02	2 66E-02	1 2500	3 156E+13
Cs-137	2 7939E+00	920 05	1,840 09	0 00E+00	2 57E+03	5 14E+03	1 7500	4 894E+11
Eu-154	2 2626E-01	920 05	1,840 09	0 00E+00	2 08E+02	4 16E+02	2 2500	2 456E+11
Eu-155	1 1680E-01	920 05	1,840 09	0 00E+00	1 07E+02	2 15E+02	2 7500	8 226E+09
Fe-55	1 2760E-01	920 05	1,840 09	0 00E+00	1 17E+02	2 35E+02	3 5000	1 055E+09
H-3	1 1168E-01	920 05	1,840 09	0 00E+00	1 03E+02	2 05E+02	5 0000	1 732E+06
I-129	9 8288E-07	920 05	1,840 09	0 00E+00	9 04E-04	1 81E-03	7 0000	1 997E+05
Kr-85	1 9606E-01	920 05	1,840 09	0 00E+00	1 80E+02	3 61E+02	11 0000	2 294E+04
Np-237	9 6915E-06	920 05	1,840 09	0 00E+00	8 92E-03	1 78E-02		
Pa-231	8 5917E-10	920 05	1,840 09	0 00E+00	7 90E-07	1 58E-06		
Pb-210	1 6247E-12	920 05	1,840 09	0 00E+00	1 49E-09	2 99E-09		
Pm-147	1 0063E+00	920 05	1,840 09	0 00E+00	9 26E+02	1 85E+03		
Pu-238	9 4428E-02	920 05	1,840 09	0 00E+00	8 69E+01	1 74E+02		
Pu-239	1 1631E-02	920 05	1,840 09	0 00E+00	1 07E+01	2 14E+01		
Pu-240	1 4919E-02	920 05	1,840 09	0 00E+00	1 37E+01	2 75E+01		
Pu-241	3 8130E+00	920 05	1,840 09	0 00E+00	3 51E+03	7 02E+03		
Pu-242	6 4260E-05	920 05	1,840 09	0 00E+00	5 91E-02	1 18E-01		
Ra-226	1 2608E-11	920 05	1,840 09	0 00E+00	1 16E-08	2 32E-08		
Ra-228	3 8986E-12	920 05	1,840 09	0 00E+00	3 59E-09	7 17E-09		
Ru-106	5 4910E-01	920 05	1,840 09	0 00E+00	5 05E+02	1 01E+03		
Se-79	1 2380E-05	920 05	1,840 09	0 00E+00	1 14E-02	2 28E-02		
Sn-126	2 5210E-05	920 05	1,840 09	0 00E+00	2 32E-02	4 64E-02		
Sr-90	1 8718E+00	920 05	1,840 09	0 00E+00	1 72E+03	3 44E+03		
Tc-99	3 9357E-04	920 05	1,840 09	0 00E+00	3 62E-01	7 24E-01		
Th-229	2 9603E-11	920 05	1,840 09	0 00E+00	2 72E-08	5 45E-08		
Th-230	4 5559E-09	920 05	1,840 09	0 00E+00	4 19E-06	8 38E-06		
Th-232	5 2826E-12	920 05	1,840 09	0 00E+00	4 86E-09	9 72E-09		
Ti-208	1 9654E-07	920 05	1,840 09	0 00E+00	1 81E-04	3 62E-04		
U-232	5 7607E-07	920 05	1,840 09	0 00E+00	5 30E-04	1 06E-03		
U-233	2 3288E-08	920 05	1,840 09	0 00E+00	2 14E-05	4 29E-05		
U-234	4 1182E-05	920 05	1,840 09	0 00E+00	3 79E-02	7 58E-02		
U-235	1 4494E-06	920 05	0 00	2 76E-02	2 62E-02	2 76E-02		
U-236	7 5646E-06	920 05	1,840 09	0 00E+00	6 96E-03	1 39E-02		
U-238	2 6129E-07	920 05	0 00	1 02E-01	1 02E-01	1 02E-01		
Y-90	1 8718E+00	920 05	1,840 09	0 00E+00	1 72E+03	3 44E+03		
Other Radionuclides					3 82E+03	7 64E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator: Fuel Cladding: BOL HM Constituents BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ZIRC	ZIRC	
	U	U	
	4 025941269	0 to 5	
Burnup Summary (MWd) ²			Basis for burnup used in estimate
Nominal Bounding	From SFD	Estimated	
		920 05 1,840 09	
			Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Checks			Estimated EOL HM/Given EOL HM
Nominal Bounding	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0 08		
	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: 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 4433E-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:
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
BOL HM Constituents:	ZIRC	ZIRC	This fuel matches PWR Template on all but one parameter (enrichment) making PWR a reasonable match.
BOL Enrichment %:	U	U	
	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		71 415 03	Bounding burnup assumed to be twice nominal burnup

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name 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

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3344E-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	1 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 61E-07	2.61E-07	0 1250	5 943E+12
Cm-244	2.3178E-09	1,047 61	1,047 61	0 00E+00	2 43E-06	2.43E-06	0.2250	7 879E+12
Co-60	7.0849E-02	1,047 61	1,047 61	0 00E+00	7 42E+01	7.42E+01	0.3750	3 437E+12
Cs-134	3 0266E-06	1,047 61	1,047 61	0 00E+00	3 17E-03	3.17E-03	0 5750	5 661E+13
Cs-135	3 0316E-05	1,047 61	1,047 61	0 00E+00	3 18E-02	3.18E-02	0 8500	5 730E+11
Cs-137	1 4511E+00	1,047 61	1,047 61	0 00E+00	1.52E+03	1.52E+03	1.2500	5.696E+12
Eu-154	6 6955E-04	1,047 61	1,047 61	0 00E+00	7 01E-01	7.01E-01	1 7500	1 478E+10
Eu-155	6 9850E-04	1,047 61	1,047 61	0 00E+00	7 32E-01	7.32E-01	2.2500	3 069E+07
Fe-55	1 2318E-03	1,047 61	1,047 61	0 00E+00	1 29E+00	1.29E+00	2.7500	8.871E+05
H-3	2 5141E-03	1,047 61	1,047 61	0 00E+00	2 63E+00	2.63E+00	3.5000	6.255E+01
I-129	7.3195E-07	1,047 61	1,047 61	0 00E+00	7 67E-04	7.67E-04	5 0000	2 573E+01
Kr-85	4 1281E-02	1,047 61	1,047 61	0 00E+00	4 32E+01	4.32E+01	7 0000	2 841E+00
Np-237	1.1489E-06	1,047 61	1,047 61	0 00E+00	1.20E-03	1.20E-03	11 0000	3 187E-01
Pa-231	4.5241E-08	1,047 61	1,047 61	0 00E+00	4 74E-05	4.74E-05		
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	1 22E+00	1.22E+00		
Pu-238	2 9517E-04	1,047 61	1,047 61	0 00E+00	3 09E-01	3.09E-01		
Pu-239	6 6772E-04	1,047 61	1,047 61	0 00E+00	7 00E-01	7.00E-01		
Pu-240	8 6839E-05	1,047 61	1,047 61	0 00E+00	9 10E-02	9.10E-02		
Pu-241	7 1514E-04	1,047 61	1,047 61	0 00E+00	7 49E-01	7.49E-01		
Pu-242	1 9717E-09	1,047 61	1,047 61	0 00E+00	2.07E-06	2.07E-06		
Ra-226	1.7654E-12	1,047 61	1,047 61	0 00E+00	1.85E-09	1.85E-09		
Ra-228	8.2928E-12	1,047 61	1,047 61	0 00E+00	8 69E-09	8.69E-09		
Ru-106	1.8419E-10	1,047 61	1,047 61	0 00E+00	1 93E-07	1.93E-07		
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		
Ti-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		
U-238	-2 8547E-09	1,047 61	0 00	4 84E-05	4.54E-05	4 84E-05		
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	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.83E+01	1.83E+01
Total	Total

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)²

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal	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
SNF ID #: 182
Fuel Units & Descr: 40 - 14 X 14 ROD ARRAY
Heavy Metal Mass: BOL=15287.2kg; EOL=15126.928kg
ROD Storage Site: INEEL

Fuel decay start date: 1972
Estimates as of: 2030
Template: PWR (Light Water, Zinc, 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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-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-05	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	8.0486E-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator: Fuel Cladding: BOL HM Constituents: BOL Enrichment %:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ZIRC	ZIRC	
	U	U	
	3.480035585	0 to 5	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal Bounding	From SFD	Estimated	
	154,660.60	152,411.09	
	218,499.95	304,822.18	
			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
Nominal Bounding	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0.29	0.99	
	0.41	1.40	
			1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

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	8.7456E-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		
Ti-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	Thermal Power	
U-233	3.6144E-04	2,276.58	4,553.16	0.00E+00	8.23E-01	1.65E+00	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.2788E-02	2,276.58	4,553.16	2.41E-01	2.91E+01	5.82E+01	5.85E+04	1.13E+05
U-235	5.7486E-04	2,276.58	4,553.16	0.00E+00	1.55E+00	2.86E+00	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	GRAPHITE	(Worst Case)	
Fuel Cladding	NONE	SST/Inconel	
BOL HM Constituents	U	U Th, & Pu	
BOL Enrichment %:	93.02375258	0 to 100	This fuel didn't closely match any existing templates, therefore the worst case template was used

Burnup Summary (MWd)⁴

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

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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: 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

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9 7360E-05	50,103.24	88,060.24	0.00E+00	4 88E+00	8 57E+00	Avg MeV	
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
Cm-243	3 0597E-07	50,103.24	88,060.24	0.00E+00	1 53E-02	2 69E-02	0 1250	5 594E+14
Cm-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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding	ZIRC	ZIRC	This fuel matches on all parameters except enrichment.
BOL HM Constituents	Th and U	Th and U	
BOL Enrichment %	0.089989331	60 to 100	

Burnup Summary (MWd)²

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
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 SHIPPINGPORT 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

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	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	1.84E+00	3.16E+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		
U-235	5.7813E-08	64,290.45	110,212.20	3.18E-04	4.03E-03	6.69E-03		
U-236	1.3273E-07	64,290.45	110,212.20	0.00E+00	8.53E-03	1.46E-02		
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		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons
Fuel Cladding	ZIRC	ZIRC	This fuel matches on all parameters except enrichment.
BOL HM Constituents	Th and U	Th and U	
BOL Enrichment %	0.071220718	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate ²
Nominal	64,290.45	40,678.11	Nominal burnup taken directly from SFD (converted to MWd)
Bounding	110,212.20	81,356.22	Bounding burnup taken directly from SFD (converted to MWd)

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.66	0.63	0.99
Bounding	1.13	0.74	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name SHIPPIINGPORT 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

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	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-05	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		
Ti-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: This Template was used for the following reasons: This fuel matches on all parameters except enrichment.
Reactor Moderator:	From SFD LIGHT WATER	Used LIGHT WATER	
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: Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup taken directly from SFD (converted to MWd)
Nominal	From SFD 129 014 55	Estimated 73,600 31	
Bounding	221,167 80	147,200 62	

Checks			Estimated EOL HM/Given EOL HM 0 99
Nominal	Burnup Multiplier 0 66	Estimated Burnup/ Given Burnup 0 57	
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 REFLCT 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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9.7360E-05	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

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

Burnup Summary (MWd)²

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 1.00
Nominal	0.10	0.00	
Bounding	0.20	0.00	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT LWBR REFLECT V
SNF ID #: 372
Fuel Units & Descr: 6 - 166 ROD ARRAY
Heavy Metal Mass: BOL=5850kg, EOL=5844 7kg
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"
6 00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9.7360E-05	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		
Ti-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:
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 %:	Th and U	Th and U	
		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 SHIPPINGPORT 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

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	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 061E+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 6255E-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	Thermal Power	
U-233	-3 3244E-03	10,315 62	0 00	1 11E+03	1 08E+03	1 11E+03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	8 1769E-04	10,315 62	166,981 81	0 00E+00	8 44E+00	1 37E+02	3 06E+02	4 48E+03
U-235	5 7813E-08	10,315 62	166,981 81	2 27E-04	8 24E-04	9 88E-03	Total	Total
U-236	1 3273E-07	10,315 62	166,981 81	0 00E+00	1 37E-03	2 22E-02		
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		
Other Radionuclides					1 72E+04	2 79E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)²

	From SFD		Estimated	Basis for burnup used in estimate:
	Nominal	Bounding	Estimated	
Nominal			10 315 62	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup taken directly from SFD (converted to MWd)
Bounding	166 981 81	20 631 25	20 631 25	

Checks

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

II. Estimates	m	X _m	X _b	b	Y _m	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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		
Ti-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		
U-234	8 1769E-04	1,654 38	13,061 64	0 00E+00	1.35E+00	1 07E+01		
U-235	5 7813E-08	1,654 38	13 061 64	1 78E-05	1 13E-04	7.73E-04		
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

	From SFD	Used
Reactor Moderator	LIGHT WATER	LIGHT WATER
Fuel Cladding	ZIRC	ZIRC
BOL HM Constituents	Th and U	Th and U
BOL Enrichment %	0 71	60 to 100

Basis for Parameter Differences:
 This Template was used for the following reasons.
 This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		1 654 38
Bounding	13 061 64	3 308 75

Basis for burnup used in estimate:
 Nominal burnup calculated from the heavy metal mass destroyed.
 Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 30	
Bounding	2 39	0 25

Estimated EOL HM/Given EOL HM

1 00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name SHIPPINGPORT LWBR SEED
SNF ID # 380
Fuel Units & Descr 12 - 619 ROD HEX ARRAY
Heavy Metal Mass BOL=5218 kg EOL=5110 kg
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
18"x15"
12.00

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	9.7360E-05	155,505.33	278,657.20	0.00E+00	1.51E+01	2.71E+01	0.0150	2.298E+16
Am-241	2.4345E-04	155,505.33	278,657.20	0.00E+00	3.79E+01	6.78E+01	0.0250	4.734E+15
Am-242m	1.4821E-06	155,505.33	278,657.20	0.00E+00	2.30E-01	4.13E-01	0.0375	4.046E+15
Am-243	3.1152E-07	155,505.33	278,657.20	0.00E+00	4.84E-02	8.68E-02	0.0575	4.422E+15
C-14	9.2432E-05	155,505.33	278,657.20	0.00E+00	1.44E+01	2.58E+01	0.0850	2.825E+15
Cl-36	1.8103E-06	155,505.33	278,657.20	0.00E+00	2.82E-01	5.04E-01	0.1250	1.770E+15
Cm-243	3.0597E-07	155,505.33	278,657.20	0.00E+00	4.76E-02	8.53E-02	0.2250	2.533E+15
Cm-244	1.4149E-05	155,505.33	278,657.20	0.00E+00	2.20E+00	3.94E+00	0.3750	1.017E+15
Co-60	8.7369E-04	155,505.33	278,657.20	0.00E+00	1.36E+02	2.43E+02	0.5750	1.553E+16
Cs-134	2.5601E-05	155,505.33	278,657.20	0.00E+00	3.98E+00	7.13E+00	0.8500	2.775E+14
Cs-135	2.8639E-05	155,505.33	278,657.20	0.00E+00	4.45E+00	7.98E+00	1.2500	1.226E+14
Cs-137	1.4772E+00	155,505.33	278,657.20	0.00E+00	2.30E+05	4.12E+05	1.7500	1.912E+13
Eu-154	8.6025E-03	155,505.33	278,657.20	0.00E+00	1.34E+03	2.40E+03	2.2500	5.555E+08
Eu-155	6.6062E-04	155,505.33	278,657.20	0.00E+00	1.03E+02	1.84E+02	2.7500	1.366E+14
Fe-55	2.3011E-06	155,505.33	278,657.20	0.00E+00	3.58E-01	6.41E-01	3.5000	4.988E+05
H-3	2.1277E-03	155,505.33	278,657.20	0.00E+00	3.31E+02	5.93E+02	5.0000	1.566E+05
I-129	1.5853E-06	155,505.33	278,657.20	0.00E+00	2.47E-01	4.42E-01	7.0000	1.149E+04
Kr-85	6.2625E-02	155,505.33	278,657.20	0.00E+00	9.74E+03	1.75E+04	11.0000	8.834E+02
Np-237	1.2620E-07	155,505.33	278,657.20	0.00E+00	1.96E-02	3.52E-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		

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		Th and U	Th and U	This Template was used for the following reasons: This fuel matches on all parameters except enrichment.
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	
Bounding		278,657.20	209,813.14	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		1.33	0.67	
Bounding		2.39	0.75	

*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: SHIPPINGPORT PWR C1 BLKT
SNF ID #: 191
Fuel Units & Descr: 36 - 17 FLAT PLATES
Heavy Metal Mass: BOL=583 92kg, EOL=569 66kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1969
Estimates as of: 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"
36 00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group ¹	Total Photons/sec (bounding)
Ac-227	1 0733E-09	13,560.21	27,120.41	0 00E+00	1 46E-05	2 91E-05	Avg. MeV	
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		

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) ²			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			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 66	2 09	
Bounding	1 33		1 01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name SHIPPINGPORT PWR C2 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

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	1.0733E-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	Thermal Power	
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

	From SFD	Used	Basis for Parameter Differences
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	0.71	0 to 5	

Burnup Summary (MWd)²

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	5.84	14.33	
Bounding	11.69		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: 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

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"x15"
1.00

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5940E-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		
Tl-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		

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		

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

²Total burnup for all fuel associated with this worksheet must be 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

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	3.4276E-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	1.999E+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	Thermal Power	
U-233	3.2596E-09	116,375.01	232,750.02	0.00E+00	3.79E-04	7.59E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	3.9817E-07	116,375.01	232,750.02	0.00E+00	4.63E-02	9.27E-02	1.36E+03	2.72E+03
U-235	-2.7761E-06	116,375.01	0.00	6.90E-01	3.67E-01	6.90E-01	Total	Total
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

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons
Fuel Cladding	ZIRC	SST	This fuel matches Pathfinder Template on all but one parameter (cladding but substituting Stainless
BOL HM Constituents	U	U	Steel is a good conservative assumption)
BOL Enrichment %	93.00008304	60 to 100	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		116,375.01	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		232,750.02	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	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
SNF ID #: 196
Fuel Units & Descr: 20 - 19 FLAT PLATES
Heavy Metal Mass: BOL=419 354kg EOL=301 588kg
ROD Storage Site: INEEL

Fuel decay start date: 1974
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
18"x15"
20 00

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CvMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.4276E-08	111,247 37	222,494 74	0 00E+00	3 81E-03	7 63E-03	Avg 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	1.2261E-06	111,247 37	222,494.74	0 00E+00	1 36E-01	2.73E-01	0 0850	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		
Rn-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		
Th-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	Thermal Power	
U-233	3 2596E-09	111,247 37	222,494 74	0 00E+00	3 63E-04	7.25E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	3 9817E-07	111,247 37	222,494.74	0 00E+00	4 43E-02	8 86E-02	1.30E+03	2 60E+03
U-235	-2 7761E-06	111,247 37	0 00	8 43E-01	5 34E-01	8 43E-01	Total	Total
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) ³			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

I. Fuel and Template Information

Fuel Name SM-1A
 SNF ID # 201
 Fuel Units & Descr: 93 - ASSEMBLY
 Heavy Metal Mass BOL=79 775kg EOL=65 751kg
 ROD Storage Site: INEEL

¹Fuel decay start date 1971
 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"
 5 81

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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 2261E-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 5750	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	Thermal Power	
U-233	3 2596E-09	13,248 12	26,496 23	0 00E+00	4 32E-05	8 64E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	3 9817E-07	13,248 12	26,496 23	0 00E+00	5 27E-03	1 05E-02	1 55E+02	3 09E+02
U-235	2 7761E-06	13,248 12	0 00	1 60E-01	1 24E-01	1 60E-01	Total	Total
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		
Other Radionuclides					1 62E+04	3 23E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	SST	SST	
BOL Enrichment %	U	U	
	93 01311673	60 to 100	

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

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

*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: 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-Zrx, 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	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 2442E-08	28,414 84	28,414 84	0 00E+00	3 54E-04	3 54E-04	Avg MeV	
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
Ci-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-10	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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Reactor Moderator	From SFD	Used	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)
Fuel Cladding	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
BOL HM Constituents	NONE	SST	
BOL Enrichment %	U	U	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Nominal		28 414 84	
Bounding:		28 414 84	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	14 00		
Bounding	14 00		1 78

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

Estimated
Canister usage
18"x10"
0.42

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	220.48	440.96	0.00E+00	5.09E-04	1.02E-03	Avg MeV	
Am-241	8.4448E+00	220.48	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	0.00E+00	3.71E+00	7.43E+00	0.0250	1.075E+14
Am-243	1.6320E-02	220.48	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	0.00E+00	2.67E+01	5.33E+01	0.0575	1.478E+14
Cl-36	2.2849E-03	220.48	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	0.00E+00	1.91E-01	3.82E-01	0.1250	4.521E+13
Cm-244	1.6848E-01	220.48	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	0.00E+00	6.19E+03	1.24E+04	0.3750	2.138E+13
Cs-134	3.4148E-04	220.48	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	0.00E+00	9.70E-02	1.94E-01	0.8500	1.328E+13
Cs-137	2.1049E+01	220.48	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	0.00E+00	2.76E+02	5.51E+02	1.7500	4.107E+11
Eu-155	6.8986E-02	220.48	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	0.00E+00	6.46E+01	1.29E+02	2.7500	1.372E+09
H-3	2.4311E-01	220.48	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	0.00E+00	2.34E-03	4.68E-03	5.0000	4.925E+05
Kr-85	5.9882E-01	220.48	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	0.00E+00	3.45E-02	6.91E-02	11.0000	6.447E+03
Pa-231	2.8656E-06	220.48	440.96	0.00E+00	6.32E-04	1.26E-03		
Pb-210	2.3918E-08	220.48	440.96	0.00E+00	5.27E-06	1.05E-05		
Pm-147	1.6900E-02	220.48	440.96	0.00E+00	3.73E+00	7.45E+00		
Pu-238	-8.6120E-01	220.48	0.00	5.40E+02	3.50E+02	5.40E+02		
Pu-239	-4.8440E-02	220.48	0.00	6.53E+01	5.46E+01	6.53E+01		
Pu-240	-3.0095E-01	220.48	0.00	8.34E+01	1.70E+01	8.34E+01		
Pu-241	-1.0411E+02	220.48	0.00	2.15E+04	0.00E+00	2.15E+04		
Pu-242	-1.1381E-04	220.48	0.00	3.61E-01	3.36E-01	3.61E-01		
Ra-226	6.4400E-08	220.48	440.96	0.00E+00	1.42E-05	2.84E-05		
Ra-228	5.9952E-07	220.48	440.96	0.00E+00	1.32E-04	2.64E-04		
Ru-106	8.5526E-07	220.48	440.96	0.00E+00	1.89E-04	3.77E-04		
Se-79	1.9181E-04	220.48	440.96	0.00E+00	4.23E-02	8.46E-02		
Sn-126	1.6671E-04	220.48	440.96	0.00E+00	3.68E-02	7.35E-02		
Sr-90	1.9799E+01	220.48	440.96	0.00E+00	4.37E+03	8.73E+03		
Tc-99	6.7678E-03	220.48	440.96	0.00E+00	1.49E+00	2.98E+00		
Th-229	1.7488E-06	220.48	440.96	0.00E+00	3.86E-04	7.71E-04		
Th-230	5.8704E-06	220.48	440.96	0.00E+00	1.29E-03	2.59E-03		
Th-232	6.0208E-07	220.48	440.96	0.00E+00	1.33E-04	2.65E-04		
Th-208	8.7573E-05	220.48	440.96	0.00E+00	1.93E-02	3.86E-02		
U-232	2.3706E-04	220.48	440.96	0.00E+00	5.23E-02	1.05E-01		
U-233	3.6128E-04	220.48	440.96	0.00E+00	7.97E-02	1.59E-01		
U-234	1.2788E-02	220.48	440.96	0.00E+00	2.82E+00	5.64E+00		
U-235	5.7486E-04	220.48	440.96	1.81E-03	1.29E-01	2.55E-01		
U-236	2.3485E-04	220.48	440.96	0.00E+00	5.18E-02	1.04E-01		
U-238	1.1581E-04	220.48	440.96	2.25E-04	2.58E-02	5.13E-02		
Y-90	1.9804E+01	220.48	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: This fuel didn't closely match any existing templates, therefore the worst case template was used.
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 %	78.235	0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
	From SFD	Estimated	
Nominal	42.00	220.48	
Bounding		440.96	

Checks			Estimated EOL HM/Given EOL HM 35.20
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	1.57	5.25	
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	
Radionuclide	Ci/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	62.56	125.11	0.00E+00	1.44E-04	2.89E-04	Avg. MeV	
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
C-14	1.2090E-01	62.56	125.11	0.00E+00	7.56E+00	1.51E+01	0.0575	4.194E+13
Cl-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+12
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-08	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		
Ti-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		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.35E+01	1.58E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Reactor Moderator	From SFD	Used	Basis for Parameter Differences: This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding	LIGHT WATER	(Worst Case)	
BOL HM Constituents	SST	SST/Inconel	
BOL Enrichment %	Pu and U	U, Th, & Pu	
	87.054	0 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup assumed to be twice nominal burnup
Nominal	62.56	-1,022.96	
Bounding		125.11	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.30	-16.35	5.94
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 _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	5.3460E-09	45 43	90 86	0.00E+00	2.43E-07	4.86E-07	Avg MeV	
Am-241	2.9433E-02	45 43	90 86	0.00E+00	1.34E+00	2.67E+00	0.0150	3.162E+12
Am-242m	7.2600E-06	45 43	90 86	0.00E+00	3.30E-04	6.60E-04	0.0250	6.537E+11
Am-243	6.3740E-06	45 43	90 86	0.00E+00	2.90E-04	5.79E-04	0.0375	5.725E+11
C-14	2.9460E-08	45 43	90 86	0.00E+00	1.34E-06	2.68E-06	0.0575	6.440E+11
Cl-36	5.9507E-35	45 43	90 86	0.00E+00	2.70E-33	5.41E-33	0.0850	3.667E+11
Cm-243	7.3933E-07	45 43	90 86	0.00E+00	3.36E-05	6.72E-05	0.1250	2.383E+11
Cm-244	1.9660E-05	45 43	90 86	0.00E+00	8.93E-04	1.79E-03	0.2250	3.158E+11
Co-60	4.3927E-08	45 43	90 86	0.00E+00	2.00E-06	3.99E-06	0.3750	1.376E+11
Cs-134	5.7507E-10	45 43	90 86	0.00E+00	2.61E-08	5.23E-08	0.5750	2.415E+12
Cs-135	4.8607E-06	45 43	90 86	0.00E+00	2.21E-04	4.42E-04	0.8500	2.317E+10
Cs-137	7.1533E-01	45 43	90 86	0.00E+00	3.25E+01	6.50E+01	1.2500	8.345E+09
Eu-154	5.5553E-04	45 43	90 86	0.00E+00	2.52E-02	5.05E-02	1.7500	6.040E+08
Eu-155	7.5800E-06	45 43	90 86	0.00E+00	3.44E-04	6.89E-04	2.2500	6.384E+04
Fe-55	8.7333E-09	45 43	90 86	0.00E+00	3.97E-07	7.94E-07	2.7500	1.630E+04
H-3	3.7313E-04	45 43	90 86	0.00E+00	1.70E-02	3.39E-02	3.5000	3.379E+02
I-129	7.1600E-07	45 43	90 86	0.00E+00	3.25E-05	6.51E-05	5.0000	1.413E+02
Kr-85	5.5793E-03	45 43	90 86	0.00E+00	2.53E-01	5.07E-01	7.0000	1.584E+01
Np-237	4.2207E-06	45 43	90.86	0.00E+00	1.92E-04	3.84E-04	11.0000	1.793E+00
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons This fuel matches on cladding and BOL heavy metal heavy water is a conservative assumption for moderator, and it is fairly close on enrichment.
Reactor Moderator	ORGANIC	HEAVY WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	5.146443515	10 to 20	

Burnup Summary (MWd)²

	From SFD	Estimated	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
Nominal		45 43	
Bounding		90 86	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.43		
Bounding	0.87		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: 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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5940E-08	1.89	3.78	0.00E+00	8.68E-08	1.74E-07	Avg. MeV	
Am-241	1.1471E-04	1.89	3.78	0.00E+00	2.17E-04	4.33E-04	0.0150	1.379E+11
Am-242m	7.4210E-09	1.89	3.78	0.00E+00	1.40E-08	2.80E-08	0.0250	2.866E+10
Am-243	9.8236E-10	1.89	3.78	0.00E+00	1.86E-09	3.71E-09	0.0375	2.490E+10
C-14	2.2928E-04	1.89	3.78	0.00E+00	4.33E-04	8.66E-04	0.0575	2.672E+10
Cl-36	1.2260E-06	1.89	3.78	0.00E+00	2.32E-06	4.63E-06	0.0850	1.614E+10
Cm-243	1.2000E-10	1.89	3.78	0.00E+00	2.27E-10	4.53E-10	0.1250	1.047E+10
Cm-244	7.3577E-10	1.89	3.78	0.00E+00	1.39E-09	2.78E-09	0.2250	1.393E+10
Co-60	1.3732E-03	1.89	3.78	0.00E+00	2.59E-03	5.19E-03	0.3750	6.067E+09
Cs-134	1.2709E-10	1.89	3.78	0.00E+00	2.40E-10	4.80E-10	0.5750	1.021E+11
Cs-135	3.0316E-05	1.89	3.78	0.00E+00	5.73E-05	1.15E-04	0.8500	9.912E+08
Cs-137	7.2579E-01	1.89	3.78	0.00E+00	1.37E+00	2.74E+00	1.2500	7.174E+08
Eu-154	5.9750E-05	1.89	3.78	0.00E+00	1.13E-04	2.26E-04	1.7500	2.550E+07
Eu-155	1.0577E-05	1.89	3.78	0.00E+00	2.00E-05	4.00E-05	2.2500	4.822E+03
Fe-55	4.1631E-07	1.89	3.78	0.00E+00	7.87E-07	1.57E-06	2.7500	2.160E+03
H-3	4.6722E-04	1.89	3.78	0.00E+00	8.83E-04	1.77E-03	3.5000	3.302E-01
I-129	7.3195E-07	1.89	3.78	0.00E+00	1.38E-06	2.77E-06	5.0000	1.372E-01
Kr-85	5.9418E-03	1.89	3.78	0.00E+00	1.12E-02	2.25E-02	7.0000	1.527E-02
Np-237	1.1499E-06	1.89	3.78	0.00E+00	2.17E-06	4.35E-06	11.0000	1.721E-03
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		
Th-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		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.54E-02	3.08E-02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	93.051	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		1.89	
Bounding		3.78	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	0.07		
Bounding	0.14		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TMI-2
SNF ID # 228
Fuel Units & Descr 1 - CANISTER OF SCRAP
Heavy Metal Mass BOL=0.032kg EOL=0.032kg
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"x10"
0.06

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	1.0733E-09	0.19	0.38	0.00E+00	2.04E-10	4.08E-10	Avg MeV	
Am-241	1.4751E-01	0.19	0.38	0.00E+00	2.81E-02	5.61E-02	0.0150	1.447E+10
Am-242m	2.6809E-04	0.19	0.38	0.00E+00	5.10E-05	1.02E-04	0.0250	2.901E+09
Am-243	6.2484E-04	0.19	0.38	0.00E+00	1.19E-04	2.38E-04	0.0375	2.733E+09
C-14	4.7820E-05	0.19	0.38	0.00E+00	9.09E-06	1.82E-05	0.0575	3.420E+09
Cl-36	8.0297E-07	0.19	0.38	0.00E+00	1.53E-07	3.05E-07	0.0850	1.598E+09
Cm-243	1.7426E-04	0.19	0.38	0.00E+00	3.31E-05	6.63E-05	0.1250	1.063E+09
Cm-244	2.7616E-02	0.19	0.38	0.00E+00	5.25E-03	1.05E-02	0.2250	1.364E+09
Co-60	3.5610E-04	0.19	0.38	0.00E+00	6.77E-05	1.35E-04	0.3750	5.892E+08
Cs-134	2.6260E-07	0.19	0.38	0.00E+00	4.99E-08	9.99E-08	0.5750	1.388E+10
Cs-135	1.4433E-05	0.19	0.38	0.00E+00	2.75E-06	5.49E-06	0.8500	1.355E+08
Cs-137	9.8870E-01	0.19	0.38	0.00E+00	1.88E-01	3.76E-01	1.2500	8.621E+07
Eu-154	6.0320E-03	0.19	0.38	0.00E+00	1.15E-03	2.29E-03	1.7500	3.791E+06
Eu-155	2.1770E-04	0.19	0.38	0.00E+00	4.14E-05	8.28E-05	2.2500	6.231E+02
Fe-55	7.9296E-07	0.19	0.38	0.00E+00	1.51E-07	3.02E-07	2.7500	2.196E+03
H-3	8.9486E-03	0.19	0.38	0.00E+00	1.70E-03	3.40E-03	3.5000	1.567E+02
I-129	9.8288E-07	0.19	0.38	0.00E+00	1.87E-07	3.74E-07	5.0000	6.697E+01
Kr-85	1.0707E-02	0.19	0.38	0.00E+00	2.04E-03	4.07E-03	7.0000	7.715E+00
Np-237	1.1927E-05	0.19	0.38	0.00E+00	2.27E-06	4.54E-06	11.0000	8.859E-01
Pa-231	1.4703E-09	0.19	0.38	0.00E+00	2.80E-10	5.59E-10		
Pb-210	1.6828E-10	0.19	0.38	0.00E+00	3.20E-11	6.40E-11		
Pm-147	6.9606E-06	0.19	0.38	0.00E+00	1.32E-06	2.65E-06		
Pu-238	6.6263E-02	0.19	0.38	0.00E+00	1.26E-02	2.52E-02		
Pu-239	1.1618E-02	0.19	0.38	0.00E+00	2.21E-03	4.42E-03		
Pu-240	1.5142E-02	0.19	0.38	0.00E+00	2.88E-03	5.76E-03		
Pu-241	4.3766E-01	0.19	0.38	0.00E+00	8.32E-02	1.66E-01		
Pu-242	6.4260E-05	0.19	0.38	0.00E+00	1.22E-05	2.44E-05		
Ra-226	3.8501E-10	0.19	0.38	0.00E+00	7.32E-11	1.46E-10		
Ra-228	5.2955E-12	0.19	0.38	0.00E+00	1.01E-12	2.01E-12		
Ru-106	2.0413E-14	0.19	0.38	0.00E+00	3.88E-15	7.76E-15		
Se-79	1.2376E-05	0.19	0.38	0.00E+00	2.35E-06	4.71E-06		
Sn-126	2.5210E-05	0.19	0.38	0.00E+00	4.79E-06	9.59E-06		
Sr-90	6.4163E-01	0.19	0.38	0.00E+00	1.22E-01	2.44E-01		
Tc-99	3.9357E-04	0.19	0.38	0.00E+00	7.49E-05	1.50E-04		
Th-229	1.5644E-10	0.19	0.38	0.00E+00	2.98E-11	5.95E-11		
Th-230	2.7972E-08	0.19	0.38	0.00E+00	5.32E-09	1.06E-08		
Th-232	5.3036E-12	0.19	0.38	0.00E+00	1.01E-12	2.02E-12		
Ti-208	1.5136E-07	0.19	0.38	0.00E+00	2.88E-08	5.76E-08		
U-232	4.1005E-07	0.19	0.38	0.00E+00	7.80E-08	1.56E-07		
U-233	2.5856E-08	0.19	0.38	0.00E+00	4.92E-09	9.84E-09		
U-234	5.2665E-05	0.19	0.38	0.00E+00	1.00E-05	2.00E-05		
U-235	-1.4487E-06	0.19	0.00	2.50E-06	2.22E-06	2.50E-06		
U-236	7.5888E-06	0.19	0.38	0.00E+00	1.44E-06	2.89E-06		
U-238	-2.6129E-07	0.19	0.00	1.04E-05	1.04E-05	1.04E-05		
Y-90	6.4180E-01	0.19	0.38	0.00E+00	1.22E-01	2.44E-01		
Other Radionuclides					1.81E-01	3.62E-01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	3.588	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		0.19	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		0.38	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.17		
Bounding	0.34		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)		
Ac-227	1.0733E-09	274,985.09	549,970.18	0.00E+00	2.95E-04	5.90E-04	Avg MeV	
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		
Th-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:
Reactor Moderator:	From SFD	Used	
	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	

*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 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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 0733E-09	66 57	133 13	0 00E+00	7 14E-08	1 43E-07	Avg MeV	
Am-241	1 4751E-01	66 57	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	0 00E+00	1 78E-02	3 57E-02	0 0250	1 015E+12
Am-243	6 2484E-04	66 57	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	0 00E+00	3 18E-03	6 37E-03	0 0575	1 197E+12
Cl-36	8 0297E-07	66 57	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	0 00E+00	1 16E-02	2 32E-02	0 1250	3 721E+11
Cm-244	2 7616E-02	66 57	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	0 00E+00	2 37E-02	4 74E-02	0 3750	2 062E+11
Cs-134	2 6260E-07	66 57	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	0 00E+00	9 61E-04	1 92E-03	0 8500	4 742E+10
Cs-137	9 8870E-01	66 57	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	0 00E+00	4 02E-01	8 03E-01	1 7500	1 327E+09
Eu-155	2 1770E-04	66 57	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	0 00E+00	5 28E-05	1 06E-04	2 7500	7 686E+05
H-3	8 9486E-03	66 57	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	0 00E+00	6 54E-05	1 31E-04	5 0000	2 345E+04
Kr-85	1 0707E-02	66 57	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	0 00E+00	7 94E-04	1 59E-03	11 0000	3 102E+02
Pa-231	1 4703E-09	66 57	133 13	0 00E+00	9 79E-08	1 96E-07		
Pb-210	1 6828E-10	66 57	133 13	0 00E+00	1 12E-08	2 24E-08		
Pm-147	6 9606E-06	66 57	133 13	0 00E+00	4 63E-04	9 27E-04		
Pu-238	6 6263E-02	66 57	133 13	0 00E+00	4 41E+00	8 82E+00		
Pu-239	1 1618E-02	66 57	133 13	0 00E+00	7 73E-01	1 55E+00		
Pu-240	1 5142E-02	66 57	133 13	0 00E+00	1 01E+00	2 02E+00		
Pu-241	4 3766E-01	66 57	133 13	0 00E+00	2 91E+01	5 83E+01		
Pu-242	6 4260E-05	66 57	133 13	0 00E+00	4 28E-03	8 56E-03		
Ra-226	3 8501E-10	66 57	133 13	0 00E+00	2 56E-08	5 13E-08		
Ra-228	5 2955E-12	66 57	133 13	0 00E+00	3 53E-10	7 05E-10		
Ru-106	2 0413E-14	66 57	133 13	0 00E+00	1 36E-12	2 72E-12		
Se-79	1 2376E-05	66 57	133 13	0 00E+00	8 24E-04	1 65E-03		
Sn-126	2 5210E-05	66 57	133 13	0 00E+00	1 68E-03	3 36E-03		
Sr-90	6 4163E-01	66 57	133 13	0 00E+00	4 27E+01	8 54E+01		
Tc-99	3 9357E-04	66 57	133 13	0 00E+00	2 62E-02	5 24E-02		
Th-229	1 5644E-10	66 57	133 13	0 00E+00	1 04E-08	2 08E-08		
Th-230	2 7972E-08	66 57	133 13	0 00E+00	1 86E-06	3 72E-06		
Th-232	5 3036E-12	66 57	133 13	0 00E+00	3 53E-10	7 06E-10		
Ti-208	1 5136E-07	66 57	133 13	0 00E+00	1 01E-05	2 02E-05		
U-232	4 1005E-07	66 57	133 13	0 00E+00	2 73E-05	5 46E-05		
U-233	2 5856E-08	66 57	133 13	0 00E+00	1 72E-06	3 44E-06		
U-234	5 2665E-05	66 57	133 13	0 00E+00	3 51E-03	7 01E-03		
U-235	-1 4487E-06	66 57	0 00	1 29E-03	1 19E-03	1 29E-03		
U-236	7 5888E-06	66 57	133 13	0 00E+00	5 05E-04	1 01E-03		
U-238	-2 6129E-07	66 57	0 00	6 21E-03	6 19E-03	6 21E-03		
Y-90	6 4180E-01	66 57	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

Reactor Moderator:	From SFD	Used	Basis for Parameter Differences:
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %:	3.125	0 to 5	

Burnup Summary (MWd)²

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
	0 10	1 10	
Nominal			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
SNF ID #: 230
Fuel Units & Descr: 146 - CANISTER OF SCRAP
Heavy Metal Mass BOL=48 647kg EOL=48 647kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1962
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: 65 years

Estimated
Canister usage:
HIC
3.65

II. Estimates	m	X _n	X _b	b	Y _n	Y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.9216E-09	896.18	1,792.36	0.00E+00	1.72E-06	3.44E-06	Avg MeV	
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
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 %	93.175	40 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		896.18	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup assumed to be twice nominal burnup
Bounding:		1,792.36	

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

Estimated
 Canister usage
 18"x10"
 13 10

II. Estimates	m	x _n	x ₀	b	y _n	y ₀	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	1.9216E-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
Cl-36	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		
Ti-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: 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	
	BERYLLIUM	HEAVY WATER	
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: Nominal burnup assumed to be 2% of BOL heavy metal mass Bounding burnup assumed to be twice nominal burnup
	From SFD	Estimated	
Nominal		1,088.39	
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		

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

²Total burnup for all fuel associated with this worksheet must be 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	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4 2184E-10	783.73	1,567.46	0 00E+00	3 31E-07	6 61E-07	Avg. MeV	
Am-241	9 6379E-02	783.73	1,567.46	0 00E+00	7 55E+01	1 51E+02	0 0150	7 616E+13
Am-242m	5 8463E-05	783.73	1,567.46	0 00E+00	4 58E-02	9 16E-02	0 0250	1 557E+13
Am-243	4 6279E-05	783.73	1,567.46	0 00E+00	3 63E-02	7 25E-02	0 0375	1 440E+13
C-14	9 2026E-05	783.73	1,567.46	0 00E+00	7 21E-02	1 44E-01	0 0575	1 643E+13
Cl-36	0 0000E+00	783.73	1,567.46	0 00E+00	0 00E+00	0 00E+00	0 0850	8 643E+12
Cm-243	0 0000E+00	783.73	1,567.46	0 00E+00	0 00E+00	0 00E+00	0 1250	5 740E+12
Cm-244	4 5445E-04	783.73	1,567.46	0 00E+00	3 56E-01	7 12E-01	0 2250	7 415E+12
Co-60	6 3707E-05	783.73	1,567.46	0 00E+00	4 99E-02	9 99E-02	0 3750	3 209E+12
Cs-134	1 4042E-05	783.73	1,567.46	0 00E+00	1 10E-02	2 20E-02	0 5750	6 922E+13
Cs-135	1 0066E-05	783.73	1,567.46	0 00E+00	7 89E-03	1 58E-02	0 8500	7 032E+11
Cs-137	1 1945E+00	783.73	1,567.46	0 00E+00	9 36E+02	1 87E+03	1 2500	3 836E+11
Eu-154	6 6451E-03	783.73	1,567.46	0 00E+00	5 21E+00	1 04E+01	1 7500	1 945E+10
Eu-155	2 9052E-04	783.73	1,567.46	0 00E+00	2 28E-01	4 55E-01	2 2500	1 571E+06
Fe-55	2 8807E-06	783.73	1,567.46	0 00E+00	2 26E-03	4 52E-03	2 7500	3 668E+04
H-3	2 1063E-03	783.73	1,567.46	0 00E+00	1 65E+00	3 30E+00	3 5000	3 243E+04
I-129	8 6006E-07	783.73	1,567.46	0 00E+00	6 74E-04	1 35E-03	5 0000	1 369E+04
Kr-85	2 6739E-02	783.73	1,567.46	0 00E+00	2 10E+01	4 19E+01	7 0000	1 551E+03
Np-237	8 5589E-06	783.73	1,567.46	0 00E+00	6 71E-03	1 34E-02	11 0000	1 766E+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		
Ti-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:
Reactor Moderator	From SFD GRAPHITE	Used GRAPHITE	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 %	92.5	0 to 5	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Nominal	30 19	783.73	
Bounding		1 567.46	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	1 01
Nominal	8.35	25.96	
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-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT) 0.000195
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0.04

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-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		
Ti-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		

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 %	19.9	10 to 20.1	

Burnup Summary (MWd) ³			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 85/20 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-Zr, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
 Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.02

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	3.73	7.47	0.00E+00	3.18E-09	6.36E-09	Avg. MeV	
Am-241	1.8331E-03	3.73	7.47	0.00E+00	6.85E-03	1.37E-02	0.0150	1.207E+12
Am-242m	1.4129E-06	3.73	7.47	0.00E+00	5.28E-06	1.06E-05	0.0250	2.656E+11
Am-243	1.4774E-07	3.73	7.47	0.00E+00	5.52E-07	1.10E-06	0.0375	2.262E+11
C-14	1.2871E-04	3.73	7.47	0.00E+00	4.81E-04	9.61E-04	0.0575	2.322E+11
Cl-36	2.8120E-06	3.73	7.47	0.00E+00	1.05E-05	2.10E-05	0.0850	1.438E+11
Cm-243	1.7940E-07	3.73	7.47	0.00E+00	6.70E-07	1.34E-06	0.1250	1.045E+11
Cm-244	1.6962E-06	3.73	7.47	0.00E+00	6.33E-06	1.27E-05	0.2250	1.220E+11
Co-60	1.2839E+00	3.73	7.47	0.00E+00	4.79E+00	9.59E+00	0.3750	8.193E+10
Cs-134	9.0541E-02	3.73	7.47	0.00E+00	3.38E-01	6.76E-01	0.5750	8.233E+10
Cs-135	3.2195E-05	3.73	7.47	0.00E+00	1.20E-04	2.40E-04	0.8500	3.533E+10
Cs-137	2.7564E+00	3.73	7.47	0.00E+00	1.03E+01	2.06E+01	1.2500	7.175E+11
Eu-154	1.5368E-02	3.73	7.47	0.00E+00	5.74E-02	1.15E-01	1.7500	4.783E+08
Eu-155	2.9293E-02	3.73	7.47	0.00E+00	1.09E-01	2.19E-01	2.2500	7.710E+08
Fe-55	7.7158E-01	3.73	7.47	0.00E+00	2.88E+00	5.76E+00	2.7500	6.118E+06
H-3	1.1111E-02	3.73	7.47	0.00E+00	4.15E-02	8.30E-02	3.5000	7.120E+05
I-129	7.3684E-07	3.73	7.47	0.00E+00	2.75E-06	5.50E-06	5.0000	4.153E+00
Kr-85	2.5263E-01	3.73	7.47	0.00E+00	9.43E-01	1.89E+00	7.0000	4.704E-01
Np-237	1.2427E-06	3.73	7.47	0.00E+00	4.64E-06	9.28E-06	11.0000	5.361E-02
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		
Ti-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

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	20.00002088	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	3.73	2.86
Bounding		7.47

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.29	0.77
Bounding	0.57	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA 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							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	8.5173E-10	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	Avg MeV	
Am-241	1.8331E-03	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 0150	1 961E+06
Am-242m	1.4129E-06	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 0250	0 000E+00
Am-243	1 4774E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 0375	2 676E+03
C-14	1 2871E-04	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 0575	1 621E+03
Cl-36	2 8120E-06	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 0850	2 286E+05
Cm-243	1 7940E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 1250	4 514E+05
Cm-244	1 6962E-06	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 2250	1 598E+06
Co-60	1 2839E+00	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 3750	3 986E+03
Cs-134	9 0541E-02	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 5750	1 961E+02
Cs-135	3 2195E-05	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	0 8500	3 056E+01
Cs-137	2 7564E+00	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	1 2500	1 802E+00
Eu-154	1 5368E-02	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	1 7500	8 816E-01
Eu-155	2 9293E-02	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	2 2500	5 107E-01
Fe-55	7 7158E-01	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	2 7500	2 967E-01
H-3	1 1111E-02	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	3 5000	2 653E-01
I-129	7 3684E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	5 0000	1 140E-01
Kr-85	2 5263E-01	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	7 0000	1 312E-02
Np-237	1 2427E-06	0 00	0 00	0 00E+00	0 00E+00	0 00E+00	11 0000	1 508E-03
Pa-231	3 8511E-09	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pb-210	7 3880E-15	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pm-147	2 1023E+00	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pu-238	1 0383E-03	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pu-239	5 5293E-03	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pu-240	2 1278E-03	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pu-241	1 0195E-01	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Pu-242	2 3128E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Ra-226	5 2782E-14	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Ra-228	1 9338E-10	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Ru-106	9 1684E-02	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Se-79	1 3018E-05	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Sn-126	1 2167E-05	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Sr-90	2 6045E+00	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Tc-99	4 4241E-04	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Th-229	1 3713E-10	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Th-230	1 8090E-11	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Th-232	2 5278E-10	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
Ti-208	1 6947E-08	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
U-232	4 8737E-08	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
U-233	1 2203E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
U-234	1 5925E-07	0 00	0 00	0 00E+00	0 00E+00	0 00E+00		
U-235	2 6194E-06	0 00	0 00	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				0 00E+00	0 00E+00	0 00E+00		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences [*]
Reactor Moderator	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	19 99996708	10 to 20 1	

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

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2 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		
Ti-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:
Reactor Moderator:	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19 95031243	10 to 20 1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	455.87	121 62	
Bounding		911 73	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.28	0.27	
Bounding	0.55		0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (ACPR 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

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	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
Cl-36	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.79999842	10 to 20.1	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD 240.93	Estimated 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
Nominal	Burnup Multiplier 1.69	Estimated Burnup/ Given Burnup 3.06	
Bounding	3.39		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 (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	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.1459E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	Avg. MeV	
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		
Ti-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

	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

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	0.00	
Bounding		

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.00	
Bounding	0.00	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA (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	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.1459E-09	243.42	486.85	0.00E+00	1.01E-06	2.02E-06	Avg MeV	
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		
Y-90	1.6195E+00	243.42	486.85	0.00E+00	3.94E+02	7.88E+02		
Other Radionuclides					4.19E+02	8.38E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	0.00	243.42
Bounding		486.85

Basis for burnup used in estimate*

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.49	
Bounding	0.97	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (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-Zrx, SST, 10 to 20%, U)

²Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.000195

Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.01

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	13.46	26.92	0.00E+00	1.15E-08	2.29E-08	Avg. MeV	
Am-241	1.8331E-03	13.46	26.92	0.00E+00	2.47E-02	4.93E-02	0.0150	4.351E+12
Am-242m	1.4129E-06	13.46	26.92	0.00E+00	1.90E-05	3.80E-05	0.0250	9.574E+11
Am-243	1.4774E-07	13.46	26.92	0.00E+00	1.99E-06	3.98E-06	0.0375	8.153E+11
C-14	1.2871E-04	13.46	26.92	0.00E+00	1.73E-03	3.46E-03	0.0575	8.368E+11
Cl-36	2.8120E-06	13.46	26.92	0.00E+00	3.78E-05	7.57E-05	0.0850	5.184E+11
Cm-243	1.7940E-07	13.46	26.92	0.00E+00	2.41E-06	4.83E-06	0.1250	3.765E+11
Cm-244	1.6962E-06	13.46	26.92	0.00E+00	2.28E-05	4.57E-05	0.2250	4.398E+11
Co-60	1.2839E+00	13.46	26.92	0.00E+00	1.73E+01	3.46E+01	0.3750	2.232E+11
Cs-134	9.0541E-02	13.46	26.92	0.00E+00	1.22E+00	2.44E+00	0.5750	2.967E+12
Cs-135	3.2195E-05	13.46	26.92	0.00E+00	4.33E-04	8.67E-04	0.8500	1.273E+11
Cs-137	2.7564E+00	13.46	26.92	0.00E+00	3.71E+01	7.42E+01	1.2500	2.586E+12
Eu-154	1.5368E-02	13.46	26.92	0.00E+00	2.07E-01	4.14E-01	1.7500	1.724E+09
Eu-155	2.9293E-02	13.46	26.92	0.00E+00	3.94E-01	7.89E-01	2.2500	2.779E+09
Fe-55	7.7158E-01	13.46	26.92	0.00E+00	1.04E+01	2.08E+01	2.7500	2.205E+07
H-3	1.1111E-02	13.46	26.92	0.00E+00	1.50E-01	2.99E-01	3.5000	2.566E+06
I-129	7.3684E-07	13.46	26.92	0.00E+00	9.92E-06	1.98E-05	5.0000	1.423E+01
Kr-85	2.5263E-01	13.46	26.92	0.00E+00	3.40E+00	6.80E+00	7.0000	1.611E+00
Np-237	1.2427E-06	13.46	26.92	0.00E+00	1.67E-05	3.35E-05	11.0000	1.835E-01
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		
Sn-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

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

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	2.85	13.46
Bounding		26.92

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	2.02	4.72
Bounding	4.05	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA (FLIP LEU 45/20) (DAMAGED) SO KOREA
 SNF ID # 819
 Fuel Units & Descr 4 - ELEMENT
 Heavy Metal Mass BOL=0 583kg EOL=0 556kg
 ROD Storage Site NEEL
 Fuel decay start date 1996
 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 25 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	4 1459E-09	25 58	51 17	0 00E+00	1 06E-07	2 12E-07	Avg MeV	
Am-241	3 5850E-03	25 58	51 17	0 00E+00	9 17E-02	1 83E-01	0 0150	4 542E+12
Am-242m	1 2899E-06	25 58	51 17	0 00E+00	3 30E-05	6 60E-05	0 0250	9 442E+11
Am-243	1 4747E-07	25 58	51 17	0 00E+00	3 77E-06	7 55E-06	0 0375	8 192E+11
C-14	1 2839E-04	25 58	51 17	0 00E+00	3 28E-03	6 57E-03	0 0575	8 822E+11
Cf-252	2 8120E-06	25 58	51 17	0 00E+00	7 19E-05	1 44E-04	0 0850	5 317E+11
Cm-243	1 1038E-07	25 58	51 17	0 00E+00	2 82E-06	5 65E-06	0 1250	3 469E+11
Cm-244	7 8917E-07	25 58	51 17	0 00E+00	2 02E-05	4 04E-05	0 2250	4 573E+11
Co-60	9 2647E-02	25 58	51 17	0 00E+00	2 37E+00	4 74E+00	0 3750	1 997E+11
Cs-134	1 0940E-04	25 58	51 17	0 00E+00	2 80E-03	5 60E-03	0 5750	3 311E+12
Cs-135	3 2195E-05	25 58	51 17	0 00E+00	8 24E-04	1 65E-03	0 8500	3 555E+10
Cs-137	1 7368E+00	25 58	51 17	0 00E+00	4 44E+01	8 89E+01	1 2500	3 650E+11
Eu-154	3 0677E-03	25 58	51 17	0 00E+00	7 85E-02	1 57E-01	1 7500	9 252E+08
Eu-155	1 7925E-03	25 58	51 17	0 00E+00	4 59E-02	9 17E-02	2 2500	1 951E+06
Fe-55	3 7444E-03	25 58	51 17	0 00E+00	9 58E-02	1 92E-01	2 7500	3 299E+04
H-3	3 6180E-03	25 58	51 17	0 00E+00	9 26E-02	1 85E-01	3 5000	6 884E+01
I-129	7 3684E-07	25 58	51 17	0 00E+00	1 89E-05	3 77E-05	5 0000	2 679E+01
Kr-85	6 9368E-02	25 58	51 17	0 00E+00	1 77E+00	3 55E+00	7 0000	3 024E+00
Np-237	1 2662E-06	25 58	51 17	0 00E+00	3 24E-05	6 48E-05	11 0000	3 438E-01
Pa-231	9 1654E-09	25 58	51 17	0 00E+00	2 34E-07	4 69E-07		
Pb-210	1 3728E-13	25 58	51 17	0 00E+00	3 51E-12	7 02E-12		
Pm-147	1 0702E-02	25 58	51 17	0 00E+00	2 74E-01	5 48E-01		
Pu-238	8 8692E-04	25 58	51 17	0 00E+00	2 27E-02	4 54E-02		
Pu-239	5 5263E-03	25 58	51 17	0 00E+00	1 41E-01	2 83E-01		
Pu-240	2 1233E-03	25 58	51 17	0 00E+00	5 43E-02	1 09E-01		
Pu-241	3 8962E-02	25 58	51 17	0 00E+00	9 97E-01	1 99E+00		
Pu-242	2 3128E-07	25 58	51 17	0 00E+00	5 92E-06	1 18E-05		
Ra-226	4 6752E-13	25 58	51 17	0 00E+00	1 20E-11	2 39E-11		
Ra-228	2 4827E-10	25 58	51 17	0 00E+00	6 35E-09	1 27E-08		
Ru-106	9 8526E-08	25 58	51 17	0 00E+00	2 52E-06	5 04E-06		
Se-79	1 3015E-05	25 58	51 17	0 00E+00	3 33E-04	6 66E-04		
Sr-126	1 2165E-05	25 58	51 17	0 00E+00	3 11E-04	6 22E-04		
Sr-90	1 6195E+00	25 58	51 17	0 00E+00	4 14E+01	8 29E+01		
Tc-99	4 4241E-04	25 58	51 17	0 00E+00	1 13E-02	2 26E-02		
Th-229	4 2451E-10	25 58	51 17	0 00E+00	1 09E-08	2 17E-08		
Th-230	6 1398E-11	25 58	51 17	0 00E+00	1 57E-09	3 14E-09		
Th-232	2 5278E-10	25 58	51 17	0 00E+00	6 47E-09	1 29E-08		
Tl-208	1 5098E-08	25 58	51 17	0 00E+00	3 86E-07	7 73E-07		
U-232	4 0662E-08	25 58	51 17	0 00E+00	1 04E-06	2 08E-06		
U-233	1 2217E-07	25 58	51 17	0 00E+00	3 13E-06	6 25E-06		
U-234	2 2391E-07	25 58	51 17	0 00E+00	5 73E-06	1 15E-05		
U-235	-2 6194E-06	25 58	0 00	5 81E-04	5 14E-04	5 81E-04		
U-236	1 2695E-05	25 58	51 17	0 00E+00	3 25E-04	6 50E-04		
U-238	-3 6331E-08	25 58	0 00	1 06E-04	1 05E-04	1 06E-04		
Y-90	1 6195E+00	25 58	51 17	0 00E+00	4 14E+01	8 29E+01		
Other Radionuclides					4 40E+01	8 80E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences*
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	This Template was used for the following reasons
Fuel Cladding	SST	SST	This fuel matches on all parameters except enrichment.
BOL HM Constituents	U	U	
BOL Enrichment %	46 09053498	10 to 20 1	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	14.21	25 58	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		51 17	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	1.29	1 80	1 00
Bounding	2.57		

*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 LEU-1 20/20) MALAYSIA
 SNF ID #: 497
 Fuel Units & Descr: 94 - ELEMENT
 Heavy Metal Mass: BOL=47.376kg EOL=46.53kg
 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"
 0.85

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.6436E-09	807.60	1,615.20	0.00E+00	2.13E-06	4.27E-06	Avg MeV	
Am-241	3.1429E-03	807.60	1,615.20	0.00E+00	2.54E+00	5.08E+00	0.0150	1.619E+14
Am-242m	1.3195E-06	807.60	1,615.20	0.00E+00	1.07E-03	2.13E-03	0.0250	3.369E+13
Am-243	1.4753E-07	807.60	1,615.20	0.00E+00	1.19E-04	2.38E-04	0.0375	2.919E+13
C-14	1.2847E-04	807.60	1,615.20	0.00E+00	1.04E-01	2.07E-01	0.0575	3.140E+13
Cl-36	2.8120E-06	807.60	1,615.20	0.00E+00	2.27E-03	4.54E-03	0.0850	1.896E+13
Cm-243	1.2465E-07	807.60	1,615.20	0.00E+00	1.01E-04	2.01E-04	0.1250	1.239E+13
Cm-244	9.5564E-07	807.60	1,615.20	0.00E+00	7.72E-04	1.54E-03	0.2250	1.628E+13
Co-60	1.7880E-01	807.60	1,615.20	0.00E+00	1.44E+02	2.89E+02	0.3750	7.134E+12
Cs-134	5.8692E-04	807.60	1,615.20	0.00E+00	4.74E-01	9.48E-01	0.5750	1.173E+14
Cs-135	3.2195E-05	807.60	1,615.20	0.00E+00	2.60E-02	5.20E-02	0.8500	1.323E+12
Cs-137	1.9489E+00	807.60	1,615.20	0.00E+00	1.57E+03	3.15E+03	1.2500	2.192E+13
Eu-154	4.5895E-03	807.60	1,615.20	0.00E+00	3.71E+00	7.41E+00	1.7500	3.398E+10
Eu-155	3.6045E-03	807.60	1,615.20	0.00E+00	2.91E+00	5.82E+00	2.2500	1.170E+08
Fe-55	1.4185E-02	807.60	1,615.20	0.00E+00	1.15E+01	2.29E+01	2.7500	1.290E+06
H-3	4.7895E-03	807.60	1,615.20	0.00E+00	3.87E+00	7.74E+00	3.5000	7.199E+03
I-129	7.3684E-07	807.60	1,615.20	0.00E+00	5.95E-04	1.19E-03	5.0000	8.686E+02
Kr-85	9.5820E-02	807.60	1,615.20	0.00E+00	7.74E+01	1.55E+02	7.0000	9.815E+01
Np-237	1.2552E-06	807.60	1,615.20	0.00E+00	1.01E-03	2.03E-03	11.0000	1.117E+01
Pa-231	7.0406E-09	807.60	1,615.20	0.00E+00	5.69E-06	1.14E-05		
Pb-210	5.8000E-14	807.60	1,615.20	0.00E+00	4.68E-11	9.37E-11		
Pm-147	4.0075E-02	807.60	1,615.20	0.00E+00	3.24E+01	6.47E+01		
Pu-238	9.2256E-04	807.60	1,615.20	0.00E+00	7.45E-01	1.49E+00		
Pu-239	5.5278E-03	807.60	1,615.20	0.00E+00	4.46E+00	8.93E+00		
Pu-240	2.1248E-03	807.60	1,615.20	0.00E+00	1.72E+00	3.43E+00		
Pu-241	4.9549E-02	807.60	1,615.20	0.00E+00	4.00E+01	8.00E+01		
Pu-242	2.3128E-07	807.60	1,615.20	0.00E+00	1.87E-04	3.74E-04		
Ra-226	2.4526E-13	807.60	1,615.20	0.00E+00	1.98E-10	3.96E-10		
Ra-228	2.4015E-10	807.60	1,615.20	0.00E+00	1.94E-07	3.88E-07		
Ru-106	3.0602E-06	807.60	1,615.20	0.00E+00	2.47E-03	4.94E-03		
Se-79	1.3015E-05	807.60	1,615.20	0.00E+00	1.05E-02	2.10E-02		
Sn-126	1.2165E-05	807.60	1,615.20	0.00E+00	9.82E-03	1.96E-02		
Sr-90	1.8226E+00	807.60	1,615.20	0.00E+00	1.47E+03	2.94E+03		
Tc-99	4.4241E-04	807.60	1,615.20	0.00E+00	3.57E-01	7.15E-01		
Th-229	3.0962E-10	807.60	1,615.20	0.00E+00	2.50E-07	5.00E-07		
Th-230	4.2346E-11	807.60	1,615.20	0.00E+00	3.42E-08	6.84E-08		
Th-232	2.5278E-10	807.60	1,615.20	0.00E+00	2.04E-07	4.08E-07		
Ti-208	1.5820E-08	807.60	1,615.20	0.00E+00	1.28E-05	2.56E-05		
U-232	4.2647E-08	807.60	1,615.20	0.00E+00	3.44E-05	6.89E-05		
U-233	1.2211E-07	807.60	1,615.20	0.00E+00	9.86E-05	1.97E-04		
U-234	1.9955E-07	807.60	1,615.20	0.00E+00	1.61E-04	3.22E-04		
U-235	-2.6194E-06	807.60	0.00	2.05E-02	1.84E-02	2.05E-02		
U-236	1.2693E-05	807.60	1,615.20	0.00E+00	1.03E-02	2.05E-02		
U-238	-3.6331E-08	807.60	0.00	1.27E-02	1.27E-02	1.27E-02		
Y-90	1.8241E+00	807.60	1,615.20	0.00E+00	1.47E+03	2.95E+03		
Other Radionuclides					1.56E+03	3.11E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	20.03968254	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal	446.61	807.60
Bounding		1.615.20

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.50	1.81
Bounding	1.00	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP LEU-I 20/20) 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

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 6436E-09	2,381 55	4,763 11	0 00E+00	6 30E-06	1 26E-05	Avg MeV	
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
Cf-252	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		

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	
Bounding		4 763 11	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	3.85	2.78	
Bounding	7 70		1 00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (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-Zrx, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 20 years

Estimated
Canister usage
18"x10"
0.90

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.6436E-09	4,143.00	8,285.99	0.00E+00	1.10E-05	2.19E-05	Avg. MeV	
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
Ci-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	3.6002E-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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	20.03968254	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	475.12	4,143.00
Bounding		8,285.99

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	2.41	8.72
Bounding	4.82	

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 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-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 15

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2 6436E-09	994.28	1,988.57	0 00E+00	2 63E-06	5 26E-06	Avg MeV	
Am-241	3 1429E-03	994.28	1,988.57	0 00E+00	3.12E+00	6 25E+00	0 0150	1 993E+14
Am-242m	1 3195E-06	994.28	1,988.57	0 00E+00	1.31E-03	2 62E-03	0 0250	4 148E+13
Am-243	1 4753E-07	994.28	1,988.57	0 00E+00	1 47E-04	2 93E-04	0 0375	3 594E+13
C-14	1 2847E-04	994.28	1,988.57	0 00E+00	1 28E-01	2 55E-01	0 0575	3 866E+13
Cl-36	2 8120E-06	994.28	1,988.57	0 00E+00	2 80E-03	5 59E-03	0 0850	2 334E+13
Cm-243	1 2465E-07	994.28	1,988.57	0 00E+00	1 24E-04	2 48E-04	0 1250	1 525E+13
Cm-244	9 5564E-07	994.28	1,988.57	0 00E+00	9 50E-04	1 90E-03	0 2250	2 004E+13
Co-60	1 7880E-01	994.28	1,988.57	0 00E+00	1 78E+02	3 56E+02	0 3750	8 784E+12
Cs-134	5 8692E-04	994.28	1,988.57	0 00E+00	5 84E-01	1 17E+00	0 5750	1 445E+14
Cs-135	3 2195E-05	994.28	1,988.57	0 00E+00	3 20E-02	6 40E-02	0 8500	1 628E+12
Cs-137	1 9489E+00	994.28	1,988.57	0 00E+00	1 94E+03	3 88E+03	1 2500	2 698E+13
Eu-154	4 5895E-03	994.28	1,988.57	0 00E+00	4 56E+00	9 13E+00	1 7500	4 183E+10
Eu-155	3 6045E-03	994.28	1,988.57	0 00E+00	3 58E+00	7 17E+00	2 2500	1 441E+08
Fe-55	1 4185E-02	994.28	1,988.57	0 00E+00	1 41E+01	2 82E+01	2 7500	1 588E+06
H-3	4 7895E-03	994.28	1,988.57	0 00E+00	4 76E+00	9 52E+00	3 5000	8 931E+03
I-129	7 3684E-07	994.28	1,988.57	0 00E+00	7 33E-04	1 47E-03	5 0000	1 099E+03
Kr-85	9 5820E-02	994.28	1,988.57	0 00E+00	9 53E+01	1 91E+02	7 0000	1 242E+02
Np-237	1 2552E-06	994.28	1,988.57	0 00E+00	1 25E-03	2 50E-03	11 0000	1 414E+01
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	1,988.57	0 00	4 56E-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
Reactor Moderator:	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	20 02427184	10 to 20 1	
Burnup Summary (MWd) ³			Basis for burnup used in estimate:
Nominal	From SFD 994.28	Estimated 122.19	
Bounding		1,988.57	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup assumed to be twice nominal burnup
Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier 0.28	Estimated Burnup/ Given Burnup 0.12	
Bounding	0.55		0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (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 (LWU-Zr, 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"
130

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.6436E-09	1,118.57	2,237.14	0.00E+00	2.96E-06	5.91E-06	Avg. MeV	
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		
Ti-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

	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

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	1,118.57	137.46
Bounding		2,237.14

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.28	0.12
Bounding	0.55	

Estimated EOL HM/Given EOL HM

0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRIGA (FLIP)
SNF ID # 729
Fuel Units & Descr 111 - ELEMENT
Heavy Metal Mass BOL=21 534kg, EOL=16.35kg
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"
1.00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
Reactor Moderator:	From SFD	Used	
Fuel Cladding	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
BOL HM Constituents	SST	SST	
BOL Enrichment %	U	U	
	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	
Bounding		9.853.39	
			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	0.67	1.05	
Bounding	1.35		
			1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (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	
Radionuclide	CvMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.5469E-09	84.97	169.94	0.00E+00	1.31E-07	2.63E-07	Avg MeV	
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		

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 %	70.2247191	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	77.67	84.97
Bounding	43.79	169.94

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.23	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) ANL-W (NRAD)
SNF ID #: 884
Fuel Units & Descr: 61 - ELEMENT
Heavy Metal Mass: BOL=10 858kg EOL=10 502kg
ROD Storage Site: INEEL

Fuel decay start date: 1994
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: 35 years

Estimated
Canister usage:
18"x10"
0.55

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CvMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.5469E-09	263.21	445.18	0.00E+00	4.07E-07	6.89E-07	Avg MeV	
Am-241	1.6326E-02	263.21	445.18	0.00E+00	4.30E+00	7.27E+00	0.0150	3.078E+13
Am-242m	2.1332E-05	263.21	445.18	0.00E+00	5.61E-03	9.50E-03	0.0250	6.367E+12
Am-243	3.0893E-05	263.21	445.18	0.00E+00	8.13E-03	1.38E-02	0.0375	5.574E+12
C-14	1.2544E-04	263.21	445.18	0.00E+00	3.30E-02	5.58E-02	0.0575	6.038E+12
Cl-36	2.6624E-06	263.21	445.18	0.00E+00	7.01E-04	1.19E-03	0.0850	3.585E+12
Cm-243	1.8446E-05	263.21	445.18	0.00E+00	4.86E-03	8.21E-03	0.1250	2.395E+12
Cm-244	1.3020E-03	263.21	445.18	0.00E+00	3.43E-01	5.80E-01	0.2250	3.097E+12
Co-60	2.4053E-02	263.21	445.18	0.00E+00	6.33E+00	1.07E+01	0.3750	1.345E+12
Cs-134	2.7480E-05	263.21	445.18	0.00E+00	7.23E-03	1.22E-02	0.5750	2.270E+13
Cs-135	1.9738E-05	263.21	445.18	0.00E+00	5.20E-03	8.79E-03	0.8500	3.047E+11
Cs-137	1.3692E+00	263.21	445.18	0.00E+00	3.60E+02	6.10E+02	1.2500	9.602E+11
Eu-154	1.1001E-02	263.21	445.18	0.00E+00	2.90E+00	4.90E+00	1.7500	8.473E+09
Eu-155	8.0292E-04	263.21	445.18	0.00E+00	2.11E-01	3.57E-01	2.2500	4.834E+06
Fe-55	2.6894E-04	263.21	445.18	0.00E+00	7.08E-02	1.20E-01	2.7500	2.014E+06
H-3	1.9573E-03	263.21	445.18	0.00E+00	5.15E-01	8.71E-01	3.5000	9.189E+03
I-129	7.1287E-07	263.21	445.18	0.00E+00	1.88E-04	3.17E-04	5.0000	3.909E+03
Kr-85	3.5914E-02	263.21	445.18	0.00E+00	9.45E+00	1.60E+01	7.0000	4.481E+02
Np-237	1.2294E-05	263.21	445.18	0.00E+00	3.24E-03	5.47E-03	11.0000	5.130E+01
Pa-231	2.6383E-09	263.21	445.18	0.00E+00	6.94E-07	1.17E-06		
Pb-210	4.4648E-12	263.21	445.18	0.00E+00	1.18E-09	1.99E-09		
Pm-147	4.1025E-04	263.21	445.18	0.00E+00	1.08E-01	1.83E-01		
Pu-238	4.3265E-02	263.21	445.18	0.00E+00	1.14E+01	1.93E+01		
Pu-239	1.4044E-03	263.21	445.18	0.00E+00	3.70E-01	6.25E-01		
Pu-240	1.1563E-03	263.21	445.18	0.00E+00	3.04E-01	5.15E-01		
Pu-241	1.0156E-01	263.21	445.18	0.00E+00	2.67E+01	4.52E+01		
Pu-242	4.9910E-06	263.21	445.18	0.00E+00	1.31E-03	2.22E-03		
Ra-226	1.4301E-11	263.21	445.18	0.00E+00	3.76E-09	6.37E-09		
Ra-228	2.3767E-11	263.21	445.18	0.00E+00	6.26E-09	1.06E-08		
Ru-106	1.1521E-10	263.21	445.18	0.00E+00	3.03E-08	5.13E-08		
Se-79	1.2828E-05	263.21	445.18	0.00E+00	3.38E-03	5.71E-03		
Sn-126	1.2088E-05	263.21	445.18	0.00E+00	3.18E-03	5.38E-03		
Sr-90	1.2560E+00	263.21	445.18	0.00E+00	3.31E+02	5.59E+02		
Tc-99	4.0319E-04	263.21	445.18	0.00E+00	1.06E-01	1.79E-01		
Th-229	3.3915E-10	263.21	445.18	0.00E+00	8.93E-08	1.51E-07		
Th-230	1.8175E-09	263.21	445.18	0.00E+00	4.78E-07	8.09E-07		
Th-232	2.3873E-11	263.21	445.18	0.00E+00	6.28E-09	1.06E-08		
Ti-208	1.2736E-07	263.21	445.18	0.00E+00	3.35E-05	5.67E-05		
U-232	3.4501E-07	263.21	445.18	0.00E+00	9.08E-05	1.54E-04		
U-233	7.0610E-08	263.21	445.18	0.00E+00	1.86E-05	3.14E-05	Thermal Power	
U-234	7.1407E-06	263.21	445.18	0.00E+00	1.88E-03	3.18E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2.6572E-06	263.21	0.00	1.65E-02	1.58E-02	1.65E-02	4.85E+00	7.87E+00
U-236	1.3576E-05	263.21	445.18	0.00E+00	3.57E-03	6.04E-03	Total	Total
U-238	-2.2698E-08	263.21	0.00	1.09E-03	1.08E-03	1.09E-03		
Y-90	1.2563E+00	263.21	445.18	0.00E+00	3.31E+02	5.59E+02		
Other Radionuclides					3.56E+02	6.02E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:	
Reactor Moderator:	From SFD	Used		
Fuel Cladding	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE		
BOL HM Constituents	SST	SST		
BOL Enrichment %	U	U		
	70.2247191	60 to 100		
Burnup Summary (MWd) ²			Basis for burnup used in estimate:	
Nominal:	From SFD	Estimated		
Bounding:	263.21	243.50		
	445.18	487.00	Nominal burnup taken directly from SFD (converted to MWd)	
			Bounding burnup taken directly from SFD (converted to MWd)	
Checks				
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM	
Nominal	0.07	0.93		
Bounding	0.12	1.09	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

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

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

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 07	0 20	
Bounding	0 14		0 98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8488E-10	339.87	679.74	0.00E+00	9.68E-08	1.94E-07	Avg MeV	
Am-241	7.5767E-03	339.87	679.74	0.00E+00	2.58E+00	5.15E+00	0.0150	1.097E+14
Am-242m	2.4459E-05	339.87	679.74	0.00E+00	8.31E-03	1.66E-02	0.0250	2.407E+13
Am-243	3.0983E-05	339.87	679.74	0.00E+00	1.05E-02	2.11E-02	0.0375	2.129E+13
C-14	1.2590E-04	339.87	679.74	0.00E+00	4.28E-02	8.56E-02	0.0575	2.125E+13
Cl-36	2.6624E-06	339.87	679.74	0.00E+00	9.05E-04	1.81E-03	0.0850	1.322E+13
Cm-243	3.8244E-05	339.87	679.74	0.00E+00	1.30E-02	2.60E-02	0.1250	1.062E+13
Cm-244	4.1010E-03	339.87	679.74	0.00E+00	1.39E+00	2.79E+00	0.2250	1.124E+13
Co-60	1.2410E+00	339.87	679.74	0.00E+00	4.22E+02	8.44E+02	0.3750	5.606E+12
Cs-134	6.5454E-01	339.87	679.74	0.00E+00	2.22E+02	4.45E+02	0.5750	9.279E+13
Cs-135	1.9753E-05	339.87	679.74	0.00E+00	6.71E-03	1.34E-02	0.8500	1.702E+13
Cs-137	2.7375E+00	339.87	679.74	0.00E+00	9.30E+02	1.86E+03	1.2500	6.538E+13
Eu-154	1.2324E-01	339.87	679.74	0.00E+00	4.19E+01	8.38E+01	1.7500	8.745E+10
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	Thermal Power	
U-233	6.8491E-08	339.87	679.74	0.00E+00	2.33E-05	4.66E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	2.0189E-06	339.87	679.74	0.00E+00	6.86E-04	1.37E-03	2.23E+01	4.46E+01
U-235	-2.6572E-06	339.87	0.00	1.46E-03	5.57E-04	1.46E-03	Total	Total
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		

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	
Bounding		679.74	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	1.04	1.04	
Bounding	2.08		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) FFCR OSU
SNF ID #: 702
Fuel Units & Descr: 4 - ELEMENT
Heavy Metal Mass: BOL=0.64kg; EOL=0.617kg
ROD Storage Site: INEL

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	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8488E-10	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		
Ti-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		
U-236	1.3575E-05	21.67	43.34	0.00E+00	2.94E-04	5.88E-04		
U-238	2.2698E-08	21.67	0.00	6.47E-05	6.43E-05	6.47E-05		
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		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.42E+00	2.84E+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 %	69.9	60 to 100	

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

Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/Given Burnup	
0.10	0.10	3.59	
Bounding	0.20		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) FFCR 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	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0386E-09	73.37	146.74	0.00E+00	7.62E-08	1.52E-07	Avg MeV	
Am-241	1.4973E-02	73.37	146.74	0.00E+00	1.10E+00	2.20E+00	0.0150	1.290E+13
Am-242m	2.2324E-05	73.37	146.74	0.00E+00	1.64E-03	3.28E-03	0.0250	2.671E+12
Am-243	3.0923E-05	73.37	146.74	0.00E+00	2.27E-03	4.54E-03	0.0375	2.347E+12
C-14	1.2559E-04	73.37	146.74	0.00E+00	9.21E-03	1.84E-02	0.0575	2.522E+12
Cl-36	2.6624E-06	73.37	146.74	0.00E+00	1.95E-04	3.91E-04	0.0850	1.505E+12
Cm-243	2.3527E-05	73.37	146.74	0.00E+00	1.73E-03	3.45E-03	0.1250	1.028E+12
Cm-244	1.9092E-03	73.37	146.74	0.00E+00	1.40E-01	2.80E-01	0.2250	1.300E+12
Co-60	8.9552E-02	73.37	146.74	0.00E+00	6.57E+00	1.31E+01	0.3750	5.645E+11
Cs-134	7.9074E-04	73.37	146.74	0.00E+00	5.80E-02	1.16E-01	0.5750	9.436E+12
Cs-135	1.9753E-05	73.37	146.74	0.00E+00	1.45E-03	2.90E-03	0.8500	1.586E+11
Cs-137	1.7243E+00	73.37	146.74	0.00E+00	1.27E+02	2.53E+02	1.2500	1.073E+12
Eu-154	2.4609E-02	73.37	146.74	0.00E+00	1.81E+00	3.61E+00	1.7500	4.457E+09
Eu-155	3.2456E-03	73.37	146.74	0.00E+00	2.38E-01	4.76E-01	2.2500	5.421E+06
Fe-55	3.8605E-03	73.37	146.74	0.00E+00	2.83E-01	5.67E-01	2.7500	7.413E+05
H-3	3.4305E-03	73.37	146.74	0.00E+00	2.52E-01	5.03E-01	3.5000	4.312E+03
I-129	7.1287E-07	73.37	146.74	0.00E+00	5.23E-05	1.05E-04	5.0000	1.830E+03
Kr-85	6.8536E-02	73.37	146.74	0.00E+00	5.03E+00	1.01E+01	7.0000	2.101E+02
Np-237	1.2219E-05	73.37	146.74	0.00E+00	8.97E-04	1.79E-03	11.0000	2.408E+01
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		
Sn-126	1.2088E-05	73.37	146.74	0.00E+00	8.87E-04	1.77E-03		
Sr-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		
Th-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:
	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:
	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-Zr, 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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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+11
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		
Ti-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		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.74E+00	3.47E+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	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
BOL HM Constituents	SST	SST	
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	
Bounding		129.34	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.03	0.51	
Bounding	0.06		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) 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-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"
0.78

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8488E-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	3.0983E-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-05	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	1.0531E-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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences ¹	
Reactor Moderator	From SFD	Used		
Fuel Cladding	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE		
BOL HM Constituents	SST	SST		
BOL Enrichment %	U	U		
	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	Estimated EOL HM/Given EOL HM	
Nominal	0.23	2.81		
Bounding	0.47			

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) SLOVENIA

SNF ID #: 495

Fuel Units & Descr: 25 - ELEMENT

Heavy Metal Mass: BOL=4 987kg¹ 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

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ct/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 0386E-09	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
Cm-243	2 3527E-05	281 70	563 41	0 00E+00	6 63E-03	1 33E-02	0 1250	3 946E+12
Cm-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		
Ti-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

	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

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	94 02	281 70
Bounding		563 41

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 17	3 00
Bounding	0 33	

Estimated EOL HM/Given EOL HM

1 00

¹Reactor shutdown, core removal storage, shipping or other date confirming that 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-Zr) SST, 60 to 100% U

²Template Burnup(MWd): 66 52

Template BOL Heavy Metal Mass (MT): 0 000196

Template Decay Time: 25 years

Estimated
Canister usage
18"x10"
1 03

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 0386E-09	2,426 99	4,853 99	0 00E+00	2 52E-06	5 04E-06	Avg MeV	
Am-241	1 4973E-02	2,426 99	4,853 99	0 00E+00	3 63E+01	7 27E+01	0 0150	4 267E+14
Am-242m	2 2324E-05	2,426 99	4,853 99	0 00E+00	5 42E-02	1 08E-01	0 0250	8 834E+13
Am-243	3 0923E-05	2,426 99	4,853 99	0 00E+00	7 50E-02	1 50E-01	0 0375	7 764E+13
C-14	1 2559E-04	2,426 99	4,853 99	0 00E+00	3 05E-01	6 10E-01	0 0575	8 341E+13
Cl-36	2 6624E-06	2,426 99	4,853 99	0 00E+00	6 46E-03	1 29E-02	0 0850	4 979E+13
Cm-243	2 3527E-05	2,426 99	4,853 99	0 00E+00	5 71E-02	1 14E-01	0 1250	3 400E+13
Cm-244	1 9092E-03	2,426 99	4,853 99	0 00E+00	4 63E+00	9 27E+00	0 2250	4 302E+13
Co-60	8 9552E-02	2,426 99	4,853 99	0 00E+00	2 17E+02	4 35E+02	0 3750	1 867E+13
Cs-134	7 9074E-04	2,426 99	4,853 99	0 00E+00	1 92E+00	3 84E+00	0 5750	3 121E+14
Cs-135	1 9753E-05	2,426 99	4,853 99	0 00E+00	4 79E-02	9 59E-02	0 8500	5 245E+12
Cs-137	1 7243E+00	2,426 99	4,853 99	0 00E+00	4 18E+03	8 37E+03	1 2500	3 551E+13
Eu-154	2 4609E-02	2,426 99	4,853 99	0 00E+00	5 97E+01	1 19E+02	1 7500	1 474E+11
Eu-155	3 2456E-03	2,426 99	4,853 99	0 00E+00	7 88E+00	1 58E+01	2 2500	1 793E+08
Fe-55	3 8605E-03	2,426 99	4,853 99	0 00E+00	9 37E+00	1 87E+01	2 7500	2 452E+07
H-3	3 4305E-03	2,426 99	4,853 99	0 00E+00	8 33E+00	1 67E+01	3 5000	1 426E+05
I-129	7 1287E-07	2,426 99	4,853 99	0 00E+00	1 73E-03	3 46E-03	5 0000	6 054E+04
Kr-85	6 8536E-02	2,426 99	4,853 99	0 00E+00	1 66E+02	3 33E+02	7 0000	6 951E+03
Np-237	1 2219E-05	2,426 99	4,853 99	0 00E+00	2 97E-02	5 93E-02	11 0000	7 966E+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	3 11E-02	6 23E-02		
Sn-126	1 2088E-05	2,426 99	4,853 99	0 00E+00	2 93E-02	5 87E-02		
Sr-90	1 5935E+00	2,426 99	4,853 99	0 00E+00	3 87E+03	7 73E+03		
Tc-99	4 0319E-04	2,426 99	4,853 99	0 00E+00	9 79E-01	1 96E+00		
Th-229	2 4023E-10	2,426 99	4,853 99	0 00E+00	5 83E-07	1 17E-06		
Th-230	9 6948E-10	2,426 99	4,853 99	0 00E+00	2 35E-06	4 71E-06		
Th-232	2 3857E-11	2,426 99	4,853 99	0 00E+00	5 79E-08	1 16E-07		
Ti-208	1 3982E-07	2,426 99	4,853 99	0 00E+00	3 39E-04	6 79E-04		
U-232	3 7943E-07	2,426 99	4,853 99	0 00E+00	9 21E-04	1 84E-03		
U-233	6 9814E-08	2,426 99	4,853 99	0 00E+00	1 69E-04	3 39E-04		
U-234	5 4059E-06	2,426 99	4,853 99	0 00E+00	1 31E-02	2 62E-02		
U-235	-2 6572E-06	2,426 99	0 00	3 28E-02	2 63E-02	3 28E-02		
U-236	1 3576E-05	2,426 99	4,853 99	0 00E+00	3 29E-02	6 59E-02		
U-238	-2 2698E-08	2,426 99	0 00	2 18E-03	2 13E-03	2 18E-03		
Y-90	1 5935E+00	2,426 99	4,853 99	0 00E+00	3 87E+03	7 73E+03		
Other Radionuclides					4 11E+03	8 22E+03		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	70	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal	816 76	2 426 99
Bounding		4 853 99

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 33	2 97
Bounding	0 66	

Estimated EOL HM/Given EOL HM

1 00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) TEXAS A&M

SNF ID #: 239

Fuel Units & Descr: 7 - ELEMENT

Heavy Metal Mass: BOL=1.372kg EOL=1.182kg

ROD Storage Site: INEEL

¹Fuel decay start date: 1976

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: 50 years

Estimated

Canister usage:

18"x10"

0.06

II. Estimates

	m	X _a	X _b	b	Y _n	Y _s	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	2.077E-09	180.29	360.59	0.00E+00	3.75E-07	7.49E-07	Avg MeV	
Am-241	1.677E-02	180.29	360.59	0.00E+00	3.02E+00	6.05E+00	0.0150	1.746E+13
Am-242m	1.991E-05	180.29	360.59	0.00E+00	3.59E-03	7.18E-03	0.0250	3.606E+12
Am-243	3.084E-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		
Ti-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		

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		m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventones(Ci)	Bounding Fuel Inventones(Ci)	Photon Energy Group	Total Photons/sec (bounding)	
Ac-227	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			
Ti-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			

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
Reactor Moderator	From SFD	Used	
Fuel Cladding	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
BOL HM Constituents	SST	SST	
BOL Enrichment %	70.00179205	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal	792.76	2,080.28	
Bounding		4,160.56	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	0.36	2.62	
Bounding	0.73		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (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

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8488E-10	63.68	127.36	0.00E+00	1.81E-08	3.63E-08	Avg MeV	
Am-241	7.5767E-03	63.68	127.36	0.00E+00	4.82E-01	9.65E-01	0.0150	2.055E+13
Am-242m	2.4459E-05	63.68	127.36	0.00E+00	1.56E-03	3.11E-03	0.0250	4.509E+12
Am-243	3.0983E-05	63.68	127.36	0.00E+00	1.97E-03	3.95E-03	0.0375	3.989E+12
C-14	1.2590E-04	63.68	127.36	0.00E+00	8.02E-03	1.60E-02	0.0575	3.981E+12
Cl-36	2.6624E-06	63.68	127.36	0.00E+00	1.70E-04	3.39E-04	0.0850	2.477E+12
Cm-243	3.8244E-05	63.68	127.36	0.00E+00	2.44E-03	4.87E-03	0.1250	1.989E+12
Cm-244	4.1010E-03	63.68	127.36	0.00E+00	2.61E-01	5.22E-01	0.2250	2.105E+12
Co-60	1.2410E+00	63.68	127.36	0.00E+00	7.90E+01	1.58E+02	0.3750	1.050E+12
Cs-134	6.5454E-01	63.68	127.36	0.00E+00	4.17E+01	8.34E+01	0.5750	1.739E+13
Cs-135	1.9753E-05	63.68	127.36	0.00E+00	1.26E-03	2.52E-03	0.8500	3.189E+12
Cs-137	2.7375E+00	63.68	127.36	0.00E+00	1.74E+02	3.49E+02	1.2500	1.225E+13
Eu-154	1.2324E-01	63.68	127.36	0.00E+00	7.85E+00	1.57E+01	1.7500	1.639E+10
Eu-155	5.9037E-02	63.68	127.36	0.00E+00	3.38E+00	6.75E+00	2.2500	1.284E+10
Fe-55	7.9555E-01	63.68	127.36	0.00E+00	5.07E+01	1.01E+02	2.7500	1.164E+08
H-3	1.0531E-02	63.68	127.36	0.00E+00	6.71E-01	1.34E+00	3.5000	1.370E+07
I-129	7.1287E-07	63.68	127.36	0.00E+00	4.54E-05	9.08E-05	5.0000	3.283E+03
Kr-85	2.4955E-01	63.68	127.36	0.00E+00	1.59E+01	3.18E+01	7.0000	3.778E+02
Np-237	1.2121E-05	63.68	127.36	0.00E+00	7.72E-04	1.54E-03	11.0000	4.336E+01
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	
Bounding		127.36	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.21	2.56	
Bounding	0.43		1.00

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

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